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THE

FARMER'S ENCYCLOPÆDIA,

AND DICTIONARY OF

RURAL AFFAIRS;

EMBRACING

ALL THE MOST RECENT DISCOVERIES

IN

Agricultural Chemistry.

ADAPTED TO THE COMPREHENSION OF UNSCIENTIFIC READERS.

ILLUSTRATED BY
WOOD ENGRAVINGS OF THE BEST MODERN
AGRICULTURAL IMPLEMENTS.

BY

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LONDON:
LONGMAN, BROWN, GREEN, AND LONGMANS.
1842.

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BIBLIOTHECA BODLEIANA

LONDON:
Printed by A. Spottiswoode,
New-Street-Square.

PREFACE.

The Editor of this work has to request for it, from the Farmers of his country, the same kind reception which they have, on many former occasions, bestowed upon his efforts in the service of Agriculture. Its object is sufficiently indicated by the title, "The Farmers' Encyclopædia, and Dictionary of Rural Affairs." Farming operations, therefore, are the chief themes — those most copiously treated of; yet it was thought desirable and necessary to include many other branches of science, and subjects more or less interesting to the cultivator of the soil, in as extended a form as the prescribed limits of the volume would allow.

The Editor is desirous to express his obligations to many friends, who have materially assisted him, during the progress of the work, by valuable information and suggestions. For the drawings, and the detailed descriptions of the implements of husbandry, he is indebted to the Treatise of Mr. J. Allen Ransome, of Ipswich; and to the partners of that gentleman, for many other illustrations and descriptive notices. For his biography of the writers upon husbandry and other sciences connected with the cultivation of the soil, he is mainly beholden to Mr. G. W. Johnson's "History of English Gardening;" and for the details of the management of the "Kitchen Garden," to the volume on that subject by the same author. For many practical suggestions, and the particulars of experiments and improvements, he is indebted to Mr. Hewitt Davis, of Addington, in Surrey, an excellent farmer and land agent.

In the arrangement, and during the whole progress, of the work the Author has had the advantage of being indefatigably assisted by Mr. P. L. Simmonds, many of whose papers and prize essays (to some of which his signature is attached) are dispersed throughout its pages. The volume, moreover, has been favoured with the corrections and annotations of Dr. A. T. Thomson, the author of the justly popular "London Dispensatory," and other scientific works. It has also been enriched by extracts from the best works of contemporary authors, such as those of Professors Low, Sir J. E. Smith, Liebig, Brande, Youatt, Thomson, Lindley, and J. F. Johnston; of Messrs. William Yarrell, John Morton, Henry Stephens, William Shaw, James Hudson, Samuel Taylor, French Burke, James Paxton, the Rev. W. Rham, Miss Louisa Johnson, &c.; the Editor believes, however, on no occasion without acknowledging his obligations to these valuable authorities: and, by their assistance, he trusts the work will be found to contain a fund of matter that will be permanently useful for reference and for study to all the cultivators of the soil. In conclusion, the Editor begs to express the hope that the friends whose kindness he has experienced on former occasions, will add to their favours by supplying him with corrections and suggestions for the improvement of future editions of "THE FARMERS' ENCYCLOPÆDIA."

CUTHBERT W. JOHNSON.

14. *Gray's Inn Square,*
May, 1842.

THE

FARMER'S ENCYCLOPÆDIA,

AND

Dictionary of Rural Affairs.

A.

A, in the composition of botanic terms, is the Greek *a*, privative, and signifies "without;" as, *a*petalous means "without petals," *a*phyllous "without leaves," *a*caulis "without stem," or "stemless."

AARON'S BEARD. *See* RHUS COTINUS.

AARON'S ROD. *See* PHLOX PANICULATA.

ABATE. (French, *abbatre*; Spanish, *abatir*; Italian, *abbatere*;) to beat down. In Commerce, to let down the price in selling.

> "In letting leases of his impropriations, if he found the curates' wages but small, he would *abate* much of his fee to increase their pensions."—*Sir G. Paul's Life of Abp. Whitgift*, p. 38. "In horsemanship, a horse is said to abate, or take down his curvets; when, working upon curvets, he puts his two hind-legs to the ground both at once."—*Johnson's Dict. by Todd.*

In Law, means the beating down or removal of an obstruction or nuisance, which any person may remove, provided he does it in a peaceable manner, so as not to occasion a breach of the peace, such as the obstruction of an ancient light, which is a private nuisance, or the erection of a gate across a common road, which is a public nuisance, and which any one may beat down and remove.

ABATTOIR. The French term for slaughter-houses. Previous to the year 1818, Paris was subject to the nuisance which still exists to a great extent in London and other towns, of having beasts intended for slaughter driven through crowded streets, to the great danger of the passengers. But by an edict of Napoleon, in 1810, public slaughter-houses were ordered to be erected on the banks of the Seine. These buildings, which were completed in 1818, are five in number, and of very large dimensions. They are placed three on the right, and two on the left, bank of the Seine. In the slaughter-rooms, which are of stone, and in the ox and sheep pens, every attention is paid to cleanliness, and all the latest mechanical improvements have been introduced. Each butcher has separate stalls and conveniences for forage, and pays a certain fixed price for the accommodation and attendance of the labourers of the establishment. These annual payments from the butchers of Paris average a very large sum. In 1824 they amounted to 40,000*l.* The erection of similar establishments in the least populous suburbs of London would be a most beneficial measure for the public health and comfort, when we take into consideration that more than 2,000,000 head of live-stock are annually slaughtered in this great capital. (*Dulaure, Hist. de Paris*, tom. ix.)

ABBEY LANDS. Lands once the property of an abbey. The chief circumstances attendant upon these lands worthy of the farmer's notice are, their general exemption from the payment of tithes, a privilege which is thus described by Blackstone (*Commentaries*, vol. i. p. 31.):—"As possessed by spiritual persons or corporations, for instance monasteries: 1. By real composition. 2. By the Pope's bull of exemption. 3. By unity of possession; as where the rectory of a parish and lands in the same parish both belonged to a religious house, those lands were discharged of tithes by this unity of possession. 4. By prescription, having never been liable to tithes, by being always in spiritual hands. 5. By virtue of their order; as the Knights Templars, Cistercians, and others, whose lands were privileged by the Pope with a discharge of tithes. Though, upon the dissolution of the abbeys by Henry VIII., most of those exemptions would have fallen with them, and the lands become tithable again, had they not been supported and upheld by the 31 Hen. 8. c. 13., which enacts, that all persons who should come to the possession of lands of any abbey then dissolved, should hold them free and discharged of tithes in as large and ample a manner as the abbeys themselves formerly held them. And from this original have sprung all the lands which, being in lay hands, do at present claim to be tithe free; for if a man can show his lands to have been such abbey lands, and also immemorially discharged of tithes, by any of the means before mentioned, this is now a good prescription *de non decimando*. But he must show both these requisites; for abbey lands, without a special ground of discharge, are not discharged of course, neither will any prescription *de non decimando* avail in total discharge of tithes, unless it relates to such abbey lands." "And where," says Mr. Hovenden, when commenting upon the text of Blackstone, "lands appear to have been before, and at the time of the Council of Lateran (*Stavely* v. *Ullithorne*, Hardres, 101.), part of the possessions of any of the greater monasteries suppressed in the time of Henry VIII., and to have remained so till the dissolution (*Norton* v. *Hammond*, 1 Y. & J. 108.), and there is no evidence of the payment of tithes for those lands at any time, our courts will consider them as discharged by some way or other before the dissolution. (*Lamprey* v. *Rooke*, Amb. 291.) The abbey lands, in fact, were widely dispersed throughout England, for there were few districts in which they had not possessions. Their revenues, by the valuation taken at the time of the dissolution, were enormous, especially if we take into account the altered value of money since that time: thus it has been calculated that the annual revenue of the Abbey of Glastonbury was equal, at the time of the dissolution, to 40,000*l.* of our money. The following is the list of the revenues of seventeen of the largest of the *mitred* abbeys; that is, of those whose abbots sat in parliament in the House of Peers.

	£	*s.*	*d.*
St. Peter's, Westminster	3977	6	4¾
Glastonbury	3508	13	4¾
St. Alban's	2510	6	1¾
St. John's, Middlesex	2385	19	8
St. Edmund's Bury	2336	16	0
Reading	2116	3	9¼
St. Mary's, near York	2085	1	9¾
Abingdon	2042	2	8¾
Tewkesbury	1598	1	3
Ramsey, Huntingdon	1983	15	3¼
Peterborough	1972	7	0¾
Gloucester	1550	4	5
St. Augustine's, Canterbury	1412	4	7¼
Evesham	1268	9	9
Crowland	1217	5	11
Waltham, Essex	1079	12	1
Cirencester	1051	7	1

(*Farmer's Waltham Abbey.*)

ABBREVIATIONS, from the Latin *Abbreviare.*

> "This book — was laid up as sacred in the church of Winchester; and for that reason, as graver authors say, was called "Liber Domus Dei," and by *abbreviation* "Domesday Book." (*Temple, Intr. Hist. of England. Johnson, by Todd.*)

For shortening botanical descriptions, some authors, as Linnæus and Willdenow, contract the terms, as *Cal.* for *Calyx*, and *Cor.* for *Corolla*; while others, particularly Trattinick, have invented for the same purpose a species of hieroglyphics. The only effect of both is to save space in writing or printing, an advantage which is overbalanced by the trouble of recollecting the contractions, or studying the hieroglyphics.

The following are a few of the abbreviations most common in botanical works:—

Anth.	Anther.
Br.	Bractea.
Char.	Character.
Cl.	Class.
Cult.	Culture.
Div.	Division.
Ess.	Essential.
Fam.	Family.
Fil.	Filament.
Fl.	Flower.
Fol.	Folium or Leaf.
Fr.	Fruit.
Gen.	Genus.
H. or *Hab.*	Habitat.
Hort.	Hortus.
Ic.	Icon or Engraving.
Infl.	Inflorescence.
Nat.	Natural.
Ord.	Order.
Ov.	Ovary.
Ped.	Peduncle.
Pet.	Petal.
Pist.	Pistil.
Rad.	Radix or Root.
Ram.	Ramus or Branch.
Sem.	Semina or Seeds.
Stam.	Stamens.
Stig.	Stigma or Summit.
Sp.	Species.
Syn.	Synonimes.
T. or *Tab.*	Tabula or Picture.
Trib.	Tribe.
Var.	Variety.
V.	Vidi, or I have seen.
V. s.	I have seen a specimen.
V. v.	I have seen it living.

(*Miller.*)

ABDOMEN. The lower part of the belly; from the Latin *abdo*, to hide or conceal. The abdomen in insects includes the whole portion of the body behind the corselet (*thorax*), embracing the back as well as the belly.

ABELE TREE (*Populus alba*). White Poplar, or Dutch Beech, otherwise called the Arbeel. The Abele is a tree of very rapid growth, but seldom exceeds forty or fifty feet in height. The leaves are large, and divided into three, four, or five lobes, which are indented on their edges. They are of a darker colour on their upper side, and very white with a dense down on their under. The foot-stalks are about an inch in length. The young branches have a purplish bark, and are covered with a white down, but the bark of the older branches and trunk is grey. In the beginning of April, the male flowers, or catkins, appear, which are cylindrical, scaly, and three inches long; and about a week after, the female flowers come out on catkins, which have no stamens like those of the male. Soon after the female catkins come out, the male catkins fall off; and in five or six weeks after, the female flowers will have ripe seeds inclosed in a hairy covering, when the catkins will drop, and the seeds will be wafted by the winds to a great distance.

ABELE TREE.

This tree is not to be considered as a native of England. "We do not find," says Phillips, "any old English name for these trees; the word Poplar is from the Latin *Populus*, or the French *Peuplier*, and Abele from the Low Dutch *Abeel*, a name which they gave to this tree on account of its hoary or aged colour." Turner, in 1568, says, "As touching the Whyte Asp, I remembre not that ever I saw it in any place in England." (*Phillips's Shrubbery*, vol. ii. p. 124.)

Hartlib, in his "Complete Husbandman," 1659, states that some years ago, there were ten thousand Abeles at once sent over into England from Flanders, and transplanted into many counties; that the timber is incomparable for all sorts of wooden vessels, especially trays; and that butchers' trays cannot be made without it, it being so exceedingly light and tough. The Abeles grown at Hartwell, near Aylesbury, in Buckinghamshire, the seat of Sir William Lee, Bart., were remarkable for their height, and the cleanness of their stem or bole. There are some very fine specimens also in Poland.

"A specimen of their advance," says Evelyn, "we have had of an Abele tree at Sion, which being lopped in Feb. 1651, did, by the end of October 1652, produce branches as big as a man's wrist, and seventeen feet in length. As they thus increase in bulk, their value advances likewise, which, after the first seven years, is annually worth one shilling more. The Dutch, therefore," he continues, "look upon a plantation of these trees as an ample portion for a daughter." Besides the uses of the wood before stated, it is considered good for wainscoting, for floors, laths, and packing cases; and, from the boards of it not splitting by nails, but closing over the heads, it is esteemed superior to deal for the latter purpose. It is found to answer for works under water. Peaty and low damp soils are the most proper for the Abele, and in these it is well worthy the attention of the forest planter. It should never be planted near the margins of, nor in grass fields, for it extends its roots under the grass to a great distance, and sends up numerous shoots. The Abele is propagated by layers, cuttings, and offshoots or suckers. If cuttings are adopted, they should be from two to three feet long, inserting them in a moist light soil to the depth of a foot and a half; and it is better to plant them in a gentle slanting direction than in an upright position. If the season prove dry, the beds or rows should be refreshed with water when necessary. The month of February is the best season for planting the cuttings. In two years, many, if not all that have rooted, will be fit to plant out for good, on the sites where they are to remain for timber. The size of the plants considered the best for final transplantation, is from one and a half to three feet in length, but much larger plants will succeed very well by paying proper attention to keep the roots as perfect as possible.

The Abele is sometimes made a variety of the Grey Poplar (*Populus canescens*), and several British as well as foreign botanists have sometimes confounded the two species, but they are very distinct. The pistils of the female flowers in the Abele are four, on egg-oblong catkins, while in the Grey Poplar the pistils are eight, on cylindrical catkins; but the distinction between the trees is most obvious to common observation in the habits of each. The Grey Poplar rises with a clear round stem and silvery bark, crowned with compact branches, forming a pretty regular rounded outline; whereas the Abele has a branched stem with grey bark, the branches long, comparatively spreading and scattered, exhibiting an irregular outline frequently tending to the spiral, but nearer to the rounded figure of the top of the Grey Poplar. On a nearer inspection, the leaves offer clear characters of distinction. In the Abele, the leaves are lobed and toothed, dark green and smooth above, and snow white with dense down beneath; while those of the Grey Poplar are scarcely half the size, are roundish and deeply waved, and hoary with grey or whitish down beneath.

There are many varieties of the Abele, arising from local circumstances. The variety called on the Continent *Polan de Holland*, is preferable for avenues and for landscape gardening, from its rapid growth, its majestic height and aspect, and from its fine white leaves contrasting well with the green of other leaves. There are some magnificent ones near the Hague, and more particularly extensive avenues of them along most of the highways in the lower districts of Belgium, near Bruges and Ghent. It is so common on the romantic banks of the Rhone, that some French authors call it *Arbre du Rhône*.

According to M'Intosh, the best cuttings are taken from the wood of the preceding year; and when made, each cutting should be nine inches in length, and planted in nursery lines eighteen inches apart, and the cuttings about six inches distant from each other. When inserted in the ground, they should be put in deep enough to resist the drought; and if only two inches of the top appear above ground, it will be found sufficient. In two years, or three at most, these cuttings will be fully grown to fit them for being finally planted out; but if they are to remain the third year in the nursery, they ought to be taken up and replanted at a greater distance. The Abele often sends up naturally vast numbers of suckers from its roots, and such are sometimes used for young plants; cuttings are, however, preferable. Langley asserts that he has known great quantities produced by chips only, where the trees have been hewed after felling; and one of our earliest authors has proposed ploughing down these slips, with a view to produce an economical coppice.

Amongst other uses of this tree, it may be mentioned that, on the Continent, the wood of the larger branches is prized, on account of its lightness, for making wooden shoes; while the smaller twigs are used for fire-wood. By splitting the wood into thin shavings, like tape or braid, the stuff called *sparterie*, used for hats, is manufactured. These shavings are always made from green wood. One workman can, with the aid of a child to carry off the shavings, keep several plaiters employed. The ancient Greek athletæ wore crowns made of the branches of this tree, because it was sacred to their patron deity, Hercules. (*Julius Pollux, de Ludis. Miller's Dict.*)

ABERCROMBIE (JOHN), a popular writer on gardening, was born at Edinburgh in 1726, near which city his father conducted a considerable market garden. At fourteen he became an apprentice of his father. He was thoroughly grounded in his profession, the practice of years being retained and concentrated by a habit of committing to paper all the observations he made in its pursuit from a very early age. Soon after his apprenticeship expired, being about eighteen, he came to London, where he obtained employment in some of the Royal gardens at Kew and Leicester House. Afterwards he became gardener to Dr. Munro. He was present at the battle of Preston Pans, which was fought under his father's garden wall. He was a loyalist. About 1751–52 he became gardener to Sir James Douglas, during his continuance in whose service he married, and, in 1759, returned to Scotland with the intention of becoming kitchen and market gardener, but came again to England, after an absence of only ten months. He was engaged in the service of several noblemen and gentlemen until 1770, when he engaged a kitchen-garden and small nursery-ground between Mile End Road and Hackney, attending Spitalfields Market with the products until 1771–72. At this period he became a publican in Dog-Row, Mile End, at a house afterwards the Artichoke Tea Gardens; he soon left this, and entered into the seed and nursery business at Newington and Tottenham Court, carrying on at the same time an extensive trade as a kitchen gardener and florist. About 1778 he prepared his "Every Man his own Gardener," which has passed through many editions. He actually however paid Mr. T. Mawe, gardener to the Duke of Leeds, twenty pounds to allow his name to be attached to this work. Afterwards becoming more confident, he published his "Gardener's Pocket Journal, or Daily Assistant," which obtained a very extensive sale, and has since passed through a very large edition annually. Besides these, he compiled, "The Universal Dictionary of Gardening and Botany, 4to;" "The Gardener's Dictionary;" "The Gardener's Vade-Mecum;" "The Kitchen Gardener and Hot-bed Forcer;" "The Hot-house Gardener;" "The Wall Tree Pruner;" "The Gardener's best Companion," &c. He died from an accident on the 2d of May, 1806. He at one period, after the publication of his "Every Man his own Gardener," had actually embarked to superintend the gardens of the Empress of Russia; but the sight of the ocean inspired him with terrors which he could not overcome. (*Memoir prefixed to his Gardener's Pocket Journal; Gentleman's Mag. and Monthly Mag. for* 1806.) Abercrombie was induced to become author by a visit which he received, in 1770, from Mr. Davis, a London bookseller, and the celebrated Dr. Goldsmith, who made overtures to him for an original work, the latter promising to revise the language, which he afterwards neglected to do.

After the publication of the second edition of his "Every Man his own Gardener," he accepted an invitation from Mr. Mawe, whose name he had borrowed for the title page; but when introduced to him, having never before seen him, he was so powdered and dressed, that Abercrombie mistook him for his master the Duke of Leeds. They were, however, mutually pleased with each other, and subsequently continued to correspond.

From 1796, to the time of his decease, he continued to reside in Charlton Street, Somers' Town. (*Loudon's Encyclopædia of Gardening*, p. 1106. ed. 5.)

The following is a list of his horticultural works, in the order in which they were published:—

1. Every Man his own Gardener. London. 1774. 2. The Universal Gardener and Botanist. London. 1778, 4to. Mr. Weston says the first Edition appeared in 1770. 3. The Garden Mushroom, its nature and cultivation. London. 1779. 8vo. 4. The British Fruit Garden, and Art of Pruning. London. 1779. 8vo. 5. The Garden Mushroom, its nature and cultivation. London. 1779. 8vo.—1802. 12mo. 6. The complete forcing Gardener.

London. 1781. 12mo. 7. The complete Wall Tree Pruner, &c. London. 1783. 12mo. 8. The Propagation and botanical Arrangement of Plants and Trees useful and ornamental. London. 1785. 2 vols. 12mo. 9. The Gardener's Pocket Dictionary. London. 1786. 3 vols. 12mo. 10. The Daily Assistant in the modern Practice of English Gardening. London. 1789. 12mo. 11. The Universal Gardener's Kalendar. London. 1789. 12mo.—1808. 8vo. 12. The complete Kitchen Gardener. London. 1789. 12mo. 13. The Gardener's Vade-Mecum. London. 1789. 8vo. 14. The Hot-house Gardener. Plates. London. 1789. 8vo. 15. The Gardener's Pocket Journal and Annual Register. London. 1791. 12mo.

Of these works there needs little comment. They are the sound results of lengthened experience. "Every Man his own Gardener," was re-edited in 1816, by Mr. Mean. But the editions and numbers that have been sold, have never been equalled by any other horticultural work, except Abercrombie's own "Pocket Journal," of which cheap and useful work about 2000 are annually sold.

The best portrait of Abercrombie is prefixed to Debrett's edition, 2 vols. 8vo. He is also represented at full length when seventy-two, in the 16th edition, printed in 1800. (*G. W. Johnson's Hist. Eng. Gard.*)

ABHOL, the garden shrub usually known by the name of *Savin*, which see.

ABIES. In Botany, the Fir or Pine Tree genus, well known for the valuable timber obtained from many of the varieties. The origin of the Latin name is unknown, that of the English appellation is the Saxon *Furh-wudu*, fir-wood. *See* Fir Tree.

ABLACTATION. (Latin, *ablacto.*) The weaning of an animal. Also a method of grafting, without cutting the scion from the stock.

ABNODATION, from *Abnodatio*, Latin. A term used in gardening, to signify the cutting knots from trees.

ABORTION. (Latin, *abortio.*) In Veterinary Surgery, miscarriage, slipping, slinking, casting, or warping, all meaning the expulsion of the fœtus from the womb (*uterus*) at so early a period of pregnancy, as to render it impossible for it to live. The immediate causes appear to be the death of the fœtus, or derangement in the functions of the womb or its dependencies, arising from some external cause or causes operating on the mother. Amongst these operating causes may be reckoned too much, or too little food, producing plethora or emaciation; sudden fright acting on the nerves, or sympathy with certain smells or sights, such as the smell or sight of blood, of bones, of horns, and particularly of the aborted fœtus of another animal;—on a similar principle, perhaps, to that which causes even some strong-nerved men to faint away on witnessing a surgical operation. Accidents, also, such as falls, bruises, over-driving, or fatigue, and the like, may frequently bring on abortion.

The signs of approaching abortion are, great languor, uneasiness, and restlessness; sometimes a discharge of bloody matter from the vagina, and the sudden filling of the udder, similar to the signs of approaching parturition.

Abortion in the Horse.—Abortions very frequently happen among mares. This often arises in consequence of over exertion during the latter period of pregnancy. Mares are liable, also, very frequently, to various accidents in their pastures, which may be the cause of their slipping their foal, such as kicks, tumbling into holes and ditches, over-exerting themselves to get over fences, and the like. On this account, when a mare is near her time, she should be kept by herself, in some convenient place. But there is another, and we suspect a very general, cause of these accidents in mares; we mean a stinting of them in their food, either in quantity or quality. It appears, indeed, that some imagine that the mare, when she is in foal, may be turned out almost any where: but this opinion is ill founded; for although the mare does not require to be kept so high in condition as when she is at hard work, yet she is not to be turned out into a pasture where she may be in a manner starved: but how often do we see the mare-in-foal on the worst piece of ground in the whole farm, exposed, during the rigorous winter season, to endure the cold, as well as to put up with scanty food. Every well-informed farmer knows that the slinking of the foal is often the consequence of such treatment. On the other hand, when the mare is not worked at all, and indulged with too high keep, she is almost equally in danger of abortion, her high condition having a tendency to cause inflammation and other disorders; and these deranging the reproductive organs, frequently produce miscarriage. It would seem, then, that moderate exercise and diet are best suited as means to avoid the misfortune of the premature exclusion of the foal.

Abortion in the Cow.—Abortion occurs oftener in the cow than in all other domestic animals put together. Perhaps it is one of the greatest annoyances the proprietor of cows has to encounter, and unfortunately, for aught we see to the contrary, it is likely so to continue; for in spite of the improved state of veterinary medicine, and the researches of skilful veterinary surgeons, both at home and abroad, abortion still continues as frequent and annoying as ever. The causes are frequently involved in obscurity; but it may be mentioned, that an extremely hot and foul cowhouse, a severe blow, violent exertion, starvation, plethora, an overloaded stomach, internal inflammations, constipated bowels, bad food or water, improper exposure, and the like, will now and then produce abortion. Any thing whatever, indeed, that seriously affects the health of the animal in general, or the state of the reproductive organs in particular, may do so. But abortion occurs again and again when no such causes as those enumerated can be traced. The disease, if such it may be called, as we think it may, is even said to be infectious. No sooner does it show itself in one animal than it is seen in another, and another, till it has spread over the most part of the cowhouse. Some say this is to be attributed to the odour arising from the things evacuated. Possibly it may be so, there is nothing unreasonable in the supposition; for although we cannot perceive the smell, nor account for its peculiar influence, it is still quite within possibility that such an odour does exist, having the power attributed to it. There can be no great harm, however, in acting as if we were assured that the mischief has its origin in the source so commonly supposed, provided we do not shut our eyes to any other which accident or investigation may reveal. In the meantime, the number of abortions may be diminished by carefully avoiding all those causes which are known to be capable of producing it. Let the cows be regularly fed; let their food be good, and in proper quantities; let them have water as often as they will take it; avoid sudden exposure to cold or heat; and, above all, let the cowhouse be well ventilated. Prohibit all manner of rough usage on the part of those who look after the cows, whether they be pregnant or not. If any of them accumulate flesh too rapidly, gradually reduce their allowance; and, on the other hand, if any become emaciated, discover the cause, and remedy it, always by slow degrees. Sudden changes in the matter or mode of feeding should also be avoided. The same sort of diet does not agree equally well with all the cows; and this, in general, is indicated by undue relaxation, or constipation of the bowels: this should be watched, and removed at once. Attention to these, and many other minor circumstances, will amply repay the proprietor for the little additional trouble.

"That improper or too little food," says Mr. Lindsay, "is a prominent cause of abortion, is strongly indicated by the following facts. A friend of mine, a respectable grazing farmer, kept a dairy of twenty-two cows, ten of which slipped calf at different periods of parturition. The summer had been very unfavourable in every respect, both as regarded the ground where the cows were pastured, and in getting in the hay crop. He had little or no hay of the last year's growth, and the hay of that year when cut into was in a very bad state; but as he had no other, he was obliged to give it to his cattle. The consequence was as mentioned above; and besides, many of his stock died of various disorders; and many of those which recovered remained long weakly."

"The most common cause of abortion in cows," says White, "is improper feeding during the winter and spring, before they are turned to pasture. The filthy pond-water they are often compelled to drink, and feeding on the rank fog-grass of October and November, especially when covered with hoar frost, are likewise frequent causes of miscarriage. I remember a farm near Berkeley, in Gloucestershire, which afforded a striking proof of the injuries of stagnant pond-water, impregnated with dung and urine. This farm had been given up by three farmers successively, in consequence of the losses they sustained through abortion in their cattle, their not being in season (that is, not conceiving), red water, and other diseases. At length a Mr. Dimmery, after suffering considerably in his live stock for the first five years, suspected that the water of his ponds, which was extremely filthy, might be the cause of the mischief. He therefore dug three wells upon his farm, and having fenced round the ponds to prevent his cattle from drinking there, caused them to be supplied with well water, in stone troughs erected for the purpose; and from this moment his live stock began to thrive, became uncommonly healthy, and the quality of the butter and cheese made on his farm was greatly improved. It should be observed, that on this farm the cattle were regularly fed with good hay during the winter, and kept in good pasture in summer: so that there cannot exist a doubt that the losses sustained by Mr. Dimmery were entirely attributable to the unwholesome water the animals were compelled to drink."

"In order," adds Mr. White, "to show that the accident of warping may arise from a vitiated state of the digestive organs, I shall here notice a few circumstances tending to corroborate this opinion. In January, 1782, all the cows in the possession of farmer D'Euruse, near Grandvilliers, in Picardy, miscarried. The period at which they warped was about the fourth or fifth month. The accident was attributed to the excessive heat of the preceding summer; but as the water they were in the habit of drinking was extremely bad, and they had been kept upon oat, wheat, and rye straw, it appears to me more probable that the great quantity of straw they were obliged to eat in order to obtain sufficient nourishment, and the injury sustained by the third stomach in expressing the fluid parts of the masticated mass, together with the large quantity of water they probably drank while kept upon this dry food, was the real cause of their miscarrying. A farmer at Charentin, out of a dairy of twenty-eight cows, had sixteen slip calf at different periods of gestation. The summer had been very dry, and during the whole of this season they had been pastured in a muddy place, which was flooded by the Seine. Here the cows were generally up to their knees in mud and water, and feeding on crowfoot, rushes, and the like. Part of the stock had recently been brought from Lower Normandy, where they had all been affected with indigestion by feeding upon lucerne, from the effects of which they had been relieved by the operation of paunching. In one, the opening made was large enough to admit the hand for the purpose of drawing out the food; the rest were operated on with a trocar. In 1789, all the cows in the parish of Beaulieu, near Mantes, miscarried. All the land in this parish was so stiff as to hold water for a considerable time; and as a vast quantity of rain fell that year, the pastures were for a long time, and at several periods, completely inundated, on which the grass became sour and rank. These, and several other circumstances which have fallen under my own observation, plainly shew that keeping cows on food that is deficient in nutrition, and difficult of digestion, is one, if not the principal, cause of their miscarrying. It is stated by Mr. Handwin, that feeding in pastures, when covered with white frost, has been observed to occasion abortion in these animals."

If there be any probability of a cow miscarrying from exposure to any of the common causes already enumerated, let her by all means be put apart from the others; and let a skilful person attend to the evil from which she is expected to suffer. If the approach of abortion be evident, bleeding may be had recourse to; for if it do not check abortion, it will yet do no harm though it take place. When there are any premonitory symptoms of abortion, they are precisely the same as those which present themselves in ordinary labour, with the exception of their being less marked.

Fumigation of the cow-house is resorted to as one of the means of preventing the spread of abortion: tar, sulphur, gunpowder, feathers, and the like, are burned for the purpose of destroying the odour. We have never seen a single instance of the practice being attended with the smallest success; while it is obvious that, if carried beyond a certain point, it may produce the very evil it is intended to remove or mitigate.

It is a remarkable feature in the history of this complaint, that those cows that have once miscarried are particularly liable to do so again at the same period of their succeeding pregnancy. Greater care is therefore requisite to guard against those causes which do, or are supposed to, excite it. The treatment of abortion, when it does take place, differs not from that adopted in cases of parturition, only that the cow which miscarries should be removed with all that belongs to her from among pregnant cows.

If the signs of approaching abortion be discovered early, the accident may sometimes be prevented. If the cow is in good condition, then immediately let it be bled to the extent of five or six quarts, and the bowels opened with half a pound of Epsom salts, three or four drams of aloes in powder, or as many ounces of castor oil, administered in a quart of gruel; but if the cow is in very poor condition, and the miscarriage is anticipated from her having been exposed to cold, it would be more advantageous to avoid bleeding, and give her a warm gruel drink, with an ounce of laudanum in it. If after this abortion does take place, let her be kept in a comfortable place by herself; and if the after-birth has not passed off, let no injudicious and unnecessary administration of violent forcing medicines, such as capsicum or hellebore, be given. Nature, with a little assistance, is generally equal to the perfect restoration of the animal.

Abortion in the Sheep. Ewes are much subject to abortion, in consequence of the numerous accidents they are liable to, such as fright, overdriving, being worried or run with dogs, a remarkable instance of which came under my own observation. A pack of hounds, in pursuit of a hare, got among a flock of sheep belonging to a farmer, and so hurried and alarmed them, that thirty out of a flock of two hundred ewes prematurely dropped their lambs. It is the same in sheep as in the other cases of domestic animals,—scarcity of food, and exposure to severe cold, having a great tendency to make the ewes prematurely drop their lambs, or produce them weakly and crippled at the full time; and although there may be a little danger in giving too much food, such as allowing them to feed all the winter on turnips, the danger is trifling compared with the starving system. (*Miller.*)

ABORTIVE. A term applied by gardeners and farmers to flowers, seeds, and fruits, which do not come to maturity, in consequence of external injury from the weather, from insects, or other causes affecting their *growth*. Thus fruit often becomes abortive, in consequence of cold winds or frosts in spring checking the flow of the nutritive juices; and after losing its healthy colour it shrivels, and falls. The same effects arise when the leaves of fruit-branches are devoured by caterpillars, or the fruit-stalks sucked by insects (*Aphides*, *Cocci*, &c.). The only preventives are sheltering from cold, and destroying the insects.

ABORTIVE CORN. A distemper in grain, first mentioned by M. Tillet, in a Dissertation which gained the prize at the Academy of Bourdeaux. This distemper, said that ingenious naturalist, shows itself long before harvest, when the stalk is not above eighteen inches high; and may be known by a deformity in the stalks, the leaves, the ears, and even in the grain. The stems of abortive corn plants are generally shorter than those of healthy ones of the same kind and age: they are crooked and knotted, the leaves being commonly of a bluish green colour, curled up in various forms, sometimes turned like wafer-cakes, and often rolled in a spiral form. The ears have very little of their natural form: they are lean, withered, and show very imperfect rudiments of either the chaff or grain. These appearances are, however, only to be observed in plants that are highly diseased. The stalks are often pretty straight, the leaves but little curled, and the chaff tolerably well formed; but instead of inclosing a small embryo, white and soft at the summit, it contains only a green kernel, terminating in a point, not unlike a young pea when forming in its pod. These abortive kernels have two or three points very visible, and are formed in a manner as if two or three kernels were joined together at the base. When they are ripe, or rather when dried up, they grow black, and resemble the seeds of cockle so much, that farmers who are not acquainted with this distemper often confound abortive wheat with the seeds of that weed. It is supposed by the author just mentioned, that this disease is occasioned by the perforations of insects, as he perceived on the sickly plants small drops of a very limpid liquor, which he imagined to be extravasated sap.

ABROKUS. A term employed by some old authors for the *Bromus*, *Avena sterilis*, or wild oat; and, by others, for the *Orobus*, or bitter vetch.

ABROTANUM, and ADONIUM. The plant Southernwood; which see.

ABSCESS. (Latin, *abscessus.*) In Veterinary Surgery, a circumscribed cavity in an animal, containing matter. The deposition of matter in a solid part of the body is always preceded, and in some degree accompanied, by inflammation. The local symptoms are, pain on pressure, heat, swelling, hardness, and, where it can be seen, redness. These are easily recognised, in proportion as the inflamed part is near the external surface. If the part in which an abscess is about to form be soft, yielding, and well supplied with blood, it soon softens and points, the pain diminishes, the skin becomes thin, a fluid is felt fluctuating under it, and by and by the skin bursts, or a portion of it drops out, and the matter escapes. What is called the process of granulation succeeds to this; and, provided the matter be completely evacuated, and the outlet be such as not to retain any that may form subsequently, the cavity soon fills up.

Such are the different stages of an ordinary abscess. The general health of the animal is rarely affected; but if an abscess form in a dense unyielding texture, in a part which cannot without much difficulty accommodate itself to an increase of volume, then the swelling may be less, but the animal will endure a great deal more pain. The irritation indeed is sometimes so great, from this cause, as to induce fever, and even death; and hence the formation of an abscess in the foot of an irritable horse is not an unfrequent cause of death. During the deposition of the matter in such cases, we have general symptoms added to those termed local. There is loss of appetite, thirst, a hot skin, quick and hard pulse, constipated bowels; in short, the animal is *fevered.* When an abscess forms in a part remote from the surface, its presence is not easily recognised. The general practitioner has here an advantage over the veterinary surgeon. The expressed feelings of the patient, and the occasional slight shivering fits which accompany the formation of matter, are guides which the veterinary surgeon can rarely or never command. The shivering, if it occurs, passes unobserved, and the animal can give no account of himself; dissection, therefore, sometimes reveals large abscesses, whose existence was not even suspected during life. Fortunately these are not frequent.

It is a curious circumstance, and one that well illustrates the preservative principle of a living being, that, unless there be some mechanical obstacle, as in the case of the horse's foot, the matter always seeks its exit by an external opening. If this were not a law in the animal economy, and if the matter were to spread indiscriminately on all sides, it might not only accumulate to an enormous extent, and produce much destruction, but by encroaching upon vital organs, it might be a very frequent cause of death. The instances of such a thing happening are rare; but they are easily accounted for by the presence of some mechanical obstacle which the absorbents could not overcome. Why an abscess should point at one part rather than another, is truly wonderful; but it is not more so than almost every other process of importance in the animal economy. We may attempt to explain it; but, in truth, to perceive that such is the case, and that because it would have been wrong had it been otherwise, is as far as we can proceed. We know that the absorbents remove a portion of that side of the cavity which is next to the external surface; but we do not know what urges them to act on that side in preference to any other; and, perhaps, in a practical point of view, we need not care to know.

The causes of abscess may in general be traced to an injury done to the texture of a part, or to the introduction of some foreign substance by which it is irritated. In the former, the formation of matter is a part of the process by which the injury is repaired; in the latter, it becomes necessary to interpose a bland insensible medium between the surrounding parts and the irritating substance, while the same means serve to expel it. Thus a severe bruise, the insertion of a thorn, a nail, or any similar agent, may be followed by an abscess.

The treatment of an ordinary abscess is very *simple*: as a general rule, the matter should be evacuated as soon as discovered. Let a broad-shouldered lancet be used, and let the opening be made sufficiently large; and, what is of still more consequence, let it be at the lowest part of the tumour, in order that the cavity may be completely and constantly drained. The general practitioner has some scruple about making an artificial opening, often for good reasons. His patients dread the lancet more than a tedious cure; while the skin is thinner, and consequently the natural outlet is sooner formed. But in the horse, and the dog, and still more in the ox, the skin is thick, its removal proportionally slow, and the natural process is both tedious and painful. It is, therefore, better both for the animal and his owners, to have an artificial outlet made for the matter as soon as the abscess is brought to a head, either naturally, or by the application of a bran poultice. Little more is necessary than to keep the part clean; trim the hair from the edges of the orifice, and by applying hogs'-lard, prevent the acrid discharge from adhering to, and removing the hair from the skin beneath. Let no pretender stuff the cavity with a candle, or tent of tow, or rowels, or any thing else. All these interfere with nature's operations, prevent the escape of the matter, produce fistula, and other evils, often far more serious than the original abscess. If the cavity do not fill up so readily as might be expected, allow the animal a little more nourishing food than that recommended for invalids; and inject once, or even twice a day, a liniment, composed of equal parts of spirits of turpentine and sweet oil; or, if the matter discharged, instead of being thick, pale yellow, and without smell, be dark-coloured, variegated, and smell offensively, a solution of chloride of lime, or one to three drachms of nitre in six ounces of water, may be used.

A hernial tumour has been mistaken for an abscess; and, in consequence, the blacksmith has plunged a lancet into the gut, or inserted a rowel. This is a most unlikely mistake for a veterinary surgeon to make. The heat, the pain, the rigidity, and the situation of an abscess, would be sufficient to distinguish it from a hernial swelling. If there be met with a tumour without heat or pain, very compressible, elastic, and situated on the belly, the veterinary surgeon would pronounce it a rupture, or hernia; and of course would never dream of touching it with the lancet.—*Miller.*

ABSCISSION. The act of cutting or lopping off.

ABSINTHIUM (Greek *αψινθιον*, from *α*, not, and *ψινθος*, pleasant). 1. The common Wormwood (*Artemisia Absinthium*). 2. A section of the genus *Artemisia*. See Wormwood.

ABSORBENT SOILS. Such soils as imbibe water. See Earth, the use of, to vegetation.

ABSORBENTS. In veterinary medicine, those drugs are termed absorbents that are given internally for the purpose of neutralising any acid which forms in the stomach and bowels in consequence of impaired digestion. Prepared chalk is generally used for this purpose. Those medicines are likewise termed absorbents which are applied externally for absorbing moisture. Armenian bole, calamine, flour, and the like, are employed in this way. They are sometimes dusted between folds of the skin when galled, and raw from friction, blisters, or grease. They are likewise useful in canker of the horse's foot, foul in the foot of cattle, foot-rot in sheep, and sores between the toes of dogs; and they are beneficial in some forms of mange, in staying bleeding, and assisting the cure of a penetrated joint.

Absorbents. In veterinary physiology, a class of vessels whose office it is to convey the product of digestion, and the residue of nutrition into the circulation, to be mixed with and repair the waste of the blood. They are divided into lacteals and lymphatics. The former are all situated in the cavity of the belly; and by extremely minute mouths, opening on the inner surface of the stomach and intestines, they receive the nutritious portion of the food, and carry it to a vessel which runs along the left side of the spine, and which, in its turn, empties itself into the left jugular vein. The lymphatics are distributed over every portion of the frame, at least over every portion that contains blood. Their different branches are so minute and so numerous, that a celebrated anatomist who attempted their dissection, is said to have thrown down his knife in despair, exclaiming, "that the body is entirely composed of absorbents." The uses of the lymphatics are, to remove the residue of nutrition; and when the supply of food is deficient, to remove such portions of the body as can be spared and converted into blood. It is they that effect the removal of parts which disappear without the action of external agents. The lymphatics ultimately empty their contents into the same vessel as the lacteals; and they follow, in their distribution through the body, the same course as the veins. In the horse they are liable to a disease termed farcy; and in all animals they are frequently inflamed in the neighbourhood of a sore. The absorbents, both lacteals and lymphatics, are very delicate in their sides, nearly transparent, have numerous valves which compel their contents to flow only in one direction; and their larger trunks have numerous glandular bodies on them. The use of these glands is not well known; but, from one or two circumstances, it would appear that they have to produce some change on the fluid which passes through them before it is fit to mingle with the blood.

ABSORPTION. An important process in vegetable physiology. As plants are not furnished with any individual organ similar to the mouth of animals, how, it may be asked, do they effect the introduction of food into their bodies? Is it by the general surface of their stem, leaves, or roots, or by any peculiar part of these? By whatever part it may enter, it must, at any rate, pass through the covering of the outer bark (*epidermis*), which the earlier physiologists thought it could not do, but by means of pores more or less visible. Yet some of them described the outer bark as being of so close and compact a texture, that the eye, aided even by the best microscopes, was unable to discover in it the slightest vestige either of pores or of apertures. But Hedwig and De Candolle detected superficial pores in the leaves, at least, of many plants; and so will any one else, who will be at the trouble of repeating their observations with lenses of similar powers.

The next difficulty was with regard to the outer bark (*epidermis*) of the flower, fruit, and root. No pores had been detected in the flower and fruit, though it was evident that they were refreshed and invigorated by the access of moisture and of atmospheric air; and no pores had been detected in the root, though it was evident that the whole of the nourishment which the plant derives from the soil must of necessity pass through the root. It was also evident that no aliment could be taken up by the plant, except in the state of a liquid, or of a gas—that is, by absorption or by inhalation, as the chyle is taken up into the animal lacteals, or the air into the cells of the lungs. The greediness with which plants absorb water was perceived and acknowledged even in the earliest times, and even by men who were not botanists. Anacreon, in one of his little trifles in honour of drinking, makes the very trees of the forest drink:

'Η γῆ μέλαινα πίνει,
Πίνει δὲ δένδρε' αὐτήν. Ode xix.

"The black earth drinks, and the trees drink it;"

that is, the moisture which it contains.

By merely immersing in water a plant of almost any species of moss that has been some time gathered, or long exposed to drought, so as to have had its leaves shrivelled up, the moisture will immediately begin to penetrate the plant, which will thereby resume its original verdure; an experiment which proves the fact of the entrance of moisture into the plant through the outer bark (*epidermis*).

It might be doubted whether any of the moisture thus imbibed had passed through the root. But if the bulb of a hyacinth is placed on the mouth of a glass bottle filled with water, so as that the smaller roots (*radicles*) only shall be immersed, the water is imperceptibly exhausted, and the plant grows. The moisture must, consequently, have passed through the root. Plants seem, indeed, to be peculiarly well adapted for the absorption of fluids by the root, from the infinite number of little absorbent fibulous sponges (*spongiolæ*), in which the fine fibres of the root terminate. It is owing to this important property that the scientific gardener, in the transplanting of his young trees, or the scientific and ornamental planter, in the transplanting of his trees of full growth, is so extremely careful to preserve entire even the minutest fibres and extremities of the root. Sir Henry Steuart's *Planter's Guide* has taught him the great importance of these little organs.

Hales instituted a variety of experiments to show the absorbing power of roots, and the force with which it acted; as did also Duhamel and Marriotte, to show the absorbent power of leaves. But the most complete set of experiments upon the absorbent power of leaves is that of M. Bonnet of Geneva, whose main object was to ascertain whether the absorbing power of both surfaces of a leaf was alike. With this view he placed a number of leaves over water, so as that they only floated on it, but were not immersed; some with the upper surface, and others with the under surface, applied to the water. If the leaf retained its verdure the longer with the upper surface on the water, the absorbing power of the upper surface was to be regarded as the greater; but if it retained its verdure the longer with the under surface on the water, then the absorbing power of the under surface was to be regarded as the greater. Some leaves were found to retain their verdure the longer when moistened by the upper surface, and some when moistened by the under surface; and some were indifferent to the mode in which they were applied to the water. But the inference deducible from the whole, and deduced accordingly by Bonnet, was, that the leaves of herbs absorb moisture chiefly by the upper surface, and the leaves of trees chiefly by the under surface. What is the cause of this singular difference between the absorbing surfaces of the leaf of the herb, and of the tree? The physical cause might be the existence of a greater, or of a smaller number of pores, found in the leaves of the herb and tree respectively. The chemical cause would be the peculiar degree of affinity existing between the absorbing organs and the fluid absorbed. Duhamel seems to have been content to look to the physical cause, merely regarding the lower surface of the leaf of the tree as being endowed with the greater capacity of absorbing moisture chiefly for the purpose of catching the ascending exhalations which must necessarily come in contact with it as they rise, but which might possibly have escaped if absorbable only by the upper surface, owing to the increased rapidity of their ascent at an increased elevation; and regarding the upper surface of the leaf of the herb as being endowed with the greater absorbing power, owing to its low stature and the slow ascent of exhalations near the earth. This did not throw much light upon the subject; and the experiments were still deemed insufficient, as not representing to us the actual phenomenon of vegetation, though the fact of the absorption of moisture by the leaf is fully confirmed.

If, after a long drought, a fog happens to succeed before any rain falls, so as to moisten the surface of the leaves, plants begin to revive, and to resume their verdure long before any moisture can have penetrated to their roots. Hence it follows incontestably, either that moisture has been absorbed by the leaf, or that exhalation has been suddenly stopped by closing the pores of the leaf, or both. The efficacy of rain and of artificial waterings may be accounted for partly on the same principle; for they have not always penetrated to the root when they are found to have given freshness to the plant by either or both of the processes just alluded to. The moisture, then, that enters the plant as an aliment, is taken up by means of the pores; or, in default of visible pores, merely by means of the absorbent power of the outer bark (*epidermis*), not only of the root and leaf, but often, as it is to be believed, of the other parts of the plant also, at least when they are in a soft and succulent state.

It is to the modern improvements in pneumatic chemistry, and to them alone, that we are indebted for our knowledge of the real functions of the leaves of plants, and of their analogical resemblance to the lungs of animals, it being now proved indisputably that the leaves of plants not only contain air, but do both inhale and respire it. It was the opinion of Dr. Priestley that they inhale it chiefly by the upper surface; and it has been shown by Saussure that their inhaling power depends entirely upon the integrity of their organisation. A bough of *Cactus Opuntia*, detached from the plant and placed in an atmosphere of common air, inhaled in the course of a night four cubic inches of oxygen; but when placed in a similar atmosphere, after being cut to pieces and pounded in a mortar, no inhalation took place. The inhalation of air, therefore, is no doubt effected by the pores of the outer bark (*epidermis*) of the leaf.

It is important to attend particularly to the distinction pointed out above, that it is not the whole of the root which is endowed with the power of absorbing nourishment, but only the points of the root fibres, termed spongelets. The surface of the root whose outer bark has acquired a certain consistence does not absorb the moisture of the soil in contact with it; but the roots, and also the smallest rootlets, constantly lengthen at their extremities; and these extremities are composed of a fine cellular tissue, compact, spongy, and the whole newly developed, possessing in a high degree the hygroscopical faculty proper to vegetable tissue.

M. Carradori (*Degli Organi Assorbenti*) has remarked that there is a slight absorption, either by the surface of the roots, or by the fugacious hairs with which the roots of young plants are often furnished: but this effect seems owing to general hygroscopicity; and he himself agrees that this absorption is extremely feeble, especially in old and woody roots, comparatively with that which takes place at their extremities. These experiments, however, are not made with such minute accuracy as to enable us to appreciate this comparison.

When we cut a branch of a tree and plunge it into water, its woody tissue thus laid bare quickly absorbs a quantity of water; and in this manner is the life of branches preserved which are kept for ornamental purposes, but this effect has a limit. The extremity which has been cut and plunged in the water is not renewed, as in the case of the root; and is, consequently, more or less quickly altered or deteriorated by being in contact with the water. We renew its action by cutting off the rotting extremity, and thus place a new and healthy surface in contact with the liquid. The water which in this manner penetrates into the woody tissue of vegetables, preserves their existence, at least for a certain time, as if it entered by the spongelets. This is the same thing, we may rest assured, in these phenomena, as is presented in the developement of the cuttings of trees, which are also nourished in general only through the water sucked up by the surface of their denuded wood. These means of nutrition are, however, accidental or artificial; and absorption is a natural operation by the spongelets in general, or by the suckers in some vegetable parasites. M. Sennebier observed that, if we divide a plant into three parts, the roots as far as the crown, the stem as far as the branches, and the leafy top, then plunge the lower ends of these into water, the whole three will pump up a certain quantity, but the leafy parts more than the others. This absorption particularly takes place at the cut surface, where the woody parts are laid bare.

A branch of raspberry put in water and exposed to the sun has absorbed a hundred and fifty grains, but only imbibed eight grains when the division has been covered over with wax. It sucked up no more when, having the divided part covered, it was plunged in the whole of its length, than when only a short zone at the extremity was immersed. This proves that the outer bark is impenetrable to water.

The woody portion, when laid bare, sucks up moisture in every way; that is to say, when we cut a branch and place it in the water, it sucks it up, either when put into it by the upper or by the lower cut part. The habitual or upright direction, however, appears to offer certain facilities for this more than an inverse one. This, indeed, results, first, from the observation of M. Pollini (*Elem. di Botan.*, i. 281.); for the watery juices mount a little less high in the branches placed in an inverse direction; secondly, from the observation of common gardeners, and of Mr. T. A. Knight, that, in the cuttings made in an inverse manner, it is more frequently only the lower buds which are developed, and not the higher ones, as happens in those made in a direct manner. It is necessary, in order to render these experiments comparative, that the horizontal cuttings be made equal; and, as we were doubtful whether this circumstance had been taken into consideration, we made the following experiment: — We placed two branches of willow in water, the one in a direct manner, the other inverted, and contrived in such a manner that these two absorbing bodies were equal; but the branch which was placed inverted pushed its roots a little slower than the direct one. (*Mém. sur les Lenticelles*, *Ann. des Sc. Nat.*, 1825, Jan., pp. 18, 19.)

The wood tends not only to absorb the water by its transverse section, but also lengthways. Thus we placed in water (*ibid.*, p. 4.) a branch of willow, the section of which was covered with mastic, but which had the part immersed denuded of the bark by taking off a cortical ring of an inch in length. This branch pushed its buds and roots in a manner similar to the branches which are immersed by a transverse section.

The hygrometrical power of wood is such that when we expose it to the air it easily imbibes the surrounding moisture; and, when preserved in shady places, it never dries of itself. Count Rumford (*Mém. sur le Bois et le Charbon:* 8vo, Paris, 1812) dried in an oven a piece of wood taken from the interior of a beam which had been placed for one hundred and fifty years in a battlement, and observed that it lost about ten per cent of its own weight; and he thinks that this is the greatest degree of natural desiccation which wood can attain in our climate. An oak faggot, exposed eighteen months in the air, and which might be regarded as excellent wood for burning, lost twenty-four per cent. The same experimenter observed that, when chips of wood have been well dried in a stove, on their exposure to the open air they very freely imbibe water. If these chips are placed for twenty-four hours in a room, the extremes of this power of absorption have proved to be, on one side, the Lombardy poplar, whose chips, five inches long by six lines broad, have sucked up 0·87 grains; and, on the other, a billet of oak of the same dimensions, which sucked up 1·40 grains. When the same chips were exposed for eight successive days, it was found that they did not increase in weight if the air had remained at the same temperature, but they lost in weight if the air became more heated. This experiment, then, proves that the absorption is rapid; and that the equilibrium it attains will be determined by the surrounding atmosphere, and certainly also by its own hygrometrical power.

These necessary conditions of existence have been effected by the organisation of the spongelets as organs of suction, and by the nature of the water, which is abundantly diffused over nature, and also impregnated with their principal nourishment.

The nature of the action of the spongelets is remarkable in this, that the choice which they seem to make of the matter which they absorb does not appear to be determined by the natural wants of the plant, but the facility is less or more influenced by the nature of the liquids. Thus, M. Théodore de Saussure (*Rech. Chim.*, ch. 8.) found, that if we place plants in water, with which is mixed sugar, gum, or the like, the spongelets will absorb a greater proportion of water than of the materials which are dissolved in it; for the water which remained after the experiment was more saturated than before the roots were put into it. Again, if we plunge the roots into different solutions, they will absorb so much the more of these in proportion to their fluidity, although at the same time such solutions may be injurious to the plant, and yet will they absorb a less proportion of viscous matter, although this may contain more nutritive materials. Thus, of blue vitriol (*sulphate of copper*), the most hurtful of the substances employed, they absorbed a large quantity, but a very small quantity of the gum, which is not injurious. When we placed plants in solutions of gum, of different degrees of thickness, we found that the quantity absorbed was smaller in proportion as the solution was more viscous. Sir H. Davy, also, observed that plants perished in those solutions in which there was a large quantity of sugar or gum; and prospered when the solutions had only a small quantity of either. (*Agricultural Chem.*)

The effect of the viscosity is obviated when we put the roots in water which holds organic matters in suspension. Thus, the drainings of dunghills, and impure waters, are taken up by the roots in smaller quantities than pure water. It should seem that these particles have a tendency to obstruct the imperceptible pores, passages, or cells of the spongelets. M. Th. de Saussure remarks that analogous laws may be observed in the case of liquids in which different substances are dissolved, the more fluid being absorbed in a greater quantity than others. It would accordingly appear that the roots exercise a kind of choice in the soil; but that the choice, far from being relative to the wants of the plants, is a circumstance purely mechanical.

On the other hand, M. Pollini, who has repeated these experiments, found that of the solutions of different substances in water, the roots sucked up different quantities, without any apparent regard to their viscosity. Thus he constantly found, he says, that the roots absorbed more of common salt, or of potass, than of the acetate or of the nitrate of lime, and more of sugar than of gum. He found, on the other hand, that if he cut the extremity of a root, the water which entered by the wound contained indifferently all the salts which had been dissolved in the water; and the portion which remained after absorption did not contain more than before. (*Saggio di Osserv. e di Sperienze sulla Veget. degli Alberi:* Verona, 1815.)

Another circumstance remarkable in the experiments which we have before detailed is, that the disorganised tissue of the spongelets appears to give a much freer passage to the juices than that which had been uninjured. Thus plants can only live for two or three days in a solution of blue vitriol (*sulphate of copper*), of which they absorb a large quantity; while they will live eight or ten days in a solution of gum, of which they absorb only a very little. Branches cut and plunged in the different solutions follow similar laws, and absorb both water and its solutions.

It is very probable that the spongelets of different species of plants are not all organised in a uniform manner, and that there are some which more easily admit of certain substances; but microscopical observations are still far from accounting for these differences, and the facts drawn from culture are equally obscure in directing our judgment upon the point.

The manner in which plants of different kinds exhaust the soil relatively to each other, the general action of manures, the prodigious number of different plants which we can cultivate in the same patch of a garden, tend to prove that the differences of absorption in vegetables are of great importance. Instead of the variety, however, of aliments which sustain the life of animals, we find among vegetables a great uniformity of the substances absorbed. The quantity of liquid absorbed at different epochs of the life of plants, and under the influence of different atmospherical circumstances, appear more intimately connected with the ascent of the sap than with its suction.

Absorption varies according to the state of the plants and the periods of their growth; going on more rapidly in proportion as the leafing is rapid. At the time of flowering and fruiting, also, more nourishment is absorbed from the soil. We likewise know that absorption, as well as the progression of the fluids absorbed, depends greatly on the influence of heat and light; that it is most active in spring, that it diminishes in autumn, and is reduced almost to nothing, if it do not altogether cease, in winter.—*Miller.*

ABSTERGENT REMEDIES, in *farriery*, are those used for the purpose of resolving or discussing tumours and concretions on the joints and other parts of animals. They mostly consist of volatile, stimulant, and saponaceous matters.

ABUTILON. The yellow marsh-mallow.

ABUTTAL. (Barb. Lat. *abuttare;* Celtic, *but*, abound; Saxon, abutan; old French, *aboutir*.) The boundary or butting of any land or headlands. In a terrier, or description of the site of land, the sides on the breadth are called *adjacentes*, lying or bordering, and the ends only in length are *abuttantes*, abutting, or bounding.

> "Declaration must be made of the *abuttals* and sides of the land seized.—*Spelman*.

—*Johnson's Dict.*, by Todd. See HEDGES, NUISANCES.

ACACIA TREE (*Robinia Pseud-Acacia* Linnæus). The Acacia tree is well known in America, from which it was introduced by the name of the Locust tree. It grows very rapidly in the early stages of its progress; so that in a few years, from seeds, plants of eight and ten feet high may be obtained. It is by no means uncommon to see shoots of this tree eight or ten feet high in one season. The branches are furnished with very strong, crooked thorns; the leaves are winged with eight or ten pairs of leaflets, egg-oblong, bright green, entire, and without foot-stalks. The flowers come out from the branches in pretty long bunches, hanging down like those of the laburnum, or the still more lovely *Wistaria sinensis*. Each flower grows on a slender foot-stalk, smelling very sweet. It is of a white colour, but there is a rose-red variety. It blows in June; and when the tree is full of bloom makes a handsome appearance, and perfumes the whole air around. The flowers are followed by seed-pods, oblong, flat, having a longitudinal rib next the seeding suture, on the outside of that being drawn out into a membranous margin; one-celled, and two-valved. The seeds are sometimes as many as sixteen, kidney-shaped, ending in a hooked beak, like a lens, and are of a rusty colour.

In North America, where this tree grows to a very large size indeed, the wood is much valued for its duration. Most of the houses which were built at Boston in New England, on the first settling of the English, were constructed of this wood; and then it has been much used in Ameri various purposes.

The seeds of the Acacia tree wer brought to Europe by M. Jean Robin seryman to the King of France, and aut a "History of Plants." M. Robin br the first seeds from Canada; in conseq of which, succeeding botanists ha honour to his name, termed the genus *nia* to which the Acacia tree belongs. after its introduction into Franc English gardeners received seeds fron ginia, from which many trees were ra

Parkinson, who mentions the Acaci in his "Theatre of Plants," which was lished in 1640, says it was then grown exceeding height by John Tradescant Evelyn recommended it to the notice nation in his "Sylva," which was pre to the Royal Society in 1662. In this he observes that the Acacia is well des of a place among our avenue trees, wl so well adapted to the adorning c walks with its beautiful leaves and flowers.

There appears to have been very notice taken of the Acacia tree till Bra time, in 1720; and he mentions only trees growing in the court before H House, Bloomsbury, and in the Old Yard, Westminster. Mortimer after tells us that a goodly number of Acacia formerly planted in St. James's Park that in consequence of the high winds tering some of their branches, they w ordered to be cut down. We wish th hint had been then taken, that the tree w only the shelter of the numerous off of our woods in order to show its dignity, and spread its usefulness. wood, when green, is of a soft textur becomes very hard when dry. It durable as the best white oak of America, and esteemed preferable for trees of carriages, trenails for ships many other important purposes. The finds the wood of the Acacia hard an suited to his purpose, and is delighte its smooth texture and beautifully d straw-colour.

The tree, when aged, abounds with c excrescences or knots, which, when po are beautifully veined, and much est by the cabinet-maker. It makes ex fuel, and its shade is said to be less inj than that of any other tree; while the afford wholesome food for cattle. A tleman in New England sowed severa of it for this purpose alone.

It has been employed with signal s in Virginia for ship-building, and is to be very superior to American oa elm, or any other wood they use for that purpose. In New York it has been found, after repeated trials, that posts for rail-fencing, made of the Acacia tree, stand wet and dry near the ground better than any other in common use, and will last as long as those of swamp cedar.

The Acacia tree seems happily adapted to ornamental planting. Whether as a single tree upon the grass, feathering to the ground line, or as a standard in the shrubbery, towering above a monotonous mass of sombre evergreens, the Acacia has great charms for us, and may justly be called a graceful tree; and, although its light, loose, and pleasing foliage admits the light, and seems to harmonize so delightfully with the polished lawn, or the highly cultivated shrubbery (and there is hardly a shrubbery to be found without them), yet we should like much to see the Acacia tree planted in the woods everywhere, where forest timber is an object of attention.

In France the Acacia tree appears to have been more generally diffused throughout the country than with us: for it does not only ornament their gardens, and shade their public walks, but the sprightly foliage of this beautiful tree shines through their woods and forests in every direction; so much so that it might be taken for an indigenous inhabitant of the soil.

In one of the Memoirs by the Agricultural Society at Paris, the properties of this tree are very highly extolled. Its shade, it is said, encourages the growth of grass. Its roots are so tenacious of the soil, and shoot up such groves of suckers, that when planted on the banks of rivers it contributes exceedingly to fix them as barriers to check the incursions of the stream. Acacia stakes, too, are more durable than any other known wood.

The choicest pieces only of the best oak timber are applied to the purpose of trenail-making in ship-building; and, as the Sussex oaks are generally reckoned the best, most shipwrights, even in the north, have them from thence, and the demand for them is so great, that trenail-making is there become a very considerable manufacture. If it be proved that the Acacia tree is equal to our best oak for this important purpose in our naval architecture, then do we strongly recommend (and we write practically) to every landed proprietor to plant the Acacia as a forest tree, more especially as it will grow upon almost any description of soil, but more particularly upon sandy or gravelly shallow soils, where the oak does not thrive.

In forty years the Acacia tree will grow sixty feet high, and will girth six feet, three feet from the ground; and, although brittle in a young state, the characteristics of the timber of a grown tree are toughness and elasticity.

There are many fine stately Acacia trees on the banks of the Thames. On the estate of his Grace the Duke of Devonshire, at Chiswick House, there are some remarkably fine trees, which, from their size and appearance, we have no doubt were among the first introduced to this country.

In the pleasure-grounds at Sion House many fine old Acacia trees are to be found, and several groups in the park there. But the finest, perhaps, in England, are growing on Claremont estate, Esher, Surrey. Sir Robert Gardener occupies a small portion of this domain, at Milbourne, where may be seen some Acacia trees eighty years old. One, in particular, measures eleven feet in circumference three feet from the ground, tapering but very little till it sends out its lofty branches from the trunk at about fifteen feet from the ground, and is now perfectly sound. The extreme altitude of this remarkable tree is seventy feet; forming, by the deep indentures of its bark and fine large limbs, a truly picturesque as well as an ornamental tree.

There are numerous Acacia trees throughout the grounds at Claremont, measuring seven and eight feet in circumference two feet from the ground, which, although growing in exposed situations, exhibit no symptoms of being shaken or unsound. It is worthy, perhaps, of observation, too, that these trees are growing upon very shallow soil, where the under-soil is nothing but sand and gravel. In the grounds of Sir William Cooper, of Isleworth House, there are also some very fine Acacia trees, not measuring less than eight feet in circumference three feet from the ground. There are, perhaps, more Acacias in the counties of Middlesex and Surrey, than in any other counties in England, but chiefly confined to the shrubbery and the lawn. In many parts of Scotland the Acacia tree grows extremely well, and many very fine trees are to be found in the neighbourhood of Edinburgh. Sir John Nasmyth, Bart., has one at Dalwick, in Tweeddale, which measures between five and six feet in circumference about three feet from the ground, and six feet six inches close to the ground. But the finest group of these trees we have ever seen in this country, are at Niddrie Mareschall, near Edinburgh. One of these measures upwards of nine feet a few inches above the ground. Another tree in the same group, at three inches from the ground, measures six feet six inches round the base; and there is a third Acacia belonging to them that measures six feet five inches at two feet and a half from the ground. The Acacia also thrives well in Ireland, and there are many fine healthy trees in the neighbourhood of Dublin. It grows more rapidly in that country than it does in either England or Scotland. In the different States of Germany the Acacia seems to bear the rigour of their winters, and grows to a fine ornamental tree.

As a durable timber, it has been proved that nothing can exceed the Acacia wood, when of proper age. But there is one important use to which these trees may be applied, which has hitherto escaped the notice of the planter, namely, hedges. From its rapidity of growth it forms a fence capable of resistance in one fourth of the time of any other plant hitherto used for that purpose. Had we to fence in a whole estate, we should, in preference to all others, plant Acacias. They bear clipping, and may be raised to twenty or thirty feet high, if required, and are so strong that no animal can force through them. Fences of this kind are common on the Continent, but generally of hornbeam. The only instance of an Acacia hedge we know of is to be seen round part of the boulevard of the city of Louvain. Plants for this purpose should be taken from the nursery lines four feet high. At every point where the stems cross one another, a natural union or grafting takes place, and, as the stems increase in size, the spaces between will gradually decrease; so that in the course of a few years the fence becomes a complete wooden wall, not occupying a space more than twelve or fifteen inches, forming a barrier that no animal can force. Fences of this description may either be made on the level ground, or concealed from the distant view.

We are at a loss to account for the name commonly given to this tree by the Americans, namely, Locust tree; for the Locust tree (*Hymenæa Courbaril*) is a native of South America.

In the arboretum of the gardens of the Horticultural Society of London, there is a proof, perhaps the very best proof that this country affords, of the great rapidity of growth, and also the beauty of this truly interesting and highly valuable tree. About twelve years ago, this arboretum was planted for the express purpose of introducing the trees of all countries—the research of enterprising men. The Acacia was planted with the other individuals of this very splendid collection, and the result has been, that the Acacia has made greater progress than any of the oaks, the ash, the elm, the maple, or, indeed, any of the hard-wooded timber trees within the wall of the gardens.

The Acacia trees, in their rapidity of growth, are exceeded only by a few of the poplar and willow tribes.

There is a singular character about the suckers of this tree. They are rarely seen to appear on the lawn, but in the shrubbery frequently. They rise singly, not like the elm, and other trees, in thick masses, choking one another, but they start out of the ground at once, with all the boldness and vigour of a healthy shoot from a powerful stool; and in a sheltered situation will grow, the same year, from twelve to fifteen feet long from the ground; and it is the more remarkable, that these suckers grow in this vigorous way immediately under the shade of the parent, and other large trees. What is also very singular, so strongly are they attached to the root below the ground, at the insertion, that they are very rarely from accident displaced.

Mr. William Lindsey mentions a very striking instance of the astonishing rapidity of the growth of this tree. He observed a strong shoot make its appearance in one of the woods at Chiswick, and he had the curiosity to see what would be the result by applying a stake to this sucker for protection. By the end of the season, it was twenty feet high, and measured three inches in circumference. When the full-grown old Acacia trees are felled, the following year hundreds of suckers will start up from the roots in all directions, and grow as freely as if a fresh plantation had been carefully made. So that, on the score of economy, we know of no tree that can be planted equal to the Acacia. As an underwood, it far exceeds any other tree in produce; and for stakes, arbour-poles, hop-poles, and pale-fencing, there is no wood equal to Acacia. In America, the use of the Acacia has been confined to trenails of ships, in consequence of its scarcity. But were it, either in that or this country, as plentiful as oak, it would be applied for more purposes in naval architecture, such as knees, floor-timbers, and foot-hooks, being far superior to oak for its strength and duration; and from the tree arriving much sooner at perfection, and spreading into so many branches, it affords full as large a proportion of crooks and compass timber as the oak tree.

A cubic foot of Acacia, in a dry state, weighs from forty-eight to fifty-three pounds' weight. If we compare its toughness, in an unseasoned state, with that of oak, it will not be more than 8-100 less. Its stiffness is equal to 99-100 of oak; and its strength nearly 96-100; but, if it were properly seasoned, it might, possibly, be found much superior to oak in strength, toughness, and stiffness. A piece of Acacia, unseasoned, two feet six inches long, and an inch square in the vertical section, broke when loaded with a weight of two hundred and forty-seven pounds avoirdupois. Its medium cohesive force is about 11-500 pounds. (*Dictionary of Architecture.*)

We are not aware that this tree has added in any shape to the list of medicines. The Acacia of the shops was formerly made from the unripe pods of the true Acacia tree; but of later years, the Acacia Germanica of the shops is made from unripe sloes, and is preferred as an astringent medicine to the true Acacia.

The Acacia is easily propagated from seeds or suckers. (*Miller.*)

ACACIA. The Rose Acacia (Lat. *Robinia hispida*). This graceful shrub is a native of North America. It grows twenty feet high, when the soil and situation agrees with it, and its beautiful rose-coloured drooping flowers bloom in June. It often blows again in July and August. Its branches are covered with prickles till they are two years old, when they fall off. This gives it the appellation of *hispida*, or hairy. It loves a good soil, and is very hardy. The flowers bloom on the wood of the same year; therefore the plants should be shortened every season, unless they are planted in a shrubbery, in which case cut away only the dead wood. The *smooth tree Acacia* (Lat. *Mimosa Julibrissin*) is a green-house shrub, and a native of the Levant, but it succeeds in the open ground if carefully sheltered from frost and cold wind. It loves a fresh light mould, and blows its beautiful rose-coloured flowers in August. It is multiplied by layers. The *Sponge tree Acacia* (Lat. *Mimosa farnesiana*) is also a green-house shrub; but it will thrive in the open air if very carefully protected. It comes originally from St. Domingo, and in August it throws out a small head of sweet-scented yellow flowers. It loves a good rich soil, with a sheltered south aspect. It is raised by seed, and multiplied by layers. (*L. Johnson.*)

ACANTHA. The prickle of thorny plants.

ACANTHIS. The plant called groundsel.

ACANTHUS (Lat.). The name of the herb bear's breech, remarkable for being the model of the foliage on the Corinthian capital. Milton, in his *Paradise Lost*, iv. 696., speaks of it,

> "On either side
> *Acanthus*, and each odorous bushy shrub,
> Fenc'd up the verdant wall."

Todd's Johnson.

In modern botany, Acanthus is a genus of herbaceous plants found in the South of Europe, Asia Minor, and India, belonging to the natural order *Acanthaceæ*.

ACARON. The wild myrtle.

ACCENTOR, The Alpine (*Accentor Alpinus*). In Ornithology. "The nest," says Yarrell, "is formed of moss and wool, lined with hair, amongst stones, or the cavities of rocks. Eggs four or five, of a fine light blue colour. Its food, insects and seeds. The beak black at the point, and yellowish white at the base. Head and neck brownish grey. Feathers of the back brown, with longitudinal central patches of darkish blackish brown. Rump greyish brown. This bird is not often met with in England. (*Yarrell, Brit. Birds*, vol. i. p. 219.)

The *Hedge Accentor* is better known by the name of the Hedge Sparrow. *See* SPARROW.

ACCIPITRINIA. The herb hawkweed.

ACCLIMATATION OF PLANTS. This term has been applied to the act of accustoming plants to support a temperature or a climate different from that in which they are found originally growing. This differs from *naturalisation*, which is the act of transporting or transferring a plant into a country different from its native place of growth. Nobody can deny the possibility of these naturalizations; but there are some doubts upon the acclimatations of plants; doubts which have been corroborated by M. Schubler (*Linnæa*, 1829, p. 16.); and it renders this important question the more deserving of examination, that the facts which are reported are complex and somewhat contradictory.

On the one hand, we see wild plants appear fixed within the same climate from the epoch of which we have any knowledge, and cultivated trees, such as the olive, that have for many centuries kept within the same limit.

On the other hand, we see certain trees, such as the horse-chestnut, which, although originally from the tropics, have reached as far north as Sweden. We see that in gardening, the *Aucuba japonica* and the *Pæonia Moutan*, after having been cultivated in the hothouse, have passed into the greenhouse, and now flourish in the open air. But before we infer from these facts the possibility of acclimatation, it will be necessary to analyse them more fully.

Taking the instance of a plant which may have been placed at the first in the hothouse, and afterwards cultivated in the open ground, what are we to conclude, but that, while ignorant of its nature, and while its rarity rendered it more precious, we were unwilling to run the risk of losing it. There is not a gardener, or one who has had the management of a botanic garden, who has not made such calculation a hundred times, and who, doubtful of success, has been led to follow this prudent course with a multitude of plants. Those plants which are received from tropical countries are usually thus treated, on the supposition that they partake of the general nature of plants brought from those countries; and we afterwards try, by groping in the dark, those which form exceptions to the general law. We thus succeed in naturalising some of them; but this does not yet prove that they have been acclimated, for they have not been exposed on their arrival in the climate they were afterwards seen to support. Even had this been done, the experiment would have been frequently doubtful; for when plants arrive in Europe they are for the most part weak, and too young to try the experiment with; while every one knows that young plants, such as those of the bead tree and the silk tree, will thrive in a temperate climate in their adult age, if they are very vigorous when planted, but which are easily destroyed by the frost when young.

An exact knowledge of the manner of living of each species tends to explain some of the illusions which we are apt to fall into on this subject. Thus, when a plant newly arrived in Europe, and consequently little known, is cultivated in the open ground, it often happens that it is placed in a soil or a position contrary to its nature, that it is watered too much or too little, and that it is pruned unseasonably, and the like; it consequently perishes without the temperature of the climate being to blame. Some years afterwards its nature becomes better known, and the management which it requires; it is planted anew in the open ground, is properly cultivated, and it succeeds, and we then say it is acclimated, while it is simply naturalised.

The greater number of cultivators think that plants produced from seeds collected in the same country are much stronger than those produced from foreign seeds, and make this an argument to prove the doctrine of acclimatation. Sir Joseph Banks (*Trans. Hort. Soc.*, i. 21.), in particular, adduces in favour of this opinion the culture of *Zizania aquatica*, established by him at Spring Grove; but he also relates that the first seeds collected in England produced delicate plants, and the second strong plants, so that this example proves as much against as in favour of the theory. Dr. Macculloch, also (*Journ. of Science*, 1825, p. 20.; *Feruss. Bull., Sc. Agr.*, ix. p. 262.), in his Essay on the Island of Guernsey, strongly doubts this pretended superiority of plants coming from seeds. We will not stop to notice that this opinion is in opposition to the very generally received idea, that the changing of seeds is useful. We do not think it less probable that those seeds taken from trees supposed to be languishing, in consequence of not being yet properly acclimated, produce young plants much stronger than those which are taken from trees more healthy, and growing in their natal soil. We will not discuss that which certain cultivators, such as M. J. Street (*Trans. Hort. Soc.*, viii. 1.; *Ferussac, Bull., Agr.*), assert, that the individual plants coming from cuttings are much stronger than those coming from seeds; but we will ask whether this experiment has been made with any degree of certainty, that is to say, in a comparative manner; and when the fact is so, that native seeds have had better success, whether this may not have arisen from the circumstance that certain sorts of seeds do not succeed well when they are not sown immediately after maturity, as in the case of the coffee plant, or perhaps from there being a greater number of seeds to dispose of, and more of them sown? In fine, supposing that experiments are in accordance with the admitted opinion, does this prove any thing more than that a tree which produces good seed is of a nature to accommodate itself to the soil; and is not this rather a proof of naturalisation than of acclimatation? Let us see if there exist any clearer proofs of the reality of acclimatation.

One of the principal results of culture is the formation of varieties which otherwise would have no existence in nature, and which have different degrees of susceptibility according to the temperature. We know that these varieties, in many instances, are much more delicate than the wild species. We may instance the varieties of double flowers, which are less hardy than those of single varieties of the same species; varieties of white flowers, which are generally less hardy than red or yellow varieties; and the varieties of the oleander, with double rose-red flowers, and with single white flowers, are often killed by the frost, while the common oleander, with single rose-red flowers, may stand the winter.

It is, however, those species produced by culture, and chiefly by hybridising, which are of a more hardy nature than the wild species. Now we conceive that the choice of these varieties affords the means of introducing certain sorts into climates where the original species could not have succeeded. This effect is most apparent in such varieties as have undergone some change in the season of vegetation: thus the late variety of the walnut tree, which we call St. John's walnut, will thrive in those localities where the frosts are felt late in the spring, and where the common walnut tree is soon killed by the cold. Thus the very early varieties of the vine will bear fruit in certain climates, where either from there being little heat, or from the rapid approach of autumnal frosts, other varieties would not succeed.

There exists, in many species of plants, the remarkable phenomenon of certain individuals being more early or more late than others, without our being able to attribute the circumstance to the influence of locality; while, at the same time, we cannot perceive any sensible difference in the organisation. Now, by carefully collecting the seeds, or the layers, or the tubercles, or grafts, of such early and late varieties, we obtain artificially such agricultural sorts or varieties as present certain useful qualities, and such, in particular, as will thrive in climates where the original species would not succeed. For example, by gathering the tubers of such potatoes as ripen first, and by repeating the same, many times in succession, we may by this means obtain a variety which will ripen in three months. To us, such a variety is of no more advantage than in giving us an early vegetable; but if cultivated in climates farther north, it might introduce the useful culture of the potato in places where this was previously unknown. Attentive observation of such species and varieties may furnish means of advancing the culture of certain vegetables beyond their ordinary limits. For example, if the varieties of the olive brought from the Crimea, which appear less affected with cold than our European varieties, should come to be introduced on the shores of the Mediterranean; or if we should propagate extensively the variety called *Caillou* in Provence, which seems to stand eleven or twelve degrees (*Desmuchels, Bull., Sc. Agr.* xii. p. 344.), we might be led to conclude that the olive is accustomed to a greater degree of cold, although there might only be the substitution of a hardier sort for a more delicate one.

In fine, although we are not authorised to observe that the vegetable tissue cannot, by the effects of habit, accustom itself to a different temperature than that of its native climate; and although we are disposed to recognise, in many cases, this influence of habit, yet the preceding facts seem to lead to the following inferences; 1. That if certain species of vegetables are susceptible of being acclimated, this occurs within very narrow limits; and we frequently exaggerate these limits by confounding acclimatation with naturalisation. 2. That the cases in which acclimatation appears to take place in reality, chiefly, if not exclusively, comprise species where there is a formation of new varieties, or where we have managed to change the season of the vegetation of plants, as arising from periodicity. 3. That practical results, almost as important as those of acclimatation, more properly so called, are obtained by ably following up certain processes of culture. (*Miller's Dictionary.*)

Accounts, Farm. *See* Farm Accounts.

ACER. The Roman name for a genus of trees, comprehending different species of the large deciduous kind, as the sycamore, &c. *See* Maple Tree.

ACETIC ACID, and ACETUM, terms employed to signify *Vinegar*, which see.

ACETOSA. *See* Sorrel.

ACHE. (Sax. ace; Gr. *αχος*.) *Dr. Johnson*, see also *Doescheri Litirator Celta*, Lips. 1726, p. 65., "Act antiqua vox Iapetica, dolores et suspiria indicans." Our word, it has been observed, is now often written *ake*, and in the plural *akes*, of one syllable, the primitive manner being preserved chiefly in poetry, for the sake of the measure. In Farriery, a violent continued pain in a part, existing independently of any motion, swelling, or other apparent alteration; being, of course, an affection only to be discovered in brute animals, by the common signs of pain. The bones and joints of horses are often liable to aches, in consequence of having been hard ridden, and exposure to cold.

ACHILLEA. A genus of plants, consisting of sixty or seventy species, found exclusively in the colder climates of the northern hemisphere. They are all herbaceous, perennial weeds of little importance, except to botanists, and are only seen in cultivation in the collections of the curious.

ACHRAS. The wild pear tree.

ACICULA. A herb; the wild chervil.

ACIDS. (Lat. *acetum*; Goth. *aceit*; Sax. aeceð.) Liquids and other substances are called acids which commonly, but not always, affect the taste in a sharp, piercing, and peculiar manner. The common way of trying whether any particular liquor hath in it any acid particles is by mixing it with syrup of violets, when it will turn of a red colour; but if it contains alkaline or lixivial particles, it changes that syrup green. They combine with various earths, alkalies, and metallic oxides, and form the peculiar class of bodies called salts. (*Todd's Johnson.*)

Vegetable acids abound in most plants: thus, the *Acetic acid* (*vinegar*) is found in the chick pea (*Cicer arietinum*), in the elderberry (*Sambucus nigra*), in the date palm tree (*Phœnix dactylifera*), and in numerous others.

The *Oxalic acid* is found combined with potash in the *Oxalis Acetosella*, or wood sorrel (whence its name), and many other plants; united with lime, it is detected in the root of the rhubarb, in parsley, fennel, soapwort, squills, &c.; and in an uncombined state in the liquid which exudes from the *Cicer arietinum.*

Tartaric Acid is commonly procured from *tartar* or tartrate of potash (whence its name). It has been detected in many plants, such as in grapes, tamarinds, bilberries, white mulberries, the Scotch fir, couch grass, dandelion, &c. &c.

Citric Acid has been found in oranges and lemons, cranberries, red whortleberry, birdcherry, woody nightshade, the hip, and the onion.

Malic Acid is the only acid existing in the apple, barberry, plum, sloe, elder, service, &c. It is found with the citric acid in the gooseberry, currant, bleaberry, cherry, strawberry, raspberry, &c.; combined with lime, it is found in the house-leek, wake-robin, &c.; and with potash and lime, in rue, garden purslane, madder, spinach, lilac, mignionette, &c.

Benzoic Acid. — This acid is found in benzoin, balsam of Tolu, storax, &c.; and in marjoram, clary, chickpea, Tonkin bean, &c.

The *Prussic*, or *Hydrocyanic Acid*, exists in laurel leaves, peach blossoms, bitter almonds, flowers of the sloe, leaves of the bay-leaved willow, &c.; there is little doubt but that all the bitter almond-tasted kernels contain this acid.

Gallic Acid abounds in the barks of many plants, such as the elm, oak, chestnut, beech, willow, elder, plum tree, sycamore, birch, cherry tree, sallow, mountain ash, poplar, hazel, common ash, sumach, &c.

These are the chief vegetable acids. There are others which have been detected occasionally; such as the moroxylic, in the *Morus alba*, or white mulberry; the boletic, in the *Boletus pseudo-igniarius;* the meconic, in opium; the kinic, in the bark of the *Cinchona officinalis;* the camphoric from camphor; the suberic from cork, &c.; but none of these are of that importance to the cultivator to require a particular notice in this place. The composition of the principal vegetable acids is much more similar than the intelligent farmer might be inclined to suspect, as will be readily seen from a comparison of the following table of their composition, chiefly by M. Berzelius: —

	Hydrogen.	Carbon.	Oxygen.
Acetic acid	- 6·35	46·83	46·82
Oxalic acid	- 0·244	33·222	66·534
Tartaric acid	- 3·951	36·167	59·882
Citric acid	- 3·800	41·369	54·831
Benzoic acid	- 5·16	74·41	20·43
Gallic acid	- 5·00	56·64	38·36

(*Thomson's Chem.*)

ACINUS. The stone of any berry.

ACONITE (Gr. ακονιτον; Fr. *aconit.* Our old writers use also the Latin *aconitum* instead of *aconite;* and, indeed, *aconite* is placed among the hard words which are explained in *Sylvester's Du Bartas,* ed. 1621, p. 653. *Todd's Johnson.*) Properly the herb wolfsbane, but commonly used in poetical language for poison in general. It is often met with, in this sense, in the works of Dryden, Shakspeare, Granville, and others. *See* Wolfsbane.

ACORNS. The seed or fruit of the oak; æceꞃn, Saxon, from ac, an oak, and coꞃn, corn or grain; that is, the grain or fruit of the oak. (*Todd's Johnson.*) Germ. *eicheln;* Fr. *glands;* It. *ghiande;* Sp. *bellotas;* Russian, *schedudii.* (*Macculloch.*)

The Greeks had a tradition, that the oak was the first created tree; and hence, having a similar idea as to the Arcadians being the first created men, they compared them to the oak. Virgil tells us to

> —— "Thresh the wood,
> For masts of oak, your father's homely food."

And Ovid corroborates their use: —

> "Content with food which nature freely bred,
> On wildings and on strawberries they fed,
> Cornels and bramble berries gave the rest,
> And fallen *acorns* furnish'd out a feast."

Turner, who is the earliest English author on this subject, writes, "Oke, whose fruit we call an *acorn*, or an *eykorn* (that is, the corn or fruit of an eyke), are hard of digestion, and nourish very much, but they make raw humores. Wherefore, we forbid the use of them for meates." They were long the food of the early Greeks, as they are of the lower order of Spaniards, even to this day; but then it must be remembered, that the acorns of Spain are more sweet and nutritious than those of England. And yet the early Britons certainly eat them: their priests, or Druids, taught them, that every thing that was produced on the oak, even to the parasitical mistletoe, was of heavenly origin, a superstition which was common, also, to the Persians and the Massagetæ.

The Saxons valued them chiefly for fattening swine. Their king Ina, in the seventh century, gave them a law, respecting the fattening of their swine in the oak woods, which privilege was called a pawnage, or pannage.

The oak is often mentioned in Holy Writ, as the oak of Ophra, *Judges*, vi. 11.; of Sechem, *Gen.* xxxv. 4.; and of Deborah's Grave, *Gen.* xxxv. 8. *See* Oak.

Although acorns are said to have been the primitive food of mankind, at present they are only used in raising young oaks, or for the purpose of fattening deer and hogs, for which last they are said to be a very proper and useful kind of food.

In Gloucestershire, according to Mr. Marshall, they are in high esteem among the farmers, who seem to be as anxious about them as their apples. They consider them as the best means of fatting hogs, and think they make the bacon firm, and weigh better than bean-fed bacon. The price of acorns there is from 1*s.* 6*d.* to 2*s.* per bushel, according to the season and the price of beans. Few are sold, however; every farmer collecting his own, or letting his pigs feed upon them.

Some care is necessary to be taken when hogs are fed upon acorns, for otherwise they will be subject to constipation, and the disease called the garget. These may, however, be avoided, by mixing laxative substances with them, and not allowing them to have too many at a time; at first a few, twice a day, is often enough; afterwards three times a day. The hogs, while they eat this food, should not be confined to the stye, but be suffered to run at large; for if their liberty be too much abridged, they never thrive well, or grow fat on this sort of food.

In Hertfordshire, and the New Forest in Hampshire, it is no uncommon thing, with the management above directed, and the assistance of a little wash, and a few grains now and then, for a farmer to kill several hogs in a season, which weigh from eight to ten score, and sometimes even more. Hogs fed in this way make very good well-flavoured meat; but it is not thought by some so fine as when they are taken up, and four or five bushels of pease or barley-meal given to each, to complete their fattening.

"The pigs are gone *acorning*" is a very common provincialism (see *Mr. Wilbraham's Cheshire Glossary*); and the expression is also confirmed by Shakspeare's "full-acorn'd boar."

Acorns are sometimes given to poultry, and would be found an advantageous food for them, when dried, and ground into meal.

Tusser, speaking of acorns, says,

> "Some left among bushes shall pleasure thy swine,
> For fear of a mischief keep *acorns* from kine."

They are considered injurious to cows, because they swell in their stomachs, and will not come up to the cud again; which causes them to strain as it were, to remit, and to draw their limbs together.

In medicine, a decoction of acorns is reputed good against dysenteries and colics. Pliny states, "that acorns beaten to powder, and mixed with hog's lard and salt, heal all hard swellings and cancerous ulcers; and when reduced into a liniment, and applied, stays hæmorrhage." (*Phillips's Fruits.*)

When employed for raising oak timber from, the method of planting the acorns, which is practised by some, is to make holes to receive them, at the distance of 12 or 15 inches from each other, in an oblique direction, so as to raise up a tongue of turf, under which they are to be deposited, and where they require no farther kind of nursing. In the course of from twenty to thirty years, in this mode of planting, the spot, it is said, will be fit to be coppiced, that is, partially cut down as underwood, leaving the most healthy plants. The thinnings may be sold for railing, and generally fetch a good price. A better method is, however, to dibble them on land that has been properly prepared by ploughing or digging, which may be done by women, three or four within a square yard; or they may be sown broad-cast, when the surface is fine and moist, and rolled in with a light roller. The former is probably the better practice. They may likewise be set about the middle of November, by a land chain, a quarter of a rod asunder, and six inches apart in the rows; dibbling them in, zigzag, alternately on either side a line stretched tightly on the surface, with blunt-pointed dibbles, letting a little mould fall down to the bottoms of the holes, to prevent water lodging round them, and burying them about two inches beneath the surface. Each square rod, when planted in this way, takes 132 acorns, nearly a pint, when they are middle-sized, which is equal to two statute bushels and a half on an acre. The expense of planting acorns in this manner is about 5*s.* an acre. *See* PLANTING.

ACORUS, from the Greek *α*, privative, and *κορη*, the pupil of the eye. The botanical name of a plant of the thistle kind, that produces the drug called in the shop *Calamus aromaticus.* It is found abundantly in the neighbourhood of Norwich, and in the freshwater marshes of many parts of England. The ancient practice of strewing the floors with the leaves of these sweet rushes is still kept up in some of our cathedral churches upon certain high festivals. The plant, which belongs to the natural order *Aroideæ*, flourishes luxuriantly in loose moist soils, and sends forth many deep-green, long sword-shaped leaves from its perennial, creeping, and horizontal stems. It seldom flowers, but the blossoms which it sends forth are of a greenish colour. The root, or more properly the stem, is the part which, when dried, is used medicinally, occasionally as a stimulant. It is slightly acrid and aromatic. (*Thomson's Dispensatory.*)

ACRE. (æcꞃe, Sax. *Acre*, Lye says, is common to all the European languages. (*Sax. Dic.*) He might have added further, that it is an Eastern word; and that *agr*, *akoro*, and *akkoran*, denote in the Hebrew, Syriac, and Arabic, a field, an husbandman. So the Saxon æccer-mon, an husbandman. Wachter, in his *Glossary*, gives *ackerman*, a day-labourer. *Todd's Johnson.*) In *Shakspeare's King Lear*, we have —

> " Search every *acre* in the high grown field,
> And bring him to our eye."

The prevailing and standard measure of land in Britain. An acre in England contains 4 square roods; a rood, 40 perches, rods, or poles, 5½ yards or 16½ feet each, according to the statute in the act passed in 1824, for the equalisation of weights and measures throughout the United Kingdom, which is in this instance confirmatory of the old law of England. But in some parts of England there are other measures under the same designation of *acre*. For example, in Devonshire, and part of Somerset, 5 yards (instead of 5½) have been reckoned to a perch; in Cornwall, 6 yards (anciently called the woodland perch); in Lancashire, 7 yards; in Cheshire and Staffordshire, 8 yards; in the Isle of Purbeck, and some parts of Devonshire, 15 feet and 1 inch. In the common fields of Wiltshire, and the neighbouring counties, 120 poles, or 3 roods, were reckoned to an acre.

The Irish acre is 7840 square yards, and is equal to 1 acre, 2 roods, and 19 poles nearly of English measure.

The Scotch acre contains 5760 square Scotch ells, and is equal to 1 acre, 1 rood, 2 poles nearly of English measure.

The following Table shows the comparative quantity of each of the above measures: —

A.	R.	P.		
120	3	20	Devonshire Customary measure,	Equal to 100 statute acres.
119	2	26	Isle of Purbeck ditto,	
84	0	4	Cornish or Woodland ditto,	
61	2	37¼	Lancashire or Irish ditto,	
47	1	2¾	Cheshire and Staffordshire ditto,	
133	2	0	Wiltshire tenantry ditto,	
79	1	6¼	Scotch measure,	

The French acre, or *arpent*, according to Mr. Greave's calculation, consists of 100 perches, of 22 feet each, amounting to 48,400 square French feet, which are equal to 51,691 square English feet, or very near one acre and three quarters of a rood, English measure. The Strasburg acre is about half an English acre.

An Account of the Number of Plants or Trees which may be planted on a Rood, Perch, or an Acre of Land, at different distances: —

In an acre are

4 roods, each rood forty perches.
160 perches, sixteen feet and a half each.
4,840 square yards, nine feet each.
43,560 square feet, 144 inches each.
174,240 squares of six inches each, thirty-six inches each.
6,272,640 inches, or squares, of one inch each.

Table exhibiting the Number of Plants which may be raised on a Perch of Land, at different distances: —

In a perch are 272¼ square feet, or 39,204 square inches. A perch will contain

Trees or Plants.	Inches over.	Numberof Inches asunder.	Square Inches to each.
2450	4	4 by 4	16
1960	. .	5 — 4	20
1633	12	6 — 4	24
1069	. .	6 — 6	36
816	36	8 — 6	48
612	36	8 — 8	64
490	4	10 — 8	80
392	4	10 — 10	100
272	36	12 — 12	144
261	54	15 — 10	150

An acre will contain

Trees or Plants.	Inches over.	Number of feet asunder.	Square feet to each
108	360	20	400
160	. .	16½	272¼
134	144	18	324
302	72	12	144
435	60	10	100
680	40	8	64
888	48	7	49
1089	. .	8 by 5	40
1210	. .	6	36
1361	8	8 — 4	32
1452	. .	6 — 5	30
1555	20	7 — 4	28
1815	. .	6 — 4	24
2178	. .	5 — 4	20
2722	8	4 — 4	16½
2904	. .	5 — 3	15
3630	. .	4 — 3	12
4840	. .	3 — 3	9
5445	. .	4 — 2	8
7260	. .	3 — 2	6
8712	. .	2½ — 2	5
10,890	. .	2 — 2	4
19,305	. .	1½ — 1½	2½
21,780	. .	2 — 1	2
43,560	. .	1	1

A Table for the more readily calculating the Value of several Crops on an Acre of Land: —

		£	s.	d.
43,560 plants (a plant to each foot), at	1d.	181	10	0
	½	90	15	0
	¼	45	7	0
19,360 plants, at	¼ each	20	3	4
9680	½ "			
4840 (a plant to each yard) at	1d. "			
2420	2d. "			
1210	4d. "			
605	8d. "			
7000 plants, at	2d. " . .	62	6	8
5200	2d. " . .	43	6	8
2200	2d. " . .	18	6	8

		£	s.	d.
9680 plants,	at 1d. each	40	6	8
7450 „		31	0	10
6534 „		27	4	6
5460 „		22	15	0
5445 „		22	13	9
4356 „		18	3	0
3630 „		15	2	6
1000 „		4	3	4
160 „		0	13	4
15,000 „	at ½d. each	31	5	0
7480 „		15	11	8
6534 „		13	12	3
6664 „		13	17	8
5000 „		10	8	4

RATES PER ACRE.

ROODS AND POLES AT GIVEN RATES PER ACRE.

	6d.		1s.		1s. 6d.		2s.	
	s.	d.	s.	d.	s.	d.	s.	d.
Rd. 3	0	4½	0	9	1	1½	1	6
2	0	3	0	6	0	9	1	0
1	0	1½	0	3	0	4½	0	6
Po. 30	0	1	0	2¼	0	3¼	0	4½
20	0	0¾	0	1½	0	2¼	0	3
10	0	0¼	0	0¾	0	1	0	1½
9	0	0¼	0	0¾	0	1	0	1¼
8	0	0¼	0	0½	0	1	0	1¼
7	0	0¼	0	0½	0	0¾	0	1
6	0	0¼	0	0½	0	0¾	0	1
5	0	0¼	0	0¼	0	0½	0	0¾
4	0	0¼	0	0¼	0	0½	0	0½
3	0	0	0	0¼	0	0¼	0	0½
2	0	0	0	0¼	0	0¼	0	0¼
1	0	0	0	0	0	0	0	0¼

	2s. 6d.		3s.		3s. 6d.		4s.	
Rd. 3	1	10½	2	3	2	7¼	3	0
2	1	3	1	6	1	9	2	0
1	0	7½	0	9	0	10½	1	0
Po. 30	0	5½	0	6¾	0	7¾	0	9
20	0	3¾	0	4½	0	5¼	0	6
10	0	1¾	0	2¼	0	2½	0	3
9	0	1¾	0	2	0	2¼	0	2¾
8	0	1½	0	1¾	0	2	0	2½
7	0	1¼	0	1½	0	1¾	0	2
6	0	1	0	1¼	0	1½	0	1¾
5	0	1	0	1	0	1¼	0	1½
4	0	0¾	0	1	0	1	0	1¼
3	0	0½	0	0¾	0	0¾	0	1
2	0	0½	0	0½	0	0½	0	0½
1	0	0¼	0	0¼	0	0¼	0	0¼

	4s. 6d.		5s.		5s. 6d.		6s.	
Rd. 3	3	4½	3	9	4	1½	4	6
2	2	3	2	6	2	9	3	0
1	1	1½	1	3	1	4½	1	6
Po. 30	0	10	0	11¼	1	0¼	1	1½
20	0	6¾	0	7½	0	8¼	0	9
10	0	3¼	0	3¾	0	4	0	4½
9	0	3	0	3¼	0	3¾	0	4
8	0	2¾	0	3	0	3¼	0	3½
7	0	2¼	0	2½	0	3	0	3¼
6	0	2	0	2¼	0	2½	0	2¾
5	0	1¾	0	1¾	0	2	0	2¼
4	0	1¼	0	1½	0	1¾	0	1¾
3	0	1	0	1	0	1¼	0	1¼
2	0	0¾	0	0¾	0	0¾	0	1
1	0	0¼	0	0¼	0	0½	0	0½

	6s. 6d.		7s.		7s. 6d.		8s.	
	s.	d.	s.	d.	s.	d.	s.	d.
Rd. 3	4	10½	5	3	5	7½	6	0
2	3	3	3	6	3	9	4	0
1	1	7½	1	9	1	10½	2	0
Po. 30	1	2½	1	3¾	1	4¾	1	6
20	0	9¾	0	10½	0	11¼	1	0
10	0	4¾	0	5¼	0	5½	0	6
9	0	4½	0	4¾	0	5	0	5½
8	0	4	0	4¼	0	4½	0	4¾
7	0	3½	0	3¾	0	4	0	4¼
6	0	3	0	3¼	0	3¼	0	3½
5	0	2½	0	2½	0	2¾	0	3
4	0	2	0	2	0	2¼	0	2½
3	0	1½	0	1½	0	1¾	0	1¾
2	0	1	0	1	0	1	0	1¼
1	0	0½	0	0½	0	0½	0	0½

	8s. 6d.		9s.		9s. 6d.		10s.	
Rd. 3	6	4½	6	9	7	1½	7	6
2	4	3	4	6	4	9	5	0
1	2	1½	2	3	2	4½	2	6
Po. 30	1	7	1	8¼	1	9¼	1	10½
20	1	0¾	1	1½	1	2¼	1	3
10	0	6¼	0	6¾	0	7	0	7½
9	0	5¾	0	6	0	6½	0	6¾
8	0	5	0	5½	0	5¾	0	6
7	0	4½	0	4¾	0	5	0	5¼
6	0	3¾	0	4	0	4¼	0	4½
5	0	3¼	0	3¼	0	3½	0	3¾
4	0	2½	0	2¾	0	2¾	0	3
3	0	2	0	2¼	0	2¼	0	2¼
2	0	1¼	0	1¼	0	1½	0	1½
1	0	0¾	0	0¾	0	0¾	0	0¾

	10s. 6d.		11s.		11s. 6d.		12s.	
Rd. 3	7	10½	8	3	8	7½	9	0
2	5	3	5	6	5	9	6	0
1	2	7½	2	9	2	10½	3	0
Po. 30	1	11½	2	0¾	2	1¾	2	3
20	1	3¾	1	4½	1	5¼	1	6
10	0	7¾	0	8¼	0	8½	0	9
9	0	7	0	7½	0	7¾	0	8
8	0	6¼	0	6½	0	7	0	7¼
7	0	5½	0	5¾	0	6	0	6¼
6	0	4¾	0	5	0	5¼	0	5½
5	0	4	0	4	0	4¼	0	4½
4	0	3¼	0	3¼	0	3½	0	3½
3	0	2¼	0	2½	0	2½	0	2¾
2	0	1½	0	1¾	0	1¾	0	1¾
1	0	0¾	0	0¾	0	0¾	0	1

	12s. 6d.		13s.		13s. 6d.		14s.	
Rd. 3	9	4½	9	9	10	1½	10	6
2	6	3	6	6	6	9	7	0
1	3	1½	3	3	3	4½	3	6
Po. 30	2	4	2	5¼	2	6¼	2	7½
20	1	6¾	1	7½	1	8¼	1	9
10	0	9¼	0	9¾	0	10	0	10½
9	0	8½	0	8¾	0	9	0	9½
8	0	7½	0	7¾	0	8	0	8½
7	0	6½	0	6¾	0	7	0	7¼
6	0	5½	0	5¾	0	6	0	6¼
5	0	4¾	0	4¾	0	5	0	5¼
4	0	3¾	0	4	0	4	0	4¼
3	0	2¾	0	3	0	3	0	3¼
2	0	1¾	0	2	0	2	0	2
1	0	1	0	1	0	1	0	1

	14s.6d.		15s.		15s. 6d.		·16s.	
	s.	d.	s.	d.	s.	d.	s.	d.
Rd. 3	10	10½	11	3	11	7½	12	0
2	7	3	7	6	7	9	8	0
1	3	7½	3	9	3	10½	4	0
Po. 30	2	8½	2	9¾	2	10¾	3	0
20	1	9¾	1	10½	1	11¼	2	0
10	0	10¾	0	11¼	0	11½	1	0
9	0	9¾	0	10	0	10½	0	10¾
8	0	8¾	0	9	0	9¼	0	9½
7	0	7½	0	7¾	0	8¼	0	8½
6	0	6½	0	6¾	0	7	0	7¼
5	0	5½	0	5½	0	5¾	0	6
4	0	4¼	0	4½	0	4¾	0	4¾
3	0	3¼	0	3¼	0	3½	0	3½
2	0	2¼	0	2¼	0	2¼	0	2½
1	0	1	0	1	0	1¼	0	1¼

	16s.6d.		17s.		17s. 6d.		18s.	
Rd. 3	12	4½	12	9	13	1½	13	6
2	8	3	8	6	8	9	9	0
1	4	1½	4	3	4	4½	4	6
Po. 30	3	1	3	2¼	3	3¼	3	4½
20	2	0¾	2	1½	2	2¼	2	3
10	1	0¼	1	0¾	1	1	1	1½
9	0	11¼	0	11½	0	11¾	1	0¼
8	0	10	0	10¼	0	10½	0	10¾
7	0	8¾	0	9	0	9¼	0	9½
6	0	7½	0	7¾	0	7¾	0	8
5	0	6¼	0	6¼	0	6½	0	6¾
4	0	5	0	5	0	5¼	0	5½
3	0	3¾	0	3¾	0	4	0	4
2	0	2½	0	2½	0	2½	0	2¾
1	0	1¼	0	1¼	0	1¼	0	1¼

	18s.6d.		19s.		19s. 6d.		20s.	
Rd. 3	13	10½	14	3	14	7½	15	0
2	9	3	9	6	9	9	10	0
1	4	7½	4	9	4	10½	5	0
Po. 30	3	5½	3	6¾	3	7¾	3	9
20	2	3¾	2	4½	2	5¼	2	6
10	1	1¾	1	2¼	1	2½	1	3
9	1	0½	1	0¾	1	1¼	1	1½
8	0	11	0	11½	0	11¾	1	0
7	0	9¾	0	10	0	10¼	0	10½
6	0	8¼	0	8½	0	8¾	0	9
5	0	7	0	7	0	7¼	0	7½
4	0	5½	0	5¾	0	5¾	0	6
3	0	4¼	0	4¼	0	4½	0	4½
2	0	2¾	0	2¾	0	3	0	3
1	0	1½	0	1½	0	1½	0	1½

	£2			£3			£4		
	£	s.	d.	£	s.	d.	£	s.	d
Rd. 3	1	10	0	2	5	0	3	0	0
2	1	0	0	1	10	0	2	0	0
1	0	10	0	0	15	0	1	0	0
Po. 30	0	7	6	0	11	3	0	15	0
20	0	5	0	0	7	6	0	10	0
10	0	2	6	0	3	9	0	5	0
9	0	2	3	0	3	4½	0	4	6
8	0	2	0	0	3	0	0	4	0
7	0	1	9	0	2	7½	0	3	6
6	0	1	6	0	2	3	0	3	0
5	0	1	3	0	1	10½	0	2	6
4	0	1	0	0	1	6	0	2	0
3	*0*	*0*	*9*	*0*	*1*	*1½*	0	1	6
2	*0*	*0*	*6*	*0*	*0*	*9*	*0*	1	0
1	*0*	*0*	*3*	*0*	*0*	*4½*	0	0	6

	£5			£6			£7		
	£	s.	d.	£	s.	d.	£	s.	d.
Rd. 3	3	15	0	4	10	0	5	5	0
2	2	10	0	3	0	0	3	10	0
1	1	5	0	1	10	0	1	15	0
Po. 30	0	18	9	1	2	6	1	6	3
20	0	12	6	0	15	0	0	17	6
10	0	6	3	0	7	6	0	8	9
9	0	5	7½	0	6	9	0	7	10½
8	0	5	0	0	6	0	0	7	0
7	0	4	4½	0	5	3	0	6	1½
6	0	3	9	0	4	6	0	5	3
5	0	3	1½	0	3	9	0	4	4½
4	0	2	6	0	3	0	0	3	6
3	0	1	10½	0	2	3	0	2	7½
2	0	1	3	0	1	6	0	1	9
1	0	0	7½	0	0	9	0	0	10½

	£8			£9			£10		
Rd. 3	6	0	0	6	15	0	7	10	0
2	4	0	0	4	10	0	5	0	0
1	2	0	0	2	5	0	2	10	0
Po. 30	1	10	0	1	13	9	1	17	6
20	1	0	0	1	2	6	1	5	0
10	0	10	0	0	11	3	0	12	6
9	0	9	0	0	10	1½	0	11	3
8	0	8	0	0	9	0	0	10	0
7	0	7	0	0	7	10½	0	8	9
6	0	6	0	0	6	9	0	7	6
5	0	5	0	0	5	7½	0	6	3
4	0	4	0	0	4	6	0	5	0
3	0	3	0	0	3	4½	0	3	9
2	0	2	0	0	2	3	0	2	6
1	0	1	0	0	1	1½	0	1	3

	£20			£30			£40		
Rd. 3	15	0	0	22	10	0	30	9	0
2	10	0	0	15	0	0	20	0	0
1	5	0	0	7	10	0	10	0	0
Po. 30	3	15	0	5	12	6	7	10	0
20	2	10	0	3	15	0	5	0	0
10	1	5	0	1	17	6	2	10	0
9	1	2	6	1	13	9	2	5	0
8	1	0	0	1	10	0	2	0	0
7	0	17	6	1	6	3	1	15	0
6	0	15	0	1	2	6	1	10	0
5	0	12	6	0	18	9	1	5	0
4	0	10	0	0	15	0	1	0	0
3	0	7	6	0	11	3	0	15	0
2	0	5	0	0	7	6	0	10	0
1	0	2	6	0	3	9	0	5	0

A Table for reducing Square Yards into Acres, Roods, and Perches.

Sq. Yds.	A.	R.	P.	Sq. Yds.	A.	R.	P.
30	0	0	1	400	0	0	13
60	0	0	2	500	0	0	17
91	0	0	3	600	0	0	20
121	0	0	4	700	0	0	23
151	0	0	5	800	0	0	26
200	0	0	7	900	0	0	30
300	0	0	10	1,000	0	0	33

Sq. Yds.	A.	R.	P.
1,100	0	0	36
1,200	0	1	0
1,300	0	1	3
1,400	0	1	6
1,500	0	1	10
1,600	0	1	13
1,700	0	1	16
1,800	0	1	20
1,900	0	1	23
2,000	0	1	26
2,100	0	1	29
2,200	0	1	33
2,300	0	1	36
2,400	0	1	39
2,500	0	2	3
2,600	0	2	6
2,700	0	2	9
2,800	0	2	13
2,900	0	2	16
3,000	0	2	19
3,100	0	2	22
3,200	0	2	26
3,300	0	2	29
3,400	0	2	32
3,500	0	2	36
3,600	0	2	39
3,700	0	3	2
3,800	0	3	6
3,900	0	3	9
4,000	0	3	12
4,100	0	3	16
4,200	0	3	19
4,300	0	3	22
4,400	0	3	25
4,500	0	3	29
4,600	0	3	32
4,700	0	3	35
4,800	0	3	39
4,900	1	0	2
5,000	1	0	5
5,100	1	0	9
5,200	1	0	12
5,300	1	0	15
5,400	1	0	19
5,500	1	0	22
5,600	1	0	25
5,700	1	0	28
5,800	1	0	32
5,900	1	0	35
6,000	1	0	38
6,100	1	1	2
6,200	1	1	5
6,300	1	1	8
6,400	1	1	12
6,500	1	1	15
6,600	1	1	18
6,700	1	1	21
6,800	1	1	25
6,900	1	1	28
7,000	1	1	31
7,100	1	1	35
7,200	1	1	38
7,300	1	2	1
7,400	1	2	5
7,500	1	2	8
7,600	1	2	11
7,700	1	2	15
7,800	1	2	18
7,900	1	2	21
8,000	1	2	24
8,100	1	2	28
8,200	1	2	31
8,300	1	2	34
8,400	1	2	38
8,500	1	3	1
8,600	1	3	4
8,700	1	3	8
8,800	1	3	11
8,900	1	3	14
9,000	1	3	18
9,100	1	3	21
9,200	1	3	24
9,300	1	3	27
9,400	1	3	31
9,500	1	3	34
9,600	1	3	37
9,700	2	0	1
9,800	2	0	4
9,900	2	0	7
10,000	2	0	11
10,100	2	0	14
10,200	2	0	17
10,300	2	0	20
10,400	2	0	24
10,500	2	0	27
10,600	2	0	30
10,700	2	0	34
10,800	2	0	37
10,900	2	1	0
11,000	2	1	4
11,100	2	1	7
11,200	2	1	10
11,300	2	1	14
11,400	2	1	17
11,500	2	1	20
11,600	2	1	23
11,700	2	1	27
11,800	2	1	30
11,900	2	1	33
12,000	2	1	37
12,100	2	2	0
12,200	2	2	3
12,300	2	2	7
12,400	2	2	10
12,500	2	2	13
12,600	2	2	17
12,700	2	2	20
12,800	2	2	23
12,900	2	2	26
13,000	2	2	30
13,100	2	2	33
13,200	2	2	36
13,300	2	3	0
13,400	2	3	3
13,500	2	3	6
13,600	2	3	10
13,700	2	3	13
13,800	2	3	16
13,900	2	3	20
14,000	2	3	23
14,100	2	3	26
14,200	2	3	29
14,300	2	3	33
14,400	2	3	36
14,500	2	3	39
14,600	3	0	3
14,700	3	0	6
14,800	3	0	9
14,900	3	0	13
15,000	3	0	16
15,100	3	0	19
15,200	3	0	22
15,300	3	0	26
15,400	3	0	29
15,500	3	0	32
15,600	3	0	36
15,700	3	0	39
15,800	3	1	2
15,900	3	1	6
16,000	3	1	9
16,100	3	1	12
16,200	3	1	16
16,300	3	1	19
16,400	3	1	22
16,500	3	1	25
16,600	3	1	29
16,700	3	1	32
16,800	3	1	35
16,900	3	1	39
17,000	3	2	2
17,100	3	2	5
17,200	3	2	9
17,300	3	2	12
17,400	3	2	15
17,500	3	2	19
17,600	3	2	22
17,700	3	2	25
17,800	3	2	28
17,900	3	2	32
18,000	3	2	35
18,100	3	2	38
18,200	3	3	2
18,300	3	3	5
18,400	3	3	8
18,500	3	3	12
18,600	3	3	15
18,700	3	3	18
18,800	3	3	21
18,900	3	3	25
19,000	3	3	28
19,100	3	3	31
19,200	3	3	35
19,300	3	3	38
19,400	4	0	1
19,500	4	0	5
19,600	4	0	8
19,700	4	0	11
19,800	4	0	15
19,900	4	0	18
20,000	4	0	21
20,100	4	0	24
20,200	4	0	28
20,300	4	0	31
20,400	4	0	34
20,500	4	0	38
20,600	4	1	1
20,700	4	1	4
20,800	4	1	8
20,900	4	1	11
21,000	4	1	14
21,100	4	1	18
21,200	4	1	21
21,300	4	1	24
21,400	4	1	27
21,500	4	1	31
21,600	4	1	34
21,700	4	1	37
21,800	4	2	1
21,900	4	2	4
22,000	4	2	7
22,100	4	2	11
22,200	4	2	14
22,300	4	2	17
22,400	4	2	20
22,500	4	2	4

Waterson's Manual of Commerce.

ACREME. A quantity of land consisting of ten acres.

ACRIMONY. (*Acrimonia*, Lat.) A sharp property in some plants and vegetables, by which they excoriate and blister the tongue, mouth, or other parts of the body, on being applied to them. The nature of this sort of acrimony has not yet been sufficiently examined by chemical investigation. It seems to differ in some measure according to the nature of the plants; as in the common onion, water-cresses, cabbages, &c., a part of their acrimony is lost, by their being exposed to a boiling heat; while other kinds, as ginger, capsicum, arum, &c., do not become much milder by undergoing that process.

The juice of the fungous excrescences of some trees possesses so much acrimony as to be capable of blistering; and some kinds of *fungi* contain a juice or liquor of a very corrosive quality; and it is probably on this account that many of those which are commonly procured disagree so much with the patient when made use of as articles of diet. By being more perfectly stewed, or otherwise prepared by means of heat, they might most likely be rendered safe and nutritious. Much caution should, however, he used, even when thus prepared, in eating such kinds as are unknown. "There be some plants," says Bacon, in his *Nat. Hist.*, "that have a milk in them when they are cut; as figs, old lettuce, sow-thistles, spurge. The cause may be an inception of putrefaction; for those milks have all an acrimony, though one would think they should be lenitive."

ACROSPIRE. (From *ακρος*, and *σπειρα*, Gr. Sometimes written provincially *acrespire* and *ackerspire; ackerspit* and *acrespit* are in like manner found for *acrospired.* See *Wilbraham's Cheshire Glossary*, and *Moore's Suffolk Words.*) A term used by maltsters for the shoot or sprout from the end of seeds when they begin to germinate. It is thus mentioned by Mortimer. "Many corns will smelt, or have their pulp turned into a substance like thick cream; and will send forth their substance in an *acrospire.*" And again, "for want of turning when the malt is spread on the floor, it comes and sprouts at both ends, which is called *acrospired*, and is fit only for swine."

ADAPTER. (*Adapto*, Lat.) In the management of bees, is a board used to place the hives or glasses upon.

ADDER. (Aetteꞃ, aettoꞃ, naꝺꝺꞃe, as it seems, from eıtteꞃ, Sax. poison; Moes-Goth. *nadr*, vipera; Teut. *adder.*) A viper, a poisonous reptile, perhaps of any species. In common language, however, adders and snakes are not the same, the term adder being generally understood to imply a viper. See ANIMAL POISONS.

ADDER'S-TONGUE (*Ophioglossum vulgatum*). The name of a pernicious herb or weed, which has, however, some excellent medicinal properties.

This wild plant abounds in moist meadows, and is found in April and May, after which period it dies away. It must be sought for *in the grass, where* it conceals its one leaf, *and the little spike of seeds arising* from its base, which has procured it the name of Adder's-tongue. This spike being indented on each side like a file, resembles in form the tongue of those disgusting and stealthy reptiles. Its one oblong leaf is a fine bright green colour, thick, smooth, fleshy, and of an oval figure, without ribs or veins. Its stalk is four inches high, and its spike rises the same height above it. The seed-vessel, or tongue, is notched on either side. Its root is fibrous. The leaves made into an oil is a fine balsam for green wounds. The juice, drank with horsetail water distilled, is a remedy for internal wounds. It is also excellent against fluxes and the whites. An ointment made of the leaves, with lard, is an admirable application to burnings, sores, hot tumours, aposthumes, and inflammations. The leaves infused, or the whole plant decocted, is a fine drink in fevers. It is also a cooling and strengthening eye-water. The dried herb in powder is good in ruptures, applied outwardly, and taken inwardly. (*L. Johnson.*)

ADDER-STUNG. Being stung by an adder. The best remedy for cattle which have been bit by any venomous reptile is an application of ammonia (hartshorn) to the part; but excision of the place affected is frequently desirable.

ADDLE EGGS. (From aꝺel, a disease, Sax. according to Skinner and Junius; perhaps from ẏꝺel, idle, barren, unfruitful. The latter of the preceding etymologies, which Dr. Johnson has given, may be rejected; but we may safely refer to the Saxon aꝺel, *morbus*, a disease; or to the verb aꝺlean, to be sick; or to the Brit. *hadyl*, corrupt, rotten; *hadlu*, to corrupt, to putrefy. Thus, Verstegan says, "we yet call eggs *addle*, when they are corrupt." *Addle*, in the Lancashire dialect, is unfruitful.) Originally applied to eggs, and signifying such as produce nothing, but grow rotten under the hen.

> There's one with truncheon, like a ladle,
> That carries eggs too fresh or *addle;*
> And still at random, as he goes,
> Among the rabble rout bestows. (*Hudibras.*)

ADEPS. In veterinary science, animal oil or fat. The fat differs in different animals; and hence it has received different names. In the horse it is called grease; in the ox and sheep, tallow, fat, suet; and in the hog, hog's lard. At a low temperature all these possess various degrees of consistence; but in the living animal they all exist in a fluid state, and are distributed over various parts of the body. An immense quantity of fat is often found in the belly, all deposited in extremely small cells, which have no communication with each other. No fat is ever found within the skull.

Fat performs important functions in the animal economy. When the supply of aliment, for example, is greater than the demand, the surplus is stored away in the form of fat; and when the demand, either from deficiency of food, over-exertion, or disease, becomes greater than the supply, then the absorbents carry the fat into the circulation, and thus, for a time, the evils that would very soon arise from a defect in the quantity of blood are prevented. Some animals accumulate fat more readily than others. Health, a round chest, a short back, and tranquil temper are highly favourable to its formation; and when to these qualities are added inaction, clean litter, and a plentiful supply of nourishing food, the animal is soon fit for the butcher. A warm atmosphere, provided it be a pure one, is also favourable to fattening. (*Miller's Dictionary.*)

ADONIS FLOWER, or FLOS ADONIS, Pheasant's eye. (Lat. *Adonis annua.*) This is a very pretty annual plant, bearing a deep red flower, and growing from one to two feet high. It blossoms from July to November. If the seeds are allowed to fall from the plant and sow themselves, they come up much finer than when delayed till the spring. This flower grows freely in a light soil, but it succeeds very well in almost any sort of earth, well dug and raked. It blooms early in a warm situation, and later in a shady one. The *perennial Adonis*, with yellow flowers, blooms very handsomely. It has a perennial root, but an annual stalk, and produces its flowers in March and April. Part the roots in autumn to increase the plant. If you sow for new plants, sow the seed in autumn in an east border; and when they rise in the spring, keep them gently moist, and very free from weeds. Plant them out the following autumn, and when they have stood another year, they may be placed where they are to remain.

This wild plant grows very abundantly in corn-fields, in the western parts of England, in May, June, and July. It is known by its bright scarlet flowers, with a black centre, and its leaves divided into many parts of a bright green colour. The seed bruised, and given in wine or beer, is good in cholic and pains of the stomach. It is good likewise against stone.

The herb infused, and drank hot, promotes gentle perspiration. (*L. Johnson.*)

ADOXA MOSCHATELLINA. See MOSCHATELL.

ADULT. (From the Latin *adultus.*) A term sometimes applied to such plants or animals as have arrived at some degree of strength, or are full-grown.

ADZ, or ADZE. (*A corruption from addice*, derived from the Saxon aꝺeꞅe, an axe.) "The addice (says Moxon, in his *Mechanical Exercises*,) hath its blade made thin and somewhat arching. As the axe hath its edge parallel to its handle, so the *addice* hath its edge athwart the handle, and is ground to a basil on its inside to its outer edge." An edge-tool of the axe kind, much used by coopers. It is a very useful instrument for many purposes of the farmer.

AEGLUS. The chameleon thistle.

AERATION. The process by which the soil is exposed to the air and imbued therewith, air being indispensable to the healthy growth of plants. When a flower-pot is filled with rather dry earth, if it be plunged under water a profusion of air bubbles will be seen to rise, owing to the water penetrating between the particles of the dry earth, and forcing out the air previously lodged there. As the more loose and porous a soil is, the greater quantity of air it will contain, it will follow, that the more a soil is ploughed and harrowed, or dug and raked, the better it will be aerated — one of the chief beneficial effects of frequently repeating these operations.

Besides the direct influence of the atmosphere, the agency of water is all-important in the process of aeration. All water openly exposed contains more or less atmospheric air; and, in consequence of this, it acquires an agreeable taste, always destroyed by boiling, which renders it vapid and disagreeable, by expelling the air. The importance of air contained in water to the growth of plants appears from water being found beneficial in proportion as it has had opportunities of becoming mixed with air. But the best water, with respect to the properties of the air it contains, is rain, which, falling in small drops, often tossed about by the wind, has an opportunity of collecting a large proportion of air, and, according to Liebig (*Organic Chem.*), ammonia, during its descent to the earth; and hence the smaller the bore of the holes in a garden watering-pot, the better; and the more minutely the garden-engine scatters the water, the more advantageously, so far as the air is concerned.

There is another point of view in which aeration appears beneficial, arising from the excrementitious matters thrown into the soil by growing plants, as ascertained by M. Macaire; for as these matters become decomposed in the processes of fallowing, irrigation, and draining, the gases there produced would not so readily be carried off from the soil, but for a due circulation of the common air through the earth. See GASES, *their use to vegetation.* (*Miller's Dictionary.*)

AERIE. (From the French *aerie*, sometimes written *aiery* or *eyrie*, as derived from the Teutonic *ey*, ovum.) Dr. Johnson has given only the imperfect definition of Cowel, viz. the proper word, in hawks, and other birds of prey, for that which we call a nest in other birds. It means also a young brood of hawks, as well as the nest in which they are produced.

AEROLITES. (From the Greek αηρ, air, and λιθος, a stone.) Meteoric stones, bodies that fall from the heavens. The origin of these remarkable bodies is still a mystery; but of the truth of their existence, and of their actual descent to the earth from very lofty regions of the air, there can be no doubt. We owe to the Hon. Edward Howard, F.R.S., an admirable paper on the nature and properties of many of these substances. He collected from various quarters authentic specimens, examined their physical characters, and subjected them to a rigid chemical analysis; and the result of his inquiries was, that stones which fell in England, in Italy, in Germany, in the East Indies, and in a great variety of other places, and whose origin rested on the very best testimony, all bore to each other the most perfect resemblance, were all composed of the same substances, and, moreover, that they differed, in many most essential particulars, not only from the minerals of the neighbourhood in which they fell, but also from all hitherto discovered on the earth.

As a general description, we may observe, that these bodies are all covered with a thin crust of a deep black colour, without gloss, and having their surfaces roughened with small asperities. Their internal texture is granulated, more or less fine, of a greyish colour, and in which four different substances may clearly be distinguished by a lens. The most abundant vary in size from a pin's head to that of a pea, and are hard enough to produce faint sparks with a steel. Their specific gravity varies from 3·352 to 4·281. The chemical composition of these stones, from whatever quarter of the globe collected, is very similar. Mr. Howard found in one that fell in Yorkshire,

Silica	75 parts.
Magnesia	37 —
Oxide of iron	48 —
Oxide of nickel	2 —
(*Phil. Trans.*, 1802.)	162

A similar origin has been ascribed to the solitary masses of iron found in Bohemia, Siberia, Senegal, and South America. One in the province of Bahia, in Brazil, is seven feet long, four feet wide, and two feet thick. Its weight is about 14,000 lbs. In the most authentic instances that have occurred, a luminous meteor, exploding with a loud noise, has immediately preceded the descent of these bodies. It would be easy to form a catalogue of these bodies reaching to the most ancient times, but we shall limit ourselves to some authentic examples of the present century.

Date.	Place and Authority.
1802, September	Stones in Scotland. — *Monthly Mag.* Oct. 1802.
1803, April 26th	Stones in the environs of Aigle.
1803, July 4th	Stones at East Norton. — *Phil. Mag.*
1803, October 8th	A stone near Apt.
1803, Dec. 13th	Near Eggenfelde. — *Imhof.*
1804, April 5th	Near Glasgow. — *Phil. Mag.*
1805, March 25th	Stones at Doroninsk, in Siberia. — *Gilbert's Annals.*
1805, June	Stones at Constantinople. — *Kongas Ingigian.*
1806, May 17th	A stone in Hampshire. — *Monthly Mag.*
1807, Dec. 14th	Stones near Weston, in Connecticut.
1808, May 22d	Near Stanneru, in Moravia.
1808, Sept. 3d	At Lissa, in Bohemia. — *De Schreibers.*
1810, January 30th	At Casswell, in America. — *Phil. Mag.*
1810, July	A large stone at Shahabad, in India. The meteor caused great havock. — *Phil. Mag.*
1810, August	A stone in the county of Tipperary. Higgins has published its analysis.
1810, Nov. 23d	Stones at Charronville, near Orleans.
1811, July 8th	Stones at Berlanguillas.
1812, April 10th	Stones near Toulouse.
1812, April 15th	A stone at Errleben. — *Gilbert's Annals.*
1813, March 14th	Stones at Cutro, in Calabria, during the fall of a great quantity of red dust. — *Bibl. Brit.*, Oct. 1813.
1814, Nov. 5th	At Doab, in India. — *Phil. Mag.*
1815, Feb. 18th	A stone at Duralla, in India. — *Phil. Mag.*
1818, March, 30th	A stone near Zaborzica, in Volhynia. Analysed by M. Laugier. — *Ann. de Museum.*
1824, January	Many stones near Arnazzo, in the territory of Bologna; one of them, weighing twelve pounds, is preserved in the Observatory of Bologna. — *Diario di Roma.*
1827, October 8th	A shower of stones near Belostok, in Russia. — *Petersburgh Gazette.*

(*Miller.*)

Those who wish to investigate this curious subject further will find it most ably and copiously treated in Chladni's work, "*Ueber Feuer-Meteore, und über die mit denselben herabgefallenen Massen.*" Gilbert's *Annalen der Physik*, and Continuation by Poggendorf. Izarn's *Lithologie Atmosphérique*, and *Mémoire Historique et Physique sur les Chûtes des Pierres*, par Bigot de Morogues, Orleans, 1812.

ÆSCULUS. The horse chestnut. See Chesnut Tree.

ÆTHUSA CYNAPIUM. See Fool's Parsley.

AFFUIAGE. A right of cutting fuel wood.

AFRICAN MARIGOLD (*Tagites erecta*, Lin.). A favourite hardy annual, which does not come from Africa, as its name would indicate, but from Mexico. See Marigold.

AFTER-BIRTH. In veterinary practice, the secundine, or membrane in which the birth was involved.

AFTER-GRASS, or AFTERMATH.

The second crop of grass, or that which springs after mowing, or the grass cut after some kinds of corn crops.

The composition of the after-grass generally varies considerably from that of the first or spring crop. The nutriment of the latter, from most of the grasses, is materially less than that of the former. This was clearly ascertained by the elaborate experiments of the late Mr. G. Sinclair, the results of which are dispersed throughout his valuable work on the Grasses. To give a few instances only —

	First Crop.		Second Crop.	
	dr.	gr.	dr.	gr.
64dr. of round-panicled cock's-foot grass afforded of nutritive matter	2	1	1	2
Meadow fox-tail grass - -	3	1	2	0
Larger-leaved creeping bent-crested dog's-tail grass - - -	4	1	2	2
Hard fescue grass - - -	3	2	1	1
Welch fescue grass - - -	2	1	1	1
Yellow oat grass - - -	3	3	1	1

And the same remark applies to the rye grass (*Solium perenne*), not only of upland pastures but of meadows. Thus, Sinclair found (*Hort. Gram. Wob.* 384.) that this grass when flowering, taken from a water meadow that had been fed off with sheep till the end of April, yielded of nutritive matter 72 grs. But the same grass from the same meadow which had not been fed off, yielded 100 grs.

The same weight of this grass, from a rich old pasture that had been shut up for hay at the same time, yielded of nutritive matter 95 grs. But the grass from the same field, which had not been depastured, yielded 120 grs.

Some of them, however, contain exactly as much nutritive matter in the aftermath as in the first crop: thus, 64 drs. of the

	First Crop.		Latter Crop.	
	dr.	gr.	dr.	gr.
Sweet-scented soft grass yielded -	4	1	4	1
Smooth-stalked meadow grass -	1	3	1	3
Short blue meadow grass - -	2	0	2	0
Cow grass - - - -	2	1	2	1
Creeping fescue - - -	1	2	1	2

and one or two were found to contain more nutritive matter in the aftermath than in the first crop: thus, 64 dr. of the

	First Crop.		Latter Crop.	
	dr.	gr.	dr.	gr.
Sweet-scented vernal grass yielded	1	3	2	1

In the vicinity of London most of the after-grass, or second crop, was formerly made into hay, and was considered of considerable value for the ewes of suckling lambs, and milch cows; but in harvesting this crop, so as to make it sell well, great nicety is requisite, the nature of after-grass being more soft, spongy, and porous than the first growth, and consequently more liable to be hurt by rains. The practice is therefore on the decline.

In the midland counties their management of the feeding off the after-grass is in general judicious. It is commonly suffered to get up to a full bite before it is broken, and not turned in upon as soon as the hay is off, or suffered to stand until much of it becomes improper for the food of animals. Farmers, however, make a point of saving autumnal grass for spring feed, and contend that it is the most certain, and, on the whole, the best spring feed yet known. This would seem to be a wasteful practice, at least in respect to the more forward after-grasses. These ought certainly to be broken sufficiently early to be eaten, without waste, before winter sets in; and the latest, that is to say, the shortest, may be shut in for spring feed. If after-grass be too long and gross, it is apt to lodge, and rot upon the ground in winter; therefore, on rich lands, it ought always to be more or less off before Michaelmas, in order to prevent its being wasted or lost in the winter.

It is remarked by the author of "Practical Agriculture," that, "In some districts much of the after-grass is frequently cut and made into a green soft sort of hay, as has been already mentioned; but in others it is fed off by live stock in the autumn." And that "both modes may be useful under different circumstances. In situations where plenty of manure can be procured, as near large towns, and where the chief dependance is upon the sale of hay, or where lamb-suckling prevails, it may frequently be a beneficial practice to take a second crop of hay, as the first may by that means be more fully spared for sale, the after-crop supplying the cows or other cattle that may be kept on the farm. But in cases where manure cannot easily be obtained, and there is no local practice carried on which requires such sort of hay, it is better to let it be fed off by stock than run the risk of exhausting and injuring the ground by taking off repeated crops. There is also another circumstance," he says, "to be considered in this business, which is, that of the state of the land in respect to dryness, as where it is low, wet, and very retentive of moisture, it may be often more hurt by the poaching of the cattle in feeding off the herbage than by a second crop of hay." But that, "independent of these considerations, it may, in general, be a more safe and usual practice to eat off the after-grass by stock, and only take one crop of hay, as by such means a more abundant annual produce may be afforded, and the land sustain less injury."

It is, however, added, that "where a crop of rowen is made into hay, the most profitable application of it is probably in the foddering of such cows as are in milk; as it is well suited, by its grassy quality, and its not heating so much, when well made, as other sorts of hay in the stack, to afford a large flow of milk. It is this reason that induces the cow farmers to cut their grass so many times in the summer. Another beneficial application of this hay is, as has been seen, in the feeding of such ewes as are employed in the suckling of house-lambs during the winter season; the intention in this case is the same as in that of the preceding instance. There is another advantageous use to which this sort of produce may be applied, which is that of supporting young calves, and all sorts of young cattle that are kept as store stock." And that, "where sheep require the support of hay in the winter season, it is also well adapted to that use."

In the manner of feeding after-grass, there is also much variety in different districts. "It has," the same author says, "been observed by a farmer in Middlesex, that the condition on which he rents his farm is that of taking out the cattle at Michaelmas, but that sheep remain till February." In that county the practice is to turn on the cattle immediately after mowing; but in the northern districts, this grass, to which they have given the name of *eddish*, is kept till November, or even a later period, for the purpose of furnishing fat stock, or for the pasturage of milch cows, from which a superior quality of cheese is made, and by which time it has attained a considerable head: however, this latter practice would seem to be attended with some loss, as has been shown from its being trodden and trampled under foot. In the stocking of after-grass, Marshall found the midland graziers of opinion, that one cow to an acre, on well-grown after-grass, was an ample stock. Good grass-land may, however, admit something more; and instead of pasturing of rowen, or after-grass, by heavy cattle in the autumn, to avoid poaching the ground, particularly at a late period in that or the winter season, it has been recommended by Dr. Wilkinson, "to confine the consumption of this grass principally to the support of sheep, unless in very favourable seasons, or where the soil is uncommonly dry; in which cases milch cows, or other heavy cattle, may be admitted without inconvenience."

In some places it is the practice, as "where there is a great scarcity of spring feed, to reserve after-grass in the autumn for spring use." Some, on the basis of experience, contend that it is the most certain, and, on the whole, the best spring feed yet known. It would seem, however, as has been shown, to be a wasteful practice, at least in respect to the more forward after-grasses. The forwardest ought certainly to be eaten without waste before winter sets in; and the latest, that is, the shortest, be shut up for spring *feed.* Arthur Young, it is stated, found, *from repeated experiments,* as suggested above, "that old after-grass feeds sheep that give milk better than turnips, which are more adapted to the fattening of stock; and that this grass holds to a period, if wanted, when most other resources fail, the last half of April and the first half of May — periods always of want and difficulty, where rye-grass is not sown." Marshall also assures us, that as a certain and wholesome supply of food for ewes and lambs in the early spring, the preserved pasture is to be depended on as "the sheet anchor, in preference to turnips, cabbages, or any other species whatever, of what is termed spring feed:" and the same thing has been experienced by Dr. Wilkinson, who has observed, that "this food with him afforded a more nutritive and healthful quality of milk from the ewes to their tender lambs than turnips, even in their best state." But however useful after-grass pastures may be under this management, there is evidently a great loss of food incurred by it, especially in severe winters. (*Sinclair's Hort. Gram.; Lowe's Prac. Agr.*)

AFTER-SWARMS. In the management of bees, are those that leave the hive some time after the first set have swarmed. See Bees.

AGARIC OF THE OAK. In Farriery, a substance sometimes employed for the restraining of hæmorrhages, or the bleeding of small vessels.

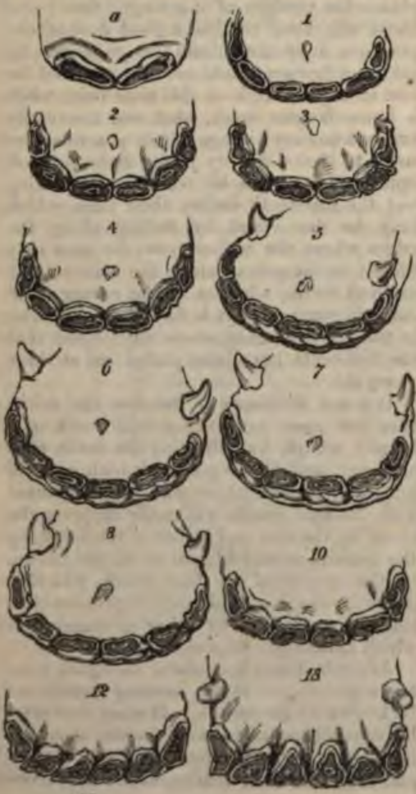
AGARICUS. See Mushroom.

AGAVE. In Botany, comprehends those plants which gardeners call American aloes.

AGE OF ANIMALS. The age of a horse may be ascertained by his mouth, and the examination of his teeth, till he is eight years old, after which the usual marks commonly wear out. These are usually forty in all; of which twenty-four are double teeth, and, from their office, denominated grinders, four tushes, or corner teeth, and twelve fore-teeth.

The first which appear are the foal-teeth, which generally begin to show themselves a month or two after foaling; they are twelve in number, six above and six below, and are easily distinguished from the teeth that come afterwards, by their smallness and whiteness, having some resemblance to the incisores, or fore-teeth of man.

When the colt is about two years and a half old, he commonly sheds the four middlemost of his foal-teeth, two above and two below; but sometimes none are cast till near three years old. The new teeth are readily distinguished from the foal-teeth, being much stronger, and always twice their size, and are called the nippers or gatherers, being those by which horses nip off the grass when they are feeding in the pastures, and mouths good for a long time, their teeth being white, even, and regular till they are sixteen years old and upwards, together with many other marks of freshness and vigour; but when a horse comes to be very old, it may be discovered by several indications, the constant attendants of age; such as his gums wearing away insensibly, leaving his teeth long and naked at their roots; the teeth also growing yellow, and sometimes brownish. The bars of the mouth, which in a young horse are always fleshy, and form so many distinct ridges, are in an old horse, lean, dry, and smooth, with little or no rising. The eye-pits in a young horse are generally filled up with flesh, look plump and smooth; whereas, in an old one, they are sunk and hollow, and make him look ghastly. There are also other marks which discover a horse to be very old, as grey horses turning white, and many of them being all over flea-bitten, except their joints. This, however, happens sometimes later, and sometimes sooner, according to the variety of colour and constitution. Black horses are apt to grow grey over their eye-brows, and very often over a great part of their faces; and all horses, when very old, sink more or less in their backs; and some horses, that are naturally long-backed, grow so hollow with age, that it is scarcely possible to fit them with a saddle.



The various progressive changes that take place in the appearance of the teeth of horses at different ages, from a few weeks old (marked *a* in *fig.*) to 1, 2, 3, 4, 5, 6, 7, 8, 10, 12, and 18 years, may be seen in the foregoing dental map constructed by Mr. Blaine (*Encyc. of Rural Sports*, 273.).

Age of Neat Cattle. The age of *cows*, *oxen*, and *bulls* is known by the teeth and horns. At the end of about two years they shed their first fore-teeth, which are replaced by others, larger, but not so white; and before five years all the incisive teeth are renewed. These teeth are at first equal, long, and pretty white; but as the animals advance in years, they wear down, become unequal and black. These animals likewise shed their horns at the end of three years; and they are replaced by other horns, which, like the second teeth, continue. The manner of the growth of these horns is not uniform, nor the shooting of them equal. The first year, that is the fourth year of the animal's age, two small pointed horns make their appearance, neatly formed, smooth, and towards the head terminated by a kind of button. The following year this button moves from the head, being impelled by a horny cylinder, which, lengthening in the same manner, is also terminated by another button, and so on; for the horns continue growing as long as the animal lives. These buttons become annular joints or rings, which are easily distinguished in the horn, and by which the age of the creature may be easily known; counting three years for the point of the horn, and one for each of the joints or rings.

Age of Sheep. — The age of these animals is known by their having, in their second year, two broad teeth; in their third year, four broad teeth; in their fourth year, six broad teeth; and in their fifth year, eight broad teeth before. After which, none can tell how old a sheep is while their teeth remain, except by their being worn down.

About the end of one year, rams, wethers, and all young sheep, lose the two fore-teeth of the lower jaw; and they are known to want the incisive teeth in the upper jaw. At eighteen months, the two teeth joining to the former also fall out; and at three years, being all replaced, they are even and pretty white. But as these animals advance in age, the teeth become loose, blunt, and afterwards black. The age of the ram, and all horned sheep, may also be known by their horns, which show themselves in their very first year, and often at the birth, and continue to grow a ring annually to the last period of their lives.

Age of Goats. — The age of these animals is known by the same marks as those of sheep, as, by their teeth, and the annular rings on their horns.

Age of Plants. — This, however difficult to ascertain, may be attempted in various ways, as from their general appearances and growth. The continuance of life is extremely different in plants, and from this difference, they are generally divided into annual, biennial, and perennial.

The infancy of plants, like that of animals, is marked by the characters of weakness and tenderness; in the youthful state they acquire beauty and size, the vessels attract and convey their juices; the full growth is crowned with the robust fibre, and full exercise of all its functions; the fruit therefore ripens; but old age advancing, the vessels begin gradually to harden and lose their tone, they droop, the juices move no longer with equal celerity as in youth, the vital powers cease, and they die.

Age of Trees. — The age of some trees may be determined from the number of ligneous annuli or rings. In many sorts of trees it is, however, very difficult to distinguish these, and in others, utterly impossible. Some trees arrive to an astonishing age; thus, the cedars of Lebanon have existed for 2000 years. In this country the oak is the most durable.

Many instances of the extreme old age of trees exist in these islands: at Ellerslie, three miles from Paisley, at the birthplace of William Wallace, is an oak, in which, according to the tradition of the neighbourhood, that celebrated chieftain once sheltered himself with many of his followers. And many others either till lately or still abound in England; for instance, there was one at Langley Wood, near Downton (*Dodsley, An. Reg.*, 1758, p. 116.), supposed to be of 1000 years' growth; then there is the oak of William Rufus, in the New Forest; the Fairlop oak of Hainault Forest; Fisher's oak on the road to Tonbridge; Hern's oak in Windsor Forest; Queen Elizabeth's oak at Heveningham, in Suffolk; the Whinfield oak, near Appleby, all of great antiquity. (*Phillips's Fruits; Withers on Planting.*)

At Ankerwyke, near Staines, is a yew tree, that has certainly been growing there since the time of King John; and at Fountain's Abbey, in Yorkshire, there are yew trees that are probably some centuries older; and the celebrated Spanish chestnut tree, growing in Lord Ducie's *park, at Tortworth,* in Gloucestershire, which in the reign of John was called the Great Chestnut of Tortworth, was certainly growing there in the days of William of Normandy.

At Trons, in the Grisons, there existed in 1798 a lime tree which was a celebrated plant in the year 1424, and which, when last measured, was 51 feet in circumference. The age of this specimen could not have been less than 580 years.

In the year 1776 there existed in the palace garden of Granada some famous cypresses, which were thought to have been at least 800 or 900 years old.

Some of the trees of oriental countries, however, attain to still greater ages than any of these: thus the Baobab trees of Africa, according to Adanson, are 5150 years old; and Decandolle considers the deciduous cypress trees of Chapultepec in Mexico to be still older.

It would seem, that, after a certain age, all trees decrease in their rapidity of growth, a fact of some importance to be known to planters; the oak, for instance, between its fortieth and sixtieth years; the elm after its fiftieth; the spruce after its fortieth; the yew after its sixtieth: of this rate of growth, Decandolle has constructed the following table: —

Table of the Rate of Increase in Diameter of certain Exogenous Trees.

Years.	Oaks.		Larch.	Elm.	Spruce.	Yew.
	Quercus pedunculata.	Quercus sessiliflora.				
1 to 10	54	10	48	16	41	8
10 — 20	62	16	61	44	54	11½
20 — 30	54	22½	58	58½	52	12
30 — 40	60	12	72	72	45	10½
40 — 50	48	13½	46	88	35½	7
50 — 60	44	14	57	74	36	12½
60 — 70	56	10¾	46	78½	18	8
70 — 80	44	11	29	66	17	
80 — 90	32	9½	30	59	13	
90 — 100	32	9½	24	45	13	
100 — 110	30	9½	32	30	22	
110 — 120	36	9	26	30	22	
120 — 130	30	9½	20½	24		
130 — 140		10	22	24		
140 — 150		8½	23	18		

Mr. Waistell has given the following Tables respecting the growth of timber, showing every fourth year, from 12 to 100, the progressive annual increase in the growth of trees, and gradual decrease in the rate per cent. per annum, that the annual increase bears to the whole tree. The whole height of the trees is taken to the top of the leading shoot, and the girt in the middle; but no account is taken of the lateral branches. If trees increase twelve inches in height and one in circumference *annually, their* increase will be as under *mentioned:* —

Years old, and Feet high.	Girt.	Contents.			Years old,' and Feet high.	Girt.	Contents.				One Year's Increase.				Rate per Cent. of Increase.
	Inches.	Ft.	In.	Pts.		Inches.	Ft.	In.	Pts.	Sds.	Ft.	In.	Pts.	Sds.	
12	1½	0	2	3	13	1⅝	0	2	10	3	0	0	7	3	26·8
16	2	0	5	4	17	2⅛	0	6	4	9	0	1	0	9	19·9
20	2½	0	10	5	21	2⅝	1	0	0	8	0	1	7	8	15·7
24	3	1	6	0	25	3⅛	1	8	4	1	0	2	4	1	13
28	3½	2	4	7	29	3⅝	2	7	9	1	0	3	2	0	11
32	4	3	6	8	33	4⅛	3	10	9	6	0	4	1	6	9·67
36	4½	5	0	9	37	4⅝	5	5	11	5	0	5	2	5	8·5
40	5	6	11	4	41	5⅛	7	5	8	10	0	6	4	10	7·6
44	5½	9	2	11	45	5⅝	9	10	7	9	0	7	8	9	6·96
48	6	12	8	0	49	6⅛	12	9	2	3	0	9	2	3	6·38
52	6½	15	3	0	53	6⅝	16	1	10	2	0	10	10	2	5·9
56	7	19	0	8	57	7⅛	20	1	1	7	1	0	5	7	5·4
60	7½	23	5	2	61	7⅝	24	7	6	6	1	2	4	6	5·1
64	8	28	5	4	65	8⅛	29	9	7	0	1	4	3	0	4·76
68	8½	34	1	4	69	8⅝	35	7	8	11	1	6	4	11	4·49
72	9	40	6	0	73	9⅛	42	2	6	4	1	8	6	4	4·2
76	9½	47	7	6	77	9⅝	49	6	5	2	1	10	11	2	3·98
80	10	55	6	8	81	10⅛	57	7	11	9	2	1	3	9	3·79
84	10½	64	3	8	85	10⅝	66	7	7	8	2	3	11	8	3·6
88	11	73	10	4	89	11⅛	76	5	11	1	2	7	7	1	3·5
92	11½	84	5	9	93	11⅝	87	3	4	0	2	9	7	0	3·3
96	12	96	0	0	97	12⅛	99	0	4	6	3	0	4	6	3·15
100	12½	108	6	0	101	12⅝	111	9	6	8	3	3	6	8	3

If the trees increase eighteen inches in height, and two inches in circumference annually, their increase will then be: —

Age of Trees.	Height.	Girt.	Contents.			Age of Trees.	Height.	Girt.	Contents.				One Year's Increase.				Rate per Cent. of Increase.
	Feet.	Inch.	Ft.	In.	Pt.		Feet.	Inch.	Ft.	In.	Pt.	Sd.	Ft.	In.	Pt.	Sd.	
12	18	3	1	1	6	13	19½	3¼	1	5	1	0	0	3	7	0	26·5
16	24	4	2	8	0	17	25½	4¼	3	2	4	0	0	6	4	0	19·8
20	30	5	5	2	6	21	31½	5¼	6	0	3	6	0	9	9	6	15·6
24	36	6	9	0	0	25	37½	6¼	10	2	0	6	1	2	0	6	13
28	42	7	14	3	6	29	43½	7¼	15	10	6	0	1	7	0	0	11
32	48	8	21	4	0	33	49½	8¼	23	4	8	0	2	0	8	0	9·6
36	54	9	30	4	6	37	55½	9¼	32	11	7	6	2	7	1	6	8·5
40	60	10	41	8	0	41	61½	10¼	44	10	3	6	3	2	3	6	7·6
44	66	11	55	5	6	45	67½	11¼	59	3	10	0	3	10	4	0	6·9
48	72	12	72	0	0	49	73½	12¼	76	7	1	0	4	7	1	0	6·3
52	78	13	91	6	6	53	79½	13¼	96	10	11	6	5	4	5	6	5·8
56	84	14	114	4	0	57	85½	14¼	120	6	8	6	6	2	8	6	5·4
60	90	15	140	7	6	61	91½	15¼	147	9	2	0	7	1	8	0	5
64	96	16	170	8	0	65	97½	16¼	178	9	4	0	8	1	4	0	4·7

(*Trans. Soc. of Arts*, vol. xxvi.)

AGENTS. Land agents, are very commonly persons of the legal profession, little conversant with the ordinary details of farming affairs. This is not always a desirable state of things — it often leads to oppression, to discord, and to very bad farming.

An agent cannot bind his principal beyond the extent of his limited authority (*Fenn* v. *Harrison*, 3 T. R. 575.). For although a principal is bound by all the acts of his general agent, yet where he appoints an agent *for a particular purpose*, he is only bound to *the extent of the authority given*. (*E. I. Company* v. *Hensley*, 1 Espinasse, 112.) Thus says Woodfall (*Law of Landlord and Tenant*).

"Agreements for a lease, made with an agent who acts under a power of attorney, and a lease executed by such agent in pursuance of the agreement, shall bind the principal. (*Hamilton* v. *Clanricarde*, 1 Bro. P. C. 341.)

And where a man does such an act as cannot be good by any other means but by virtue of his authority, it shall be intended to be an execution of his authority; but where a man has an interest and an authority, and does an act without reciting his authority, it shall be intended to be done by virtue of his interest. (1 *Lord Ray*. 658—660.)

A bailiff of a manor cannot, *by virtue of his office*, make leases for years; for his business is only to collect rents, gather the fines, look after the forfeitures, and such like: but he hath no estate or interest in the manor itself, and therefore cannot contract for any certain interest thereout. But the lord of the manor may give him a special power to make leases for years, as he may do to any stranger, and then such leases, if they are pursuant to the power, and made in the name of the lord, will be as good as leases by the lord himself; for the bailiff, though he hath such power, cannot make them in his own name. (*Bac. Ab. Tit. Leases.*)

But a general bailiff of a manor may make *leases at will*, without any special authority, because, being to collect and answer the rents of the manor to his lord, if he could not let leases at will, the lord might sustain great prejudice by absence, sickness, or other incapacity to make leases when any of the former leases were expired; and such leases at will are for the benefit of the lord, and can be no ways prejudicial to him, because he may determine his will when he thinks fit. Such, however, must be taken to be strict tenancies at will; otherwise, as general tenancies at will are construed to be tenancies from year to year, and half a year's notice to quit is required, before a tenant can be ousted, such tenancies might prove very prejudicial to the lord's interest. But if the bailiff of a manor hath a special power to make leases for years, as he ought to make them in the name of his master, so they ought to be made in writing, that the authority may appear to be pursued; a parol lease such bailiff has no power to make."

A bailiff may receive rents and may repair, but not alter, even the materials of the repairs of a building, as for instance, by substituting slate for thatch. He may, in fact, do any thing that is for his master's benefit, but not to his prejudice without his assent.

AGISTMENT. A term seemingly from the old law French word *giste*, which signifies a lying-place, and therefore, as applied to cattle, supposes pasturing. Agistment accordingly is the pasturing of cattle, the property of another, on the payment of a certain sum of money, or other valuable consideration; and the animals thus grazed are sometimes called *gistments*. "If," says Blackstone, "a man takes in a horse or other cattle to graze and depasture in his grounds, which the law calls *agistment*, he takes them upon an implied contract to *return them on demand to the owner. (Cro. Car. 271.)* But he cannot like an innkeeper retain them till payment." Agistment also means the profit arising from this practice. The tithe of agistment is the tenth part of the value for the keeping or depasturing such cattle as are liable to pay it; but it may be avoided by cutting the grass for stall-feeding.

AGREEMENT. A very considerable proportion of the lands of England are held by agreements between the landlord and the tenant. See Leases.

These are best made in writing, although not absolutely necessary for terms not exceeding three years. (*Crosby* v. *Wordsworth*, 6 East, 602.) An agreement to make a lease is, in equity, a good lease. (*Hamilton* v. *Cardness*, 2 Bro. P. C. 125.) But whether an instrument shall amount to a present lease or only as an agreement for a future lease, will depend on the intention of the parties, to be collected from the instrument itself. (*Morgan* v. *Bissett*, 3 Taunton, 65. *Baxter* v. *Browne*, 2 W. Black. 973.)

The following skeleton form of an agreement, or short demise from year to year, of a farm, is abridged from *Woodfall's Law of Landlord and Tenant*, by *Harrison*, p. 974.; and with the necessary alterations according to the *custom of counties* (see which), may serve as a guide to many of my readers.

Memorandum made the day of , in the year of our Lord 184 , between *A. B.* (*Landlord*) of , of the one part, and *C. D.* (*Tenant*) of , in the county of , farmer, on the other part; whereby the said *A. B.* lets, and the said *C. D.* agrees to take and hold of him as tenant, all that and those farms and lands called , situate in the parish of , in the county of (excepting , *here insert names of any excepted fields, &c.*), from Michaelmas-day next ensuing upon the terms following; that is to say, tenant to be deemed tenant from year , to enter on fallows at Lady-day, 184 , on the other lands, and the house, and buildings, except barns, at next, and on the barns, at . Either party may determine the tenancy by a notice in writing of nine calendar months, or upwards, expiring on any Michaelmas-day. Tenant to quit in like manner as before expressed concerning his entry. *Rent* *l.* payable half-yearly, at , and , without any deduction on account of any rate, tax, or assessment now in existence, or hereafter to be imposed, or on any other account except the quit-rent, and the land-tax, which are to be paid by the landlord. Landlord to cause the under-mentioned repairs to be done on or before the day of , 184 (*enumerate these on the back of the agreement, if any*). Landlord to keep buildings in tenantable repair. Tenant to keep the gates, stiles, bars, and fences in good repair, landlord providing rough timber. Tenant not to lop, cut, or top any oak, ash, elm tree, or tiller, or sapling on the estate, except pollards, and that only for the loppings and toppings to be used for   . Tenant not to mow grass on meadow land above once in one year, and if he breaks up any old meadow or pasture land with consent in writing of landlord, then to pay the further yearly sum of 10*l.* fo revery acre so broken up; and so in proportion for any greater or less quantity than an acre. Tenant to crop the arable land in each year as follows (*here insert course of cropping agreed upon*). Tenant to use and consume on the farm all hay, and straw, and turnips made and grown thereon. Tenant to use and spread on the farm all dung and manure made thereon, in such manner that every acre in tillage of the farm aforesaid may be well manured once in every three years of his tenancy. All hay and wheat straw on the farm at expiration of the tenancy may be purchased by landlord or succeeding tenant at a fair valuation, by two indifferent persons; one to be named by each party. Tenant to leave on premises without compensation (*here insert what straw and dung, &c. is to be left*). Landlord alone, or with any other or others in his company, may shoot game on the estate. Tenant not to crop or sow any of the land with rape, flax, hemp, or woad. Tenant not to let or assign the premises, or any part thereof. Tenant in quitting the farm to receive such pecuniary compensation from the landlord for improvements in banking and fencing within five years, and good under-draining within ten years, as two arbitrators shall award; which arbitrators shall abate according to the benefit derived by the tenant from such repairs, improvements, and additions, and take into consideration how far, at the expiration of the tenancy, they may be beneficial to the estate; and such arbitrators shall be nominated one by each party on the request of either party, and if either party neglect or refuse to nominate his arbitrator, the other party may nominate both arbitrators. In witness whereof the said parties hereto have set their hands, the day and year first aforesaid.

AGRICULTOR. (Lat. a husbandman.) The word in our language is modern, but is getting into common use. It is, however, more generally written *agriculturist*, and is intended to imply one who is skilled in the art of cultivating the ground. (*Todd's Johnson.*)

AGRICULTURE, HISTORY OF. (Lat. *agricultura.*) The art of cultivating *the ground; tillage,* husbandry, as distinct *from pasture.* (*Todd's Johnson.*)

I shall, in the present article, limit myself to a brief historical sketch of agriculture, which became one of the sustaining arts of life as soon as man was ordained to earn his bread by the sweat of his brow. In the garden of Eden, whose fertile soil and genial clime appear to have combined in maturing a continued variety and unfailing succession of vegetable sustenance, agricultural operations were unknown; for that which came spontaneously to perfection required no assistance from human ingenuity; and where there is no deficiency there can be no inducement to strive for improvement. That period of perfection was but transitory; and the Deity that had placed man in the garden "to dress it and keep it," eventually drove him thence "to till the earth from whence he was taken." (*Gen.* ii. 15.; iii. 23.)

From that time to the present, agriculture has been an improving art; and there is no reason to doubt but that it will go on advancing as long as mankind continues to increase.

Man, in his greatest state of ignorance, is always found dependent for subsistence upon the produce of the chase; but, as population increases, recourse must be had to other sources of food. And we find in the shepherd's life of the early ages, the first step of the agricultural art, the domestication of animals, which it was found to be more convenient to have constantly at hand, rather than to have to seek precariously at the very time they were required. As the increase of population still went on, and the flocks and the herds had proportionately to be enlarged, one favourite spot would be found too small for the subsistence of the whole; and, as in the case of Abraham and Lot, they would have to separate and find pasturage in different districts. This separation into tribes could not proceed beyond a certain extent; and when the land was fully occupied, recourse would by necessity be had to means of increasing the produce of given surfaces of soil instead of enlarging their extent. With Abraham and Isaac it is very evident that wheat and the other fruits of the earth were the rare and choice things of their country; but when such nations once learned, as they might from the example of Egypt, the resource such products were in periods of famine, arising from mortalities among their cattle, they would soon pursue their interests by cultivating them. This completed, the acquirement of property in land for the space not only long occupied, but upon which the occupier had bestowed his labour, built his habitation, and had enclosed from injury by vagrant animals, would be acknowledged to be his without any one stopping to inquire what right he had to make the enclosure.

When once thus located, experience and observation would soon teach the employment of manures, irrigation, times of sowing, and other necessary operations; and every generation would be wiser in the art than that which preceded it. This especially has occurred in these more northern climates, where art and industry has to compensate for a deficiency of natural advantages. "Enlarging numbers," observes Mr. Sharon Turner, "only magnify the effect; for mankind seem to thrive and civilise in proportion as they multiply; and, by a recurrent action, to multiply again in proportion as they civilise and prosper." In this manner improved modes of cultivation, the introduction of new species, and of more fruitful varieties of agricultural produce, have universally kept pace with an increasing population. This resting upon a basis of facts, vindicates the wisdom of Providence, and refutes Mr. Malthus's superficial theory of over-production. The agricultural produce of this country has gradually increased from the insignificant amount that was its value in the time of the Roman invasion, to the enormous annual return of 200,000,000*l.*; and it is very certain that in this country, and much more in other parts of the world, the produce is a mere fraction of what the total soil is capable of returning.

Agriculture is the art of obtaining from the earth food for the sustenance of man and his domestic animals; and the perfection of the art is to obtain the greatest possible produce at the smallest possible expense. Upon the importance of the art, it is needless, therefore, to insist; for by it every country is enabled to support in comfort an abundant population. On this its strength as a nation depends; and by it its independence is secured. An agricultural country has within itself the necessaries and comforts of life; and, to defend these, there will never be wanting a host of patriot soldiers.

Of the pleasure attending the judicious cultivation of the soil, we have the evidence of facts. The villa farms sprinkled throughout our happy land, the establishments of Holkham, Woburn, &c., would never have been formed if the occupation connected with them was not delightful. We have an unexceptionable witness to the same fact in the late Mr. Roscoe, the elegant, talented author of the Lives of Lorenzo de Medici and of Leo the Tenth. Mr. Roscoe was the son of an extensive potato grower near Liverpool. In the cultivation of that and other farm produce, he had been an active labourer; and he who thus had enjoyed the delights that spring from literary pursuits, and from the cultivation of the soil, has left this recorded opinion, "If I was asked whom I consider to be the happiest of the human race, I should answer, those who cultivate the earth by their own hands."

We have but little information to guide us as to the country in which man first cultivated the soil; nor of that in which he first settled after the deluge. Thus much, however, is certain, that we have the earliest authentic account of the state of agriculture as it existed among the Egyptians and their bond-servants, the Israelites. From the former, probably, the Greeks were descended. The Romans, at a later period, were a colony from Greece; and from the Romans the other countries of Europe derived their earliest marked improvement in the arts.

Our brief history of the progress of agriculture, then, will be divided into, 1. The agriculture of the Egyptians and other eastern nations; 2. The agriculture of the Greeks; 3. The agriculture of the Romans; 4. The agriculture of the Britons, including a cursory notice of its present state among the chief nations of Europe.

I. The Agriculture of the Egyptians, Israelites, and other early Eastern Nations.

Every family of these primitive nations had its appointed district for pasturage, if it pursued a pastoral life; or its allotted enclosure, if it was occupied by tilling the earth. There was no distinction in this respect between the monarch and his people: each had a certain space of land from which he and his family were to derive their subsistence.

The Egyptians, as well as the Israelites, were flock-masters. The latter were particularly so; and, as Joseph's brethren said to Pharaoh, "their trade was about cattle from their youth." (*Gen.* xlvi. 34.) When, therefore, they came into Egypt, they desired the low-lying land of Goshen, as producing the most perennial of pasture. (*Gen.* xlvii. 4.) It is true that the same authority says, "Every shepherd is an abomination unto the Egyptians;" but this was because, about a century before the arrival of Joseph among them, a tribe of Cushite shepherds from Arabia had conquered their nation, and held them in slavery; till, after a sanguinary contest of thirty years, they regained their liberty about twenty-seven years before Joseph was promoted by Pharaoh. That the Egyptians were flock-masters is certain, from many parts of the Scriptures.

Thus, when Pharaoh gave permission to the Israelites to dwell in Goshen, he added, as he spoke to Joseph, "And if thou knowest any men of activity among them, then make them rulers over my cattle" (*Gen.* xlvii. 6.); and when the murrain came into Egypt, it was upon their horses, asses, camels, oxen, and sheep. (*Exod.* ix. 3.)

The attention and care necessary to be paid to their domestic animals were evidently well-known and attended to; for when they proposed to settle in a land, their first thought was to build "sheepfolds for their cattle." (*Numb.* xxxii. 16.) They had stalls for their oxen (*Hab.* iii. 17.), and for all their beasts. Thus King Hezekiah is said to have made "stalls for all manner of beasts, and cotes for flocks; moreover, he provided him possessions of flocks and herds in abundance" (2 *Chron.* xxxii. 28.); and that this abundance exceeded the possessions of the greatest of our modern flock-masters, we may readily acknowledge, when we read that "Mesha, king of Moab, was a sheep-master, and rendered unto the king of Israel 100,000 lambs, and 100,000 rams, with the wool." (2 *Kings*, iii. 4.)

They prepared the provender for their horses and asses of chaff, or cut straw and barley. (*Judges*, xix. 21.; 1 *Kings*, iv. 28.) Our translation does not explicitly state this, but it is clear in the Hebrew original. (*Dr. Kennicott's* xxivth Codex; *Harmer's Observations*, i. 423.) It is also certain, from the Hebrew original, that they tied up calves and bullocks for the purpose of fattening them (*Jerem.* xlvi. 21.; *Amos*, vi. 4, &c., *Parkhurst's Hebrew Lexicon*, 673.); and that they were acquainted with the arts of the dairy. "Surely the churning of milk," says Solomon, "bringeth forth butter" (*Prov.* xxx. 31.); and Samuel speaks of the "cheese of kine." (2 *Sam.* xxvii. 29.) The chief vegetable products cultivated by these eastern nations were, wheat, barley, beans, lentils, rye, the olive, and the vine. (*Exod.* ix. 31.; *Levit.* xix. 10.; 2 *Sam.* xvii. 28. &c.)

The scanty notices which we have of their tillage, give us no reason to doubt that they were skilful husbandmen. Their name for tillage (*Obed*) emphatically expresses their idea of it; for it literally means *to serve the ground* (*Parkhurst*, 508). And that the cares and attention necessary were well sustained, is evidenced by the fact, that David, for his extensive estate, had an overseer for the storehouses in the fields; another over the tillage of the ground; a third over the vineyards; a fourth over the olive trees; *two to superintend* his herds; a seventh over *his camels; an eighth to superintend* his flocks; and a ninth to attend similarly to the asses. (1 *Chron.* xxvii. 25—31.)

Of their ploughing, we know that they turned up the soil in ridges, similarly to our own practice; for the Hebrew name of a husbandman signifies a man who does so. (*Parkhurst*, 93.) That they ploughed with two beasts of the same species attached abreast to the plough. (*Deut.* xxii. 10.) That the yoke, or collar, was fastened to the neck of the animal; and that the plough, in its mode of drawing the furrows, resembled our own; for we read of their sharpening the coulter and the ploughshare. (1 *Sam.* xiii. 20, &c.) Ploughing was an operation that they were aware might be beneficially performed at all seasons; for Solomon mentions it as a symptom of a sluggard, that he will not plough in the winter (*Prov.* xx. 4.); and that too much care could not be devoted to it, they expressed, by deriving their name for ploughing from a Hebrew root, which signifies *silent thought and attention.* (*Parkhurst*, 244.)

Their sowing was broadcast, from a basket (*Amos*, xi. 13.; *Psalm* cxxvi. 6.); and they gave the land a second superficial ploughing to cover the seed. It is true that harrowing is mentioned in our translation (*Job*, xxxix. 10.); but Schultens and other Hebraists agree that harrowing was not practised by them. Russell, in remarking upon the mode of cultivation now practised near Aleppo, says, "No harrow is used, but the ground is ploughed a second time after it is sown, to cover the grain." (*Parkhurst*, 720.)

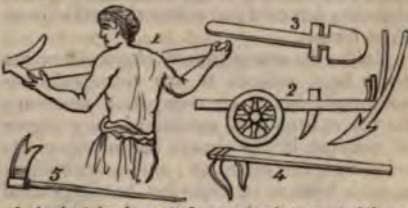
The after-cultivation apparently was not neglected; they had hoes or mattocks, which they employed for extirpating injurious plants. "On all hills," says the prophet, "that shall be digged with the mattock, there shall not come thither the fear of briars and thorns." (*Isa.* vii. 25.) In those hot climates a plentiful supply of moisture was necessary for a healthful vegetation; and the simile of desolation, employed by the same prophet, is "a garden that hath no water." (*Isa.* i. 30.) In Egypt they irrigated their lands; and the water thus supplied to them was raised by an hydraulic machine, worked by men in the same manner as the modern tread-wheel. To this practice Moses alludes, when he reminds the Israelites of their sowing their seed in Egypt, and watering it with their feet, a practice still pursued in Arabia. (*Deut.* xi. 10.; *Niebuhr*, *Voyage en Arabie*, i.121.)

When the corn was ripe it was cut with either a sickle or a scythe (*Jer.* l. 16.; *Joel*, iii. 13.), was bound into sheaves (*Psalm* cxxix. 7.; *Deut.* xxiv. 19. &c.), and was conveyed in carts (*Amos*, ii. 13.), either immediately to the threshing floor or to the barn. They never formed it into stacks as we do. These passages in the Scriptures (*Exod.* xxii. 6.; *Judg.* xv. 5.; *Job*, v. 26.) refer exclusively to the thraves or shocks in which the sheaves are reared as they are cut. (*Harmer's Observ.* iv. 145. &c.) The threshing floors, as they are at the present day, were evidently level plats of ground in the open air. (*Judg.* vi. 37.; 2 *Sam.* xxiv. 18—25. &c.) They were so placed that the wind might, at the time of the operation, remove the chief part of the chaff. They perhaps had threshing floors under cover, to be used in inclement seasons; for Hosea (ii. 35.), speaking of "the summer threshing floors," justifies such surmise. The instruments and modes of threshing were various. They are all mentioned in these two verses of the prophet: "Fitches are not threshed with a threshing instrument, neither is a cart-wheel turned upon the cummin, but the fitches are beaten out with a staff, and the cummin with a rod. Bread-corn is bruised because he will not ever be threshing it, nor break it with the wheel of his cart, nor bruise it with his horsemen." (*Isaiah*, xxviii. 27, 28.) When the seed was threshed by horses they were ridden by men; and when by cattle, although forbidden to be muzzled (*Deut.* xxv. 4.), yet they were evidently taught to perform the labour. (*Hosea*, x. 11.) The "instrument" was a kind of sledge made of thick boards, and furnished underneath with teeth of iron. (*Isaiah*, xli. 15.; *Parkhurst*, 242. 412.) The revolving wheels of a cart, and the various sized poles employed for the same purpose, need no further comment. To complete the dressing of the corn, it was passed through a sieve (*Amos*, ix. 9.), and thrown up against the wind by means of a shovel. The fan was, and is still, unknown to the eastern husbandmen; and where that word is employed in our translation of the Scriptures, the original seems to intend either the wind or the shovel. (*Isa.* xxx. 24.; *Jer.* xv. 7.; *Parkhurst*, 183. 680.)

Of their knowledge of manures we know little. Wood was so scarce that they consumed the dung of their animals for fuel. (*Parkhurst*, 764.) Perhaps it was this deficiency of carbonaceous matters for their lands that makes an attention to fallowing so strictly enjoined. (*Levit.* xix. 23. xxv. 3.; *Hosea*, x. 12. &c.)

The landed estates were large, both of the kings and of some of their subjects; for we read that Uzziah, king of Judah, "had much both in the low country and in the plains; husbandmen also, and vine-dressers in the mountains and in Carmel, for he loved husbandry" (2 *Chron.* xxvi. 10.); that Elijah found Elisha with twelve yoke of oxen at plough, himself being with the twelfth yoke (1 *Kings*, xix. 19.); and that Job, the greatest man of the east, had 14,000 sheep, 6000 camels, 1000 yoke of oxen, and 1000 she-asses. (*Job*, i. 3. xlii. 12.) In the time of Isaiah, the accumulation of landed property in the hands of a few proprietors was so much on the increase, that a curse was uttered against this engrossment. "Woe unto them," says the prophet, "that join house to house, that lay field to field, till there be no place, that they may be placed alone in the midst of the earth." (*Isaiah*, v. 8.)

II. The Agriculture of the Greeks.



1. Ancient implement, from a tombstone at Athens. 2. The Greek plough. 3. The spade. 4. and 5. Hoes.

Revelation has taught us to offer up our prayers and thanksgivings for all benefits to the one omni-beneficent Creator and Provider of the universe. The less enlightened ancients, whose religion was mythological, equally convinced with ourselves of the existence of some divine first cause and providence, like us offered up their votive petitions and hymns of praise, though the objects of their worship were as many as the benefits or the evils to which man is subject.

Agriculture was too important and too beneficial an art not to demand, and the Greeks and Romans were nations too polished and discerning not to afford to it, a very plentiful series of presiding deities. They attributed to Ceres, as their progenitors, the Egyptians, did to Isis, the invention of the arts of tilling the soil. Ceres is said to have imparted these to Triptolemus, of Eleusis, and to have sent him as her missionary round the world to teach mankind the best modes of ploughing, sowing, and reaping. In gratitude for this, the Greeks, about 1356 years before the Christian era, established, in honour of Ceres, the Eleusinian mysteries, by far the most celebrated and enduring of all their religious ceremonies; for they were not established at Rome till the close of the fourth century. Superstition is a prolific weakness; and, consequently, by degrees, every operation of agriculture, and every period of the growth of crops, obtained its presiding and tutelary deity. The goddess, *Terra*, was the guardian of the soil; *Stercutius* presided over manures; *Volutia* guarded the crops whilst evolving their leaves; *Flora* received the still more watchful duty of sheltering their blossom; they passed to the guardianship of *Lactantia* when swelling with milky juices; *Rubigo* protected them from blight; and they successively became the care of *Hostilina*, as they shot into ears; of *Matura* as they ripened; and of *Tutelina* when they were reaped. Such creations of polytheism are fables; but they are errors that should even now give rise to feelings of gratification rather than of contempt. They must please by their elegance; and much more when we reflect that it is the concurrent testimony of anterior nations, through thousands of years, that they detected and acknowledged a Great First Cause.

Unlike the arts of luxury, Agriculture has never been subject to any retrograde revolutions; being an occupation necessary for the existence of mankind in any degree of comfort, it has always continued to receive their first attention; and no succeeding age has been more imperfect, but in general more expert, in the art than that which has preceded it. The Greeks are not an exception to this rule; for their agriculture appears to have been much the same in the earliest brief notices we have of them, as it was with the nation of which they were an off-set. The early Grecians, like all new nations, were divided into but two classes: landed proprietors, and *Helots*, or slaves; and the estates of the former were little larger than were sufficient to supply their respective households with necessaries. We read of princes among them; and as we dwell upon the splendid details of the Trojan war, associate with such titles, unreflectingly, all the pageantry and luxury of modern potentates, that are distinguished by similar titles. But in this we are decidedly wrong; for there was probably not a leader of the Greeks who did not, like the father of Ulysses, assist with his own hands in the farming operations. (*Homer's Odyss.* l. xxiv.) Hesiod is the earliest writer who gives us any detail of the Grecian agriculture. He appears to have been the contemporary of Homer; and, in that case, to have flourished about nine centuries before the Christian era. His practical statements, however, are very meagre; we have, therefore, preferred taking *Xenophon's Œconomics* as our text, and introducing the statements of other authors, as they may occur, to supply deficiencies or to afford illustrations.

Xenophon died at the age of ninety, 359 years before the birth of Christ. The following narrative of the Greek agriculture is from his "Essay," if not otherwise specified.

In Xenophon's time the landed proprietor no longer laboured upon his farm, but had a steward as a general superintendant, and numerous labourers, yet he always advises the master to attend to his own affairs. "My servant," he says, "leads my horse into the fields, and I walk thither for the sake of exercise in a purer air; and when arrived where my workmen are planting trees, tilling the ground, and the like, I observe how every thing is performed, and study whether any of these operations may be improved." After his ride his servant took his horse, and led him home, "taking with him," he adds, "to my house, such things as are wanted, and I walk home, wash my hands, and dine off whatever is prepared for me moderately." "No man," he says, "can be a farmer till he is taught by experience; observation and instruction may do much, but practice teaches many particulars, which no master would ever have thought to remark upon." "Before we commence the cultivation of the soil," he observes, that "we should notice what crops flourish best upon it; and we may even learn from the weeds it produces, what it will best support."

"*Fallowing*, or frequent ploughing in spring or summer," he observes, "is of great advantage;" and Hesiod advises the farmer (*Works and Days*, 50.) always to be provided with a spare plough, that no accident may interrupt the operation. The same author directs the ploughman to be very careful in his work. "Let him," he says, "attend to his employment, and trace the furrows carefully in straight lines, not looking around him, having his mind intent upon what he is doing." (*Ibid.* 441—443.)

Theophrastus evidently thought that the soil could not be ploughed and stirred about too much, or unseasonably; for the object is to let the earth feel the cold of winter and the sun of summer, to invert the soil, and render it free, light, and clear of all weeds, so that it can most easily afford nourishment. (*De Causis Plant.* lib. iii. cap. 2. 6.)

Xenophon recommends green plants to be ploughed in, and even crops to be raised for the purpose; "for such," he says, "enrich the soil as much as dung." He also recommends earth that has been long under water to be put upon land to enrich it, upon a scientific principle which we shall explain under IRRIGATION. Theophrastus, who flourished in the fourth century B. C., is still more particular upon the subject of *manures*. He states his conviction that a proper mixture of soils, as clay with sand, and the contrary, would produce crops as luxuriant as could be effected by the agency of manures. He describes the properties that render dungs beneficial to vegetation, and dwells upon composts. (*Hist. of Plants*, ii. cap. 8.) Xenophon recommends the stubble at reaping time to be left long, if the straw is abundant; "and this, if burned, will enrich the soil very much, or it may be cut and mixed with dung." "The time of *sowing*," says Xenophon, "must be regulated by the season; and it is best to allow seed enough."

Weeds were carefully eradicated from among their crops; "for, besides the hindrance they are to corn, or other profitable plants, they keep the ground from receiving the benefit of a free exposure to the sun and air." Homer describes Laertes as hoeing, when found by his son Ulysses. (*Odyss.* xxiv. 226.)

Water-courses and *ditches* were made to drain away "the wet which is apt to do great damage to corn."

Homer describes the mode of *threshing* corn by the trampling of oxen (*Iliad*, xx. lin. 495, &c.); and to get the grain clear from the straw, Xenophon observes, "the men who have the care of the work take care to shake up the straw as they see occasion, flinging into the way of the cattle's feet such corn as they observe to remain in the straw." From Theophrastus and Xenophon combined, we can also very particularly make out that the Greeks separated the grain from the chaff by throwing it with a shovel against the wind.

III. The Agriculture of the Romans.

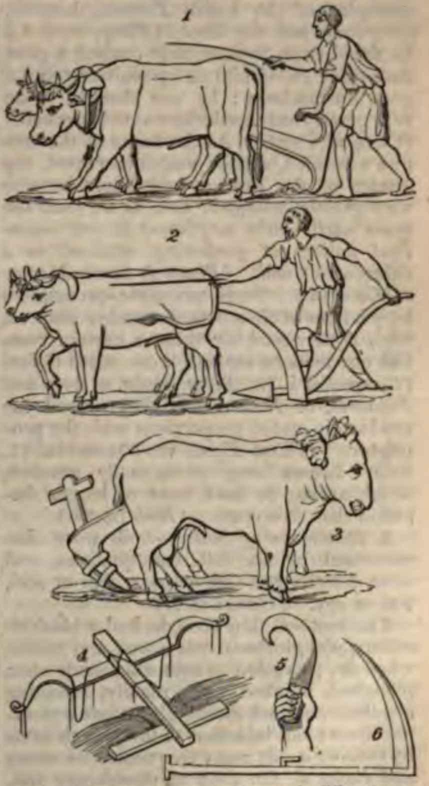
It is certain, that at a very early age Italy received colonies from the Pelasgi and Arcadians; and that, consequently, with them the arts of Greece were introduced; and we may conclude that there was then a similarity in the practice of agriculture in the two countries.

About 753 years before the nativity of Christ, Romulus founded the city of Rome, whose inhabitants were destined to be the conquerors and the improvers of Europe. The Roman eagle was triumphant in Egypt, Persia, Greece, Carthage, and Macedon; and the warriors who bore it on to victory, in those and other countries, being all possessors of land of a larger or smaller extent, naturally introduced, upon their return, any superior vegetable, or improved mode of culture, which they observed in those highly civilised seats of their victories.

Thus the arts of Rome arrived at a degree of superiority that was the result of the accumulated improvements of other nations; and, finally, when Rome became in turn the conquered, the victors became acquainted with this accumulated knowledge, and diffused it over the other parts of Europe.

Of the agriculture of the early Romans we know but little; but of its state during the period of their greatest prosperity and improvement, we fortunately have very full information. Cato in the second, and Varro in the first century before the Christian era, Virgil, at the period of that event, Columella and Pliny but few years subsequently, and Palladius in the second or fourth century, each wrote a work upon agriculture, which, with the exception of that by Columella, have come down to us entire.

From these various authorities we derive full information; and we are convinced that many of our readers will be surprised at the correct knowledge of the arts of cultivation possessed by that great nation.



1, 2, 3, Ploughs used by the Romans in different ages. 4. The yoke for fixing the cattle. 5. The reaping hook. 6. The scythe.

1. *Size of the Roman Farms.* — When Romulus first partitioned the lands of the infant state among his followers, he assigned to no one more than he could cultivate. This was a space of only two acres. (*Varro*, i. 10.; *Pliny*, xvii. 11.) After the kings

were expelled, seven acres were allotted to each citizen. (*Pliny*, xviii. 3.) Cincinnatus, Curius Dentatus, Fabricius, Regulus, and others, distinguished as the most deserving of the Romans, had no larger estates than this. Cincinnatus, according to some authorities, possessed only four acres. (*Ibid.*; *Columella*, i. 3, &c.) On these limited spaces they dwelt, and cultivated them with their own hands. It was from the plough that Cincinnatus was summoned to be dictator (*Livy*, iii. 26.); and the Samnian ambassadors found Curius Dentatus cooking his own repast of vegetables in an earthern vessel. (*Plutarch in vita Cato. Cens.*)

Some of the noblest families in Rome derived their patronymic names from ancestors designated after some vegetable, in the cultivation of which they excelled, as in the examples of the Fabii, Pisones, Lentuli, Cicerones, and the like. (*Pliny*, xviii. 1.) In those days, "when they praised a good man, they called him an agriculturist and a good husbandman: he was thought to be very greatly honoured who was thus praised." (*Cato, in Præf.*) As the limits of the empire extended, and its wealth increased, the estates of the Roman proprietors became very greatly enlarged; and, as we shall see more particularly mentioned in our historical notices of gardening, attained to a value of 80,000*l.* (*Plutarch in vit. Marius et Lucullus.*) Such extensive proprietors let portions of their estates to other citizens, who, if they paid for them a certain rent, like our modern tenants, were called *Coloni* (*Columella*, i. 7.; *Pliny*, *Epist.* x. 24.) and *Politores*, or *Partiarii*, if they shared the produce in stated proportions with the proprietor. (*Pliny*, *Epist.* vii. 30., and ix. 37, &c.) Leases were occasionally granted, which appear to have been of longer duration than five years. (*Ibid.* ix. 37.)

2. *Distinction of Soils.*—Soils were characterised by six different qualities, and were described as rich or poor, free or stiff, wet or dry. (*Colum.* ii. 2.)

The best soil they thought had a blackish colour, was glutinous when wet, and friable when dry; exhaled an agreeable smell when ploughed, imbibed water readily, retaining a sufficiency, and discharging what was superfluous; not injurious to the plough irons by causing a salt rust; frequented by crows and rooks at the time of ploughing; and, when at rest, speedily covered with a rich turf. (*Virg. Georg.* ii. 203. 217. 238. 248.; *Pliny*, xvii. 5.)

Vines required a light soil, and *corn* a heavy, deep, and rich one. (*Virg. Georg.* ii. 29.; *Cato*, vi.)

3. *Manures.*—The dung of animals was particularly esteemed by the Romans for enriching their soil. "Study," says Cato, "to have a large dunghill." (*Cato*, v.) They assiduously collected it and stored it in covered pits, so as to check the escape of the drainage. (*Colum.* i. 6.; *Pliny*, xvii. 9., and xxiv. 19.) They sowed pulverised pigeons' dung and the like over their crops, and mixed it with the surface soil by means of the sarcle or hoe. (*Colum.* i. 16.; *Cato*, xxxvi.) They were aware of the benefit of mixing together earth of opposite qualities (*Ibid.*), and of sowing lupines and ploughing them in while green. (*Varro*, i. 23.) They burnt the stubble upon the ground, and even collected shrubs and the like for the similar purpose of enriching the soil with their ashes. (*Virg. Georg.* i. 84.; *Pliny*, xvii. 6. 25.)

Pliny also mentions that lime was employed as a fertiliser in Gaul, and marl in the same country and Britain; but we can only surmise thence that they were also probably employed by the Romans. (*Pliny*, xvii. 8., and xvii. 5.)

4. *Draining.*—The superfluous water of soils was carried off by means both of open and covered drains. (*Colum.* ii. 2. 8.; *Pliny*, xvii. c.; *Virg. Georg.* i. 109.) Cato is very particular in his directions for making them. (*Cato*, xliii. clx.)

5. *Crops.*—They cultivated wheat, spelt, barley, oats, flax, beans, pease, lupines, kidney-beans, lentils, tares, sesame, turnips, vines, olives, willows, and the like. To cite the authorities who mention each of these would be needless, for they are noticed in all the Roman writers upon agriculture. Of the relative importance or proportion in which the crops were profitable to the Romans, we have this judgment of Cato:—"If you can buy 100 acres of land in a very good situation, the vineyard is the first object if it yields much wine; in the second place, a well watered garden; in the third, a willow plantation; in the fourth, an olive ground; in the fifth, a meadow; in the sixth, corn ground; in the seventh, an underwood, a plantation yielding stout poles for training the vine; and in the ninth, a wood where mast grows." (*Cato*, i.)

They made hay, and the process appears to have been the same as in modern times. After being cut it was turned with forks, piled into conical heaps, and finally into stacks or under cover. But the mowing was imperfectly performed; for, as soon as the hay was removed from the field, the mowers had to go over it again. (*Varro*; *Colum.* ii. 22.)

6. *Implements.*—The plough consisted of several parts: the beam to which the yoke of the oxen was fastened; the tail or handle terminated in a cross bar, with which the

ploughman guided the instrument; it had a ploughshare, the share-beam to which it was fixed, and two mould-boards, a coulter, and a plough-staff for cleaning the ploughshare. (*Ovid. Pont.* i. 8. 57.; *Virg. G.* i. 170.; *Pliny*, xvii. 18, 19.) Some of their ploughs had wheels, and some were without coulters and earth-boards. Besides this, they had spades, rakes, hoes, with plain and with forked blades, harrows, mattocks, and similar implements.

7. *Operations.*—Ploughing was usually performed by two oxen, though three were sometimes employed. They were yoked abreast, and trained when young to the employment. (*Cicero, in Verr.* iii. 21.; *Col.* vi. 2. 10.; *Pliny*, xviii. 18.; *Virg. G.* iii. 163, &c.) They were usually yoked by the neck, but sometimes by the horns. (*Pliny*, viii. 45.; *Colum.* ii. 2.) There was but one man to a plough, which he guided, and managed the oxen with a goad. (*Pliny, Epist.* viii. 17.)

They sometimes ploughed in ridges, and sometimes not. They did not take a circuit when they came to the end of the field, as is our practice, but returned close to the furrow. They were very particular in drawing straight and equal sized furrows. (*Pliny*, xviii. 19. s. 49.)

They seem to have ploughed three times always before they sowed (*Varro*, i. 29.): and to stiff soils, even as many as nine ploughings were given. (*Virg. G.* i. 47.; *Pliny*, xviii. 20.; *Pliny, Epist.* v. 6.) The furrows in the first ploughing were usually nine inches deep. When the soil was only stirred about three inches, it was called *scarification.* (*Pliny*, xviii. 17—19.) They usually fallowed their land every other year. (*Virg. G.* i. 71.)

Sowing was performed by hand, from a basket; and that it might be performed regularly, the hand moved with the steps. (*Colum.* ii. 9.; *Pliny*, xviii. 24.) The seed was either scattered upon the land and covered by means of rakes and harrows, or more commonly by sowing it upon a plain surface, and covering by a shallow ploughing, which caused it to come up in rows, and facilitated the operation of hoeing. (*Pliny*, xviii. 20.) They were particular as to the time of sowing, the choice of seeds, and the quantity sown. (*Varro*, i. 44.; *Pliny*, xviii. 24. s. 55.; *Virg. G.* i. 193, &c.)

Weeding was performed by hoes, hooks, and by hand.

In dry seasons the crops were watered. (*Virg. G.* i. 106.) If they appeared too luxuriant they were fed off. (*Ibid.* 193.)

Reaping and mowing were the usual modes of cutting down the corn crops, but the ears were sometimes taken off by a toothed machine, called *batilium*, which seems to have been a wheeled cart, pushed by oxen through the corn, and catching the ears of corn between a row of teeth fixed to it, upon the principle of the modern daisy rake. In Gaul, the corn was cut down by a machine drawn by two horses. (*Varro*, i. 50.; *Virg. G.* i. 317.; *Colum.* ii. 21.; *Pliny*, xviii. 30.) They do not seem to have ever bound their corn into sheaves. (*Colum.* ii. 21.)

Threshing was performed by the trampling of oxen and horses, by flails, and by means of sledges drawn over the corn. (*Pliny*, xvii. 30.; *Colum.* ii. 21.; *Virg. G.* iii. 132.; *Tibullus*, i. 5. 22.; *Varro*, i. 52.) The threshing-floor was circular, placed near the house, on high ground, and exposed on all sides to the winds. It was highest in the centre, and paved with stones, or more usually with clay, mixed with the lees of the oil, and very carefully consolidated. (*Colum.* i. 6.; *Varro*, i. 2.; *Virg. G.* i. 178.; *Cato*, xci. and cxxix.)

Dressing was performed by means of a sieve or van, and by a shovel, with which it was thrown up and exposed to the wind. (*Varro*, i. 52.; *Colum.* ii. 21.) It was finally stored in granaries or in pits, where it would keep fifty years. (*Pliny*, xviii. 30.; *Varro*, i. 57.)

8. *Animals.*—Oxen, horses, asses, mules, sheep, goats, swine, hens, pigeons, pea-fowls, pheasants, geese, ducks, swans, guinea-fowls, and bees, are mentioned by various authors as products of the Roman farms. Directions for breeding many of these are given in the third and fourth books of the Georgics.

Such is an outline of the Roman agriculture; and in it our readers will doubtless find sufficient evidence to warrant them in agreeing with us, that it was but little different from that pursued by the present farmers of England. We are superior to them in our implements, and consequently in the facility of performing the operations of tillage; we perhaps have superior varieties of corn, but we most excel them in our rotation of crops, and in the management of stock. We differ from them, also, in not practising the superstitious rites and sacrifices which accompanied almost all their operations (see *Cato*, cxxxiv. c.); but of the fundamental practices of agriculture they were as fully aware as ourselves. No modern writer could lay down more correct and comprehensive axioms than Cato did in the following words; and whoever strictly obeys them will never be ranked among the ignorant of the art. "What is good tillage?" says this oldest of the Roman teachers of agriculture; "to plough. What is the second? to plough. The third is to manure. The other part of tillage is to sow plentifully, to choose your seed cautiously, and to remove as many weeds as possible in the season." (*Cato*, lxi.)

Such is an epitome of their agricultural knowledge; a knowledge which has since increased, and can only in future be added to by attending to this advice of another of their writers. "Nature," he observes, "has shown to us two paths which lead to a knowledge of agriculture—experience and imitation. Preceding husbandmen, by making experiments, have established many maxims; their posterity generally imitate them; but we ought not only to imitate others, but make experiments, not directed by chance, but by reason." (*Varro*, i. 18.)

IV. THE AGRICULTURE OF ENGLAND.

The historian of English agriculture has not the least trace of authority from which he can obtain information of its state beyond the period when the Romans invaded this island, and the annals of even that period are meagre and unsatisfactory.

When Cæsar arrived in England, about 55 B.C., he describes the Cantii, or inhabitants of Kent, and the Belgæ, inhabiting the modern counties of Somerset, Wilts, and Hants, as much more advanced than the rest of the people in the habits of civilised life. They cultivated the soil; employed marl as manure; stored their corn unthreshed, and freed it from the chaff and bran only as their daily demands required. The interior inhabitants lived chiefly upon milk and flesh, being fed and clothed by the produce of their herds. "The country," adds Cæsar, "is well-peopled, and abounds in buildings resembling those of the Gauls, and they have a great abundance of cattle. They are not allowed to eat either the hen, the goose, or the hare, yet they take pleasure in breeding them." (*Cæs.* v. c. 10.; *Strabo*, iv. 305.; *Diodor. Sic.* v. 301.; *Pliny*, xvii. 4.) Cicero, in one of his letters, says, "There is not a scruple of money in the island; nor any hopes of booty, but in slaves; (Lib. iv. Ep. 17.); a description, that the industry and intelligence of succeeding ages has rendered singularly inapplicable. The first steps in that improvement were owing to the Romans themselves. Rutilius has elegantly and correctly said, that Rome filled the world with her legislative triumphs, and caused all to live in one common union, blending discordant nations into one country, and, by imparting a companionship in her own acquirements and laws, formed one great city of the world.

Agricola was the chief instrument in imparting to the Britons the improved arts and civilisation of the Romans. "To wean them from their savage habits, Agricola held forth the baits of pleasure, encouraging the natives, as well by public assistance as by warm exhortations, to build temples, courts of justice, and commodious dwelling-houses. He bestowed encomiums on such as cheerfully obeyed; the slow and uncomplying were branded with reproach; and thus a spirit of emulation diffused itself, operating like a sense of duty. To establish a plan of education, and give the sons of the leading chiefs a tincture of letters, was part of his policy. By way of encouragement he praised their talents, and already saw them, by the force of their natural genius, rising superior to the attainments of the Gauls. The consequence was, that they who had always disdained the Roman language began to cultivate its beauties. The Roman apparel was seen without prejudice, and the toga became a fashionable part of dress. By degrees, the charms of vice gained admission to their hearts; baths, porticos, and elegant banquets grew into vogue; and the new manners, which in fact served only to sweeten slavery, were by the unsuspecting Britons called the arts of polished humanity." (*Tacitus*, *Agricola*, xxi.) Thus eloquently does Tacitus describe the diffusion of the Roman arts among the early natives of our country; and that agriculture was one of those in which they so rapidly improved, is attested by the fact, that in the fourth century the Emperor Julian, having erected here granaries in which to store the tributary corn that he exacted from the natives, at one time sent a fleet of 600 large vessels, to convey away the store they contained. Julian himself particularises the transaction. "If," says Gibbon, "we compute those vessels at only seventy tons each, they were capable of exporting 120,000 quarters; and the country which could bear so large an exportation must have attained an improved state of agriculture." (*Dec. and Fall of Rom. Emp.* c. xix.)

Possessing this improved agriculture, our country was successively subdued by the Saxons, the Danes, and the Normans; but as these all came to improve their fortunes, and to win the comforts of life, agriculture continued to flourish: her operations were interrupted, her products destroyed, in whichever direction swept the tide of war; but no sooner was peace restored than the inhabitants, though of varied extraction, united their knowledge in the pursuit of this art, on which not only their comfort but their existence chiefly depended. A similar summary observation applies to all succeeding ages; and our agriculture has continued slowly to improve, in spite of every obstacle that has occasionally delayed, or that has permanently retarded its advance.

1. *Tenures—Size of Estates.*—The native Britons, it is very certain, appropriated but small portions of the land for raising corn, or other cultivated vegetables, and the rest of the country was left entirely open, affording a common pasturage for their cattle, and pannage for their swine. Under the Roman government, we have seen that the extent of cultivated ground must have considerably increased, yet the oldest writers agree, that by far the greatest proportion of the country was occupied by heaths, woods, and other unreclaimed wastes.

When the Saxons established themselves in the island, an almost total revolution in the proprietorship of the lands must have occurred. The conquest was only accomplished after a bloody struggle; and what was won by the sword was considered to possess an equitable title, that the sword alone could disturb. In those days it was considered that the lands of a country all belonged to the king; and on this principle the Saxon monarchs gave to their followers whatever districts they pleased, as rewards for the assistance afforded in the conquest, reserving to themselves certain portions, and imposing certain burdens upon each estate granted. (*Coke's Littleton*, 1. 58. 2.; *Blackstone's Comm.* 45, &c.) This was only a continuance of that feudal system that prevailed upon the Continent; and we may take the county of Sussex as an example, how the land was carved out among the aristocracy, reckoning a *hide* at 100 or 150 acres.

	Hides.
The king had	59½
Archbishop of Canterbury	214
Bishop of Chichester	184
Abbot of Westminster	7
Abbot of Fecamp	135
Bishop Osborn	149
Abbot of St. Peter's, Winchester	33
Church of Battle	60½
Comes of Oro	196¼
Comes Roger	818
William of Braiose	452¼
Abbot of St. Edward	21
Comes Moriton	520
William of Warrene	620¼
Odo and Eldred	10

These great proprietors granted the chief part of their estates to the actual cultivators of the soil, receiving in general from the under-tenants certain proportions of whatever might be the productions of the farms. Thus we find one tenant stating, "I give land for seventy swine in that woody allotment, called Wulfendinleh, and five waggons full of good twigs, and every year an oak for building, and others for necessary fires, and sufficient wood for burning." (*Bede*, *Hist. Append.* 970.) The rent of ten hides of land were even regulated by two of the laws of King Ina. They enacted that the tenant of such extent of land should render to the lord ten vessels of honey, three hundred loaves, twelve casks of Welsh ale, thirty of clear ale, two old rams, ten wethers, ten geese, twenty hens, ten cheeses, one cask of butter, five salmon, twenty pounds' weight of fodder, and one hundred eels; or else ten mittas of malt, five of grits, ten of wheat flour, eight gammons, sixteen cheeses, two fat cows, and in Lent eight salmon. (*Wilkins, Leges Saxon.* 25. 3.; *Gale's Hist. R.* 410.) Such grants were usually to the tenant and his heirs for ever, so long as they afforded the accustomed rent; and we are not aware of any grant or lease extending for a shorter period than the life of the tenant. An example of these occurs in the year 852, when the abbot and monks of Medehamsted let some land at Sempingham, to a tenant named Wulfred, for his life, on condition that he annually paid them sixty fother of wood, twelve fother of *græfan* (coals), six fother of turf, two tons of clear ale, two killed oxen, six hundred loaves, ten casks of Welsh ale, one horse, thirty shillings, and a night's lodging. (*Saxon Chronicle*, 75.)

As this feudal system declined, and was finally extinguished in the twelfth year of Charles II., so proportionally did the landed interest increase in prosperity. Freed from the burden of furnishing a soldier and his armour for every certain number of acres, and all restrictions as to land changing hands being removed, and the numerous impositions being got rid of, with which the lords oppressed their sub-infeudatories, it soon became a marketable species of property; and, as money and merchandise increased, and the proprietor lived less upon his estate, it soon became the most eligible plan for both landlord and tenant, that the whole rent should be paid in money.

Of the size of these early farms we have no precise information; but, from the laws of Ina we may perhaps conclude that a hide of land, equal to about 100 or 120 acres, was the customary size; for, in speaking of the produce to be given to the lord for ten hides, the law speaks of the smallest division of each county of which it was particularly cognisant; namely, of ten families, or *a tithing*, as they were collectively called. Again, Bede expressly calls a hide of land *familia*, and says it was sufficient to support a family. It was otherwise called *mansum*, or *manerium*, and was considered to be so much as one could cultivate in a year. (*Henry of Huntingdon*, vi. 2066.) That the boundaries of these farms, or manentes, were well defined is certain; for we have many grants in which they are detailed. The following is one of the shortest; it bears the date of 866. "From Sture, on the Honey-brook, up behind the brook on the old hedge; along the hedge on the old way; along the way on the great street; along the street on four boundaries; then so to Calcbrook, along the brook; then so to Horsebrook, along the brook; then so to the ditch, along the ditch to the store again; on the store to the ditch that is called Thredestreo, along the ditch to the Heasecan-hill; from that hill to the ditch; along the ditch to Wenforth, along Wenforth, and then again to the Sture." (*Smith's Append. to Bede*, 770.)

War succeeded war, and chivalry and the chase were the engrossing occupations of the landed proprietors during the whole of the middle ages; yet amid all these convulsions, and all this neglect, agriculture continued to obtain a similar degree of attention, and its practitioners to occupy a similarly humble, yet more independent station of life. Bishop Latimer flourished in the first half of the sixteenth century; and his father was among the most respectable yeomen of his time, yet his farm evidently did not exceed 100 acres. "My father," says Latimer, "was a yeoman, and had no lands of his own; he had only a farm of three or four pounds by the year, at the utmost; and hereupon he tilled as much as kept half a dozen men. He had a walk for 100 sheep; and my mother milked thirty kine," &c. (*Latimer's Sermons*, p. 30.) But that this class of society was then not very refined, is proved by Sir A. Fitzherbert, in his *Book of Husbandry*, declaring, "It is the wife's occupation to winnow all manner of corn, to make malt, to wash and wring, to make hay, to shear corn, and in time of need to help her husband to fill the muckwain, or dung-cart; to drive the plough, to load corn, hay, and such other; and to go or ride to the market, to sell butter, cheese, milk, eggs, chickens, capons, hens, pigs, geese, and all manner of corn."

This race of farmers, and this extent of farm, continued much the same till the closing years of the eighteenth century. The wife, indeed, had long previously ceased to participate in the above-mentioned drudgery, but she still attended the dairy, and sold its products at market, as her husband still participated in the usual labours of his farm; but in the latter half of that century, and thence to the present time, a different class of men have engaged in the cultivation of the soil. The accumulation of wealth from the vast increase and improvement of our manufactures and commerce, the diffusion of better information, and the increased population, have all contributed to
fect. Individuals engage in the
whose education and habits require a
income for their indulgence than can
forded by the profits of a small farm
consequently, in districts having th
fertile soils, farms of from 300 to 50
are very common; whilst in less proc
districts they extend even to 1000 an
acres. With the present expenditure
tithe, taxes, rates, and labour, and
duced prices of agricultural produce,
even of those extents, cannot yield
sufficient to support the farmer of
habits. And if the present artificial
of corn laws is removed, we do not s
possible result but a return to smaller
and a more labouring class of tenan
it admits of perfect demonstration, tha
farms, having that manual labour, ar
careful tillage which small plots obta
turn a more abundant produce than
which are too large to be so attentive
tivated.

Enclosure of Land.—It is a rule, fo
upon general observation, that the m
closed country is always the best culti
for, as Sir Anthony Fitzherbert ob
in the reign of Henry VIII., live stoc
be better kept, and with less atten
closes be better alternately cropped,
crops better sheltered in inclement s
"if an acre of land," he concludes, "be
sixpence an acre before it is enclosed.

We have seen, already, that hedges, d
and other fences, marked the bou
of the early Saxon estates; and thes
certainly not adventitious distinctio
they are mentioned in most of the
grants of which we are aware, ar
strictly regulated and protected b
If a tenant omitted to keep his far
closed, both in winter and summer,
keep his gate closed, if any damage
from his hedge being broken down
gate being open, he was declared to
gally punishable. (*Wilkins, Leges Sa*
If a freeman broke through another's
he was fined 6*s*. (*Ibid.*)

As our woollen manufactures imp
the demand for our broad cloths beca
cessive, not only in our own but in th
tinental nations; and the consequen
sumption of wool was so large, and th
was so enhanced, that self-interest d
to the landed proprietors, even in th
of Henry III., that the enclosure o
manorial wastes, on which to feed
upon their own account, or to let
pasture farms, would be a source of
sive emolument. The statutes of 20 H
13 Edw. 1., and others, were conseq
passed for sanctioning and regulati

practice. The demand for woollens continued, and became so great, that rapidity of manufacture was the chief consideration. "Yet as ill as they be made," says King Edward VI., in his private journal, "the Flemings do at this time desire them wonderfully." The consequences are depicted by the same genuine authority. "The artificer will leave the town, and for his mere pastime will live in the country; yea, more than that, will be a justice of the peace, and will scorn to have it denied him, so lordly be they now-a-days; for they are not content with 2000 sheep, but they must have 20,000, or else they think themselves not well. They must have twenty miles square their own land, or full of their farms: four or five crafts to live by is too little. Such hell-hounds be they." (*Edward the Sixth's Remains*, p. 101.) The rents of land were consequently enormously raised, and the corn farmers were ruined. "They every where," says Roger Ascham, "labour, economise, and consume themselves to satisfy their owners. Hence so many families dispersed, so many houses ruined, so many tables common to every one, taken away. Hence the honour and strength of England, the noble yeomanry, are broken up and destroyed." (*Ascham's Epistles*, 293—295.) Bishops Story, Latimer, and others, raised their voices in their behalf, and hurled their invectives from the pulpit upon those who oppressed them. "Let them," said Latimer, in a sermon preached before the king, "let them have sufficient to maintain them, and to find them in necessaries. A plough land must have sheep to dung their ground for bearing corn; they must have swine for their food, to make their bacon of; their bacon is their venison, it is their necessary food to feed on, which they may not lack; they must have other cattle, as horses to draw their plough, and for carriage of things to the markets, and kine for their milk and cheese, which they must live upon, and pay their rents."

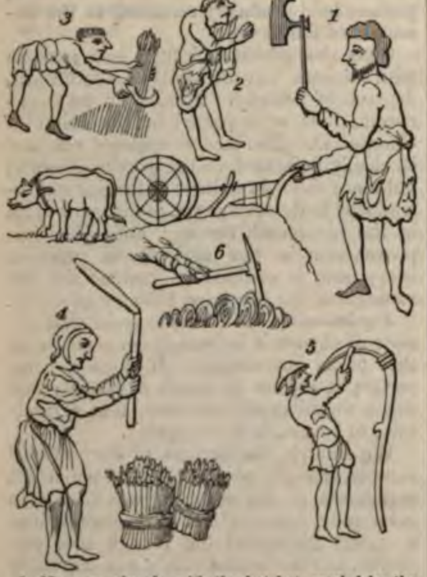
The short-sighted executive of that period endeavoured to prevent these enclosures by a prohibitory proclamation, as the legislature had done by the statutes 4 Hen. 7. c. 16. 19. There doubtless was great distress, and always will be upon any sudden change in the direction of the national industry, and in none more extensively than in the return from an agricultural to a pastoral mode of life. But, as is observed by one of the most impartial of our historians, "every one has a legal and social right of employing his property as he pleases; and how far he will make his use of it compatible with the comforts of others, must be always a matter of his private consideration, with which no one, without infringing the common freedom of all, can ever interfere. That no national detriment resulted from this extensive enclosure—no diminution of the riches, food, and prosperity of the country at large, is clear to every one who surveys the general state and progress of England with a comprehensive impartiality." (*Turner's History of Edward the Sixth*, &c.) "The landlord," he further observes, "advanced his rent, but the farmer also was demanding more for his produce."

The evil of converting arable to pasture land cured itself. The increased growth of wool in other countries, and the improvement of their manufactures, by degrees caused the production of it in England to diminish; and as dearths of corn accrued, and the consequent enormous increase of its value rendered its growth more lucrative, pasture land gradually returned to the dominion of the plough.

Since that period enclosures have gone on with various, but certainly undiminished, degrees of activity. More than 3000 enclosure bills were passed in the reign of George III. The land so enclosed was, and is, chiefly dedicated to the growth of corn; but since the field culture of turnips was introduced in the seventeeth, of mangel wurzel in the nineteenth century, and other improvements in our agricultural practice, every farm is enabled to combine the advantages of the stock and tillage husbandry.

Implements.—It is very certain that the state of any art is intimately connected with that of its instruments. If these are imperfect it cannot be much advanced; and this is so universally the case, that agriculture, of course, is no exception.

We find, in the earliest of our national records, that the *plough*, the most important implement of husbandmen, was then of a very rude construction. In general form it rudely resembled the plough now employed, but the workmanship was singularly imperfect. This is no matter of surprise; for among the early inhabitants of this country there were no artificers. The ploughman was also the ploughwright. It was a law of the early Britons that no one should guide a plough until he could make one; and that the driver should make the traces, by which it was drawn, of withs or twisted willow, a circumstance which affords an interpretation to many corrupt terms at present used by farming men to distinguish the parts of the cart harness. Thus the *womb withy* has degenerated into *wambtye* or *wantye*; *withen trees* into *whipping* or *whipple trees*; besides which we have the *tail withes*, and some others still uncorrupted. (*Leges Wallicæ*, 283—288.) We read, also, that Easterwin, Abbot of Wear-mouth, not only guided the plough and winnowed the corn grown on the abbey lands, but also with his hammer forged the instruments of husbandry upon the anvil. (*Bede, Hist. Abb. Wearmoth*, 296.) Whether the early British or Saxon ploughs had wheels is uncertain, but those of the Normans certainly had such appendages. Pliny says that wheels were first applied to ploughs by the Gauls. The Britons were forbidden to plough with any other animal than the ox; and they attached any requisite number of oxen to the plough. The Normans had been accustomed, in their light soils, to employ only one, or at most two. (*Leges Wallicæ*, 288.; *Montfaucon's Monumens de Monarchie François I. Planche*, 47.; *Giraldus Cambrensis*, c. 17.)



1. Norman plough, with the hatchet carried by the ploughman for breaking the clods. 2. Sowing, as represented by Strutt. 3. Reaping. 4. Threshing. 5. Whetting. 6. Beating hemp.

The gigantic and universal impulse that seemed simultaneously to affect the human mind in the sixteenth century, tended to the improvement of sciences which could not be benefited without agriculture sharing in the good. Metallurgy and its subservient arts, and applied mathematics, were thus assistant to improving the plough. It received the first improvement among the Dutch and Flemings in the sixteenth century; and still more so in Scotland in the following one.

The common wooden swing-plough is the state to which it was brought in the last-named country, in the eighteenth century, and still is known in many countries, as the *improved Scotch plough*. The first author of the improved form is differently stated. A man of the name of Lummis has by one writer this credit assigned to him, though he learned the improvement in Holland. He obtained a patent for his form of construction; but another ploughman, named Pashley, living at Kirkleathem, pirated his invention. The son of Lummis established a manufactory at Rotherham in Yorkshire, whence it is sometimes called the *Rotherham* plough; but in Scotland it was known as the *Dutch* or *Patent Plough*. On the other hand, the Rotherham plough is said to have been made at that town in 1720, or ten years before Lummis's improvements. The grandmother of the Earl Buchan, Lady Stewart of Goodtrees, near Edinburgh, is also named as an improver. She invented the *Rutherglen* plough, formerly much employed in the west of Scotland. Mr. Small, in 1784, and Mr. Bailey, in 1795, published upon the proper mathematical form of this implement. In the fourth volume of the *Transactions of the Highland Society*, and in the *Quarterly Journal of Agriculture* for February, 1829, there are also two valuable Essays upon the same subject. In 1811 this plough came very generally to be made of cast iron. (*Amos's Essay on Agricultural Machines, Survey of W. Riding of Yorkshire*, &c.)

Wheel ploughs have been commensurately improved. The objects to be attended to in the formation of a plough, and that is the best which attains to them most effectually, are, first, that it shall enter and pass through the soil with the least possible resistance; secondly, that the furrow-slice be accurately turned over; and, thirdly, that the moving power or team shall be placed in the most beneficial line of draught.

Scarifiers and horse hoes are implements which were unknown till within about a century ago. Hoeing by manual labour had, in very early ages, been partially practised; for the earliest writers, we have seen, recommended particular attention to the cutting down and destroying of weeds. But to our countryman, Jethro Tull, is indisputably due the honour of having first demonstrated the importance of frequent hoeing, not merely to extirpate weeds, but for the purpose of pulverising the soil, by which process the gases and moisture of the atmosphere are enabled more freely to penetrate to the roots of the crop. The works of Tull appeared between the years 1731 and 1739.

Drills. — We noticed, when considering the Roman agriculture, that the Romans endeavoured to attain the advantages incident to row-culture by ploughing in their seeds. A rude machine is described in the *Transactions of the Board of Agriculture*, as having been used immemorially in India for sowing in rows. The first drill for this purpose introduced into Europe seems to have been the invention of a German, who made it known to the Spanish court in 1647. (*Harte's Essays on Husbandry.*) It was first brought much into notice in this country by Tull, in 1731; but the practice did not come into any thing like general adoption till the commencement of the present century. There are now several improved machines adapted to the sowing of corn, beans, and turnips. See DRILLS.

Draining, as we have seen, was attended to by the Romans, and it was unquestionably practised in Britain during the middle ages; for where lands were too retentive of moisture, or abounded in springs, the obvious remedy was to remove it by drains. This, however, and far simpler operations, are seldom performed in the most correct mode without a knowledge of the sciences connected with their success. Draining was never correctly understood till the scientific observations of Dr. Anderson, and the practical details of Mr. Elkington, about the year 1761, placed it upon a more enlightened and correct system. The important benefits that have arisen from the adoption of this system are very extensive; and the acknowledgment of 1000*l.*, voted to Mr. Elkington, was a just testimony that the landed interest appreciated the boon, and that the benefiter of this country is duly estimated by its legislature.

There are numerous kinds of drain ploughs. The *mole* plough was invented by a Mr. Adam Scott, and improved by a Mr. Lumley of Gloucestershire during the present century.

The past and the present century have also given birth to machines totally unknown in previous ages; of these are rollers, machines for haymaking, reaping, threshing, and dressing; and if to these be added the immense improvement that has taken place in the form and quality of all other agricultural implements, the saving of labour, and the power to pursue the necessary operations neatly and well, will be found to be incalculably promoted.

Crops.—It is probable that wheat was not cultivated by the early Britons; for the climate, owing to the immense preponderance of woods and undrained soil, was so severe and wet, that in winter they could attempt no agricultural employments; and even when Bede wrote, early in the eighth century, the Anglo-Saxons sowed their wheat in spring. (*Bede's Works*, p. 244.) The quantity cultivated in the reign of Henry III. does not appear to have exceeded the quantity necessary for the year's consumption; for in a very wet, inclement year, 1270, wheat sold for six pounds eight shillings per quarter, which, calculating for the difference of the value of money, was equal to twenty-five pounds of our present currency. It continued an article of comparative luxury till nearly the 17th century commenced; for in the household books of several noble families it is mentioned that *manchets*, and other loaves of wheat flour, were served at the master's table, but there is only notice taken of coarser kinds for the servants. That the cultivation of wheat was very partial in the reign of Elizabeth is attested by Tusser, who, writing at that period, says,—

> "In Suffolk again, whereas wheat never grew,
> Good husbandry used, good wheat-land I knew."

As our climate has improved by the clearing and drying of the surface of the country, so, proportionately, has the cultivation of wheat extended.

It was probably owing to our fickle and inclement climate rendering the successful completion of harvest a much rarer and more hazardous event than now, that our forefathers made on the occasion such marked and joyous festivities. We do not know the motive that actuated the farmer, but no dread of an uncertain harvest could have made him more prompt and vigorous, who, in 1389, cut and stored 200 acres of corn in two days. The account is given in "The History of Hawstead." About 250 reapers, thatchers, and others, were employed during one day, and more than 200 the next. The expenses of the lord on this occasion are thus stated:—Nineteen reapers, hired for a day at their own board, 4*d.* each; eighty men one day, and kept at the lady's board, 4*d.* each; 140 men, hired for one day, at 3*d.* each; wages of the head reaper, 6*s.* 8*d.*; of the brewer, 3*s.* 4*d.*; of the cook, 3*s.* 4*d.*; thirty acres of oats, tied up by the job, 1*s.* 8*d.*; three acres of wheat, cut and tied up by the job, 1*s.* 11*d.*; five pair of gloves," &c.

Barley is probably the grain which was most cultivated by the early Britons. The representation of it occurs upon their coins. (*Camden's Britannia, by Gibson*, lxxxviii.) It was not only the grain from which their progenitors, the Cymri, made their bread, but from which they made their favourite beverage, *beer*.

Oats being well-known and cultivated by the Germans and other continental nations when Pliny wrote, they were probably known also to this island in the earliest ages. In all periods, even to the present time, bread made of oatmeal has been a very prominent part of the food of the inhabitants of the northern parts of Britain. "In Lancashire," says Gerarde, in 1597, "it is their chiefest bread-corn, for jamrocks, haver-cakes, thorffe-cakes, and those which are called generally oaten-cakes; and for the most part they call the grain *haver*, whereof they do likewise make drink for want of barley." It is so hardy that it is admirably calculated for a cold climate, and there is scarcely any soil in which it will not be productive. In southern climates it will not flourish.

"Rye," says Gerarde, "groweth very plentifully in the most parts of Germany and Polonia, as appeareth by the great quantity brought into England in times of scarcity of corn, as happened in the year 1596; and at other times, when there was a general want of bread corn, by reason of the abundance of rain that fell the year before, whereby great penury ensued, as well of cattle, and all other victuals, as of all manner of grain. It groweth, likewise, very well in most places of England, especially towards the north."

Its hardiness probably rendered it a principal grain with the early Britons; but as it is a great impoverisher of the soil upon which it grows, and the grain makes very inferior bread, it is now cultivated to a very small extent.

Peas have been extensively cultivated in this country from a very early period; but they have been much less since the bean has become a more general field crop, which it did not till within the present century. Lentils were brought to England about 1548. Gerarde says he had heard they were cultivated as fodder near Watford. Maize, or Indian corn, was made known in England in 1562. It is commonly cultivated in the south of France as a field crop, and for the same purpose was tried in this country in 1828, at the recommendation of Mr. Cobbett, but it has not succeeded. Tares, in 1566, according to Ray, were grown as a seed crop, and given to horses, mixed with oats and peas, though they were sometimes cut green as fodder. This is now their chief use.

Potatoes were introduced from South America, by Sir Walter Raleigh, about 1586. Sir Robert Southwell, President of the Royal Society, informed the Fellows, in 1693, that his father introduced them into Ireland, having received them from Sir Walter. (*MS. Journal of Royal Society.*) It long continued to be neglected by gardeners. In 1663, however, attention was drawn to its extensive culture. But notwithstanding the exertions of the Royal Society to effect this purpose, potatoes did not become a field crop till the early part of the last century. They became so in Scotland about 1730, a day labourer of the name of Prentice having the honour of first cultivating them largely two years previously. Every county of England now grows them extensively. Lancashire and Cheshire are particularly celebrated for them. In the counties round London, especially in Essex, about two thousand acres are annually cultivated for supplying the metropolis with this root.

Turnips and clover, though known in this country during time immemorial, were never much cultivated in the field before the early part of the seventeenth century, and we mention them together because their introduction among the farmer's crops caused the greatest improvement in the art that it ever received. In 1684, it is observed as a modern discovery, "sheep fatten very well on turnips, these proving an excellent nourishment for them in hard winters, when fodder is scarce; for they will not only eat the greens, but feed on the roots in the ground, scooping them out even to the very skin." This is the first notice we have of feeding off turnips; and the same authority adds, "ten acres sown with clover, turnips, &c. will feed as many sheep as one hundred acres would have done before." (*Houghton's Collections on Husbandry*, &c. iv. 142—144.) Brown, Donaldson, and all other writers upon agriculture, agree, that the introduction of the improved mode of cultivating these crops revolutionised the art of husbandry. Previously, light soils could not be cropped with advantage; there was no rotation that the judgment could approve. Tusser, in the sixteenth century, in the following homely lines, tells us that two corn crops were grown consecutively and then a fallow; and many authorities could be quoted to show that some soils were fallowed on alternate years, so that they afforded only one crop in two years.

"First rie and then barlie, the champion saies,
Or wheat before barlie, be champion waies:
But drink before bread-corn, with Middlesex men,
Then laie on more compas, and fallow agen."

But now, by the aid of green crops, a fallow usually occurs but once in four years. "Clover and turnips," it has been observed, "are the two main pillars of the best courses of British husbandry; they have contributed more to preserve and augment the fertility of the soil for producing grain, to enlarge and improve our breeds of cattle and sheep, and to afford a regular supply of butcher's meat all the year, than any other crops." It was previously a difficult task to support live stock through the winter and spring months; and as for feeding and preparing cattle and sheep for market during these inclement seasons, the practice was hardly thought of, and still more rarely attempted.

Mangel wurzel has only been cultivated by the farmer for a few years past. Its chief advantage is, that as it will succeed upon tenacious soils which will not produce turnips, it enables farms in which such soils predominate to support a larger quantity of live stock. Its cultivation seems on the increase, its fattening qualities being good, the produce heavy, and liability to failure small.

Hops, although indigenous to this country, were little attended to, and never employed in brewing till the sixteenth century; and then, when they began to be more used, the citizens of London petitioned parliament to prevent them as a nuisance. "It is not many years since," says Walter Blith, writing in the year 1653, "the famous city of London petitioned against two nuisances, and these were Newcastle coals, in regard of their stench, &c. and hops, in regard they would spoil the taste of drink and endanger the people." (*English Improver Improved*, 3d ed. 240.)

There are many other crops occasionally cultivated by the farmer which may be enumerated here, and most of them first extensively cultivated within the last 150 years, but which in this place will require no further notice — such as the artificial grasses, rape, mustard, caraway, coriander, flax, hemp, buck-wheat or brank, teasel, madder, saintfoin, lucerne, cabbage, carrots, and others.

General cultivation. — We have no information as to whether the early inhabitants of Britain varied their modes of ploughing with the nature of their soil. They sometimes ploughed with two oxen, sometimes with more; some ploughmen, represented in very old pictures, evidently drove the team as well as guided the plough; but it was usual for them to have a driver. There is a very old Saxon dialogue extant, in which a ploughman, in stating his duties, says, "I go out at day-break, urging the oxen to the field, and I yoke them to the plough — the oxen being yoked, and the share and coulter fastened on, I ought to plough one entire field or more. I have a boy to threaten the oxen with a goad, who is now hoarse through cold and bawling. I ought, also, to fill the bins of the oxen with hay, and water them, and carry out their soil." (*Turner's Anglo-Saxons*, ii. 546. ed. 5.) Repeated ploughings and fallowings, to prepare the soil for wheat, was the common practice; for Giraldus Cambrensis, speaking of the Welsh, says, with astonishment, "they ploughed their lands only once a year, in March or April, in order to sow them with oats; but did not, like other farmers, plough them twice in summer and once in winter, to prepare them for wheat." (*Descript. Cambriæ*, c. viii.)

In a law tract, called *Fleta*, and written early in the fourteenth century, are given several agricultural directions, especially upon dressing and ploughing fallows. In summer, the ploughing is advised to be only so deep as to bury and kill the weeds; and the manure not to be applied till just before the last ploughing, which is to be deep. (*Fleta*, lib. ii. c. 73.)

Sowing was anciently performed in all cases by hand. In the famous antique tapestry of Bayeux, a man is represented sowing. The seed is contained in a cloth fastened round his neck, is supported at the other extremity by his left arm, and he scatters the seed with his right hand.

All agricultural writers, from the earliest era to the present, have recommended the seed to be soaked in some medicament or other previously to sowing. Virgil recommends oil and nitre for beans; others direct the employment of urine; and Heresbachius, who wrote in 1570, mentions the juice of the houseleek. "Sow your ridges," says the same author, "with an equal hand, and all alike in every place, letting your right foot, especially, and your hand go together. Wheat, rye, barley, oats, and other large seeds must be sown with a full hand, but rape seeds only with three fingers." (*Googe's Heresbachius*, 246.)

The tapestry of Bayeux, already mentioned, represents a man harrowing; one harrow only being employed, and one horse. In the time of Heresbachius, though harrowing was the usual mode of covering the seed, yet he says, "in some places it is done with a board tied to the plough." Rakes seem to have been employed by the Anglo-Saxons; for the accurate researches of Mr. Turner do not appear to have discovered any mention of other implements that were employed by them for the purpose. (*Hist. Anglo-Sax.* ii. 544.)

We find no very early mention made of hoeing by any of our agricultural writers. Though there is generally some directions for "plucking up the naughty weeds," Heresbachius is the first that we have met with who notices the advantage of loosening the surface of the soil about growing crops. "Sometimes," he says, "raking is needful, which, in the spring, loosens the earth made clung by the cold of winter, and letteth in the fresh warmth. It is best to rake wheat, barley, and beans twice. Moreover, they break asunder with a *roller* the larger and stiffer clods." (*Googe's Heresbachius*, 256.) It was not till the time of Tull, 1731, that the due importance of this was appreciated.

Of the other operations of agriculture, as reaping, mowing, stacking, and the like, there seems no need of making mention: they were performed much in the same way as now. "Corn," says the author last quoted, "should be cut before it is thorough hard; experience teacheth that if it be cut down in due time, the seed will grow to fulness as it lieth in the barn." (*Googe's Heresbachius*, 406.) According to Henry, the practice with our ancestors was for the women to thresh and the men to reap. (*Hist. of Britain*, vi. 173.)

Irrigation seems to have been practised in a few places in Britain from the time of the Romans, there being meadows near Salisbury which have been irrigated from time immemorial. Lord Bacon mentions it as a practice well understood in his time (1560—1626); and at the same period, 1610, appeared a work by Robert Vaughan, detailing the mode of "summer and winter drowning of meadows and pastures, thereby to make those grounds more fertile ten for one." It was not, however, till the close of the last century that the attention of agriculturists was much aroused to the subject. The writings of Boswell, Wright, Western, and others, between the years 1780 and 1824, partially awakened the farmers to the importance of the practice. The best examples of it are to be observed in Gloucestershire and Wiltshire; but it is now one of the practices of farming that is the most undeservedly neglected. Mr. Welladvise was its great promoter in Gloucestershire.

Live Stock.—Cattle and sheep were the chief riches of the Britons when they became first known to the Romans (*Cæsar*, v. c. x.), and they are still a great source of our agricultural riches.

Sheep.—In a very early Anglo-Saxon MS. a shepherd is represented as saying, "In the first part of the morning I drive my sheep to their pasture, and stand over them in heat and in cold with dogs, lest the wolves destroy them. I lead them back to their folds, and milk them twice a day; and I move their folds and make cheese and butter." (*Turner's Anglo-Sax.* ii. 546.)

This attention to sheep was attended with so much success that they became an object of acquirement by the continental nations; and in the reign of Edward IV. at the time a treaty of peace was concluded with Spain (1466), a licence was granted by that monarch "for certain Coteswold sheep to be transported to Spain, as people report, which have there so multiplied and increased, that it hath turned the commodity of England much to the Spanish profit, and to the no small hinderance of the gain which was beforetimes in England raised of them." (*Hall's Chronicle*, 266. *Holinshed*, 668.) The sheep thus exported were probably improved by attention and climate till they had become that breed of Merinos which was re-imported to this country early in the present century. The statute 3 H. 6. c. 2. forbids the exportation of sheep. The fears which old chroniclers may have ignorantly entertained, that the exporting of sheep would be injurious to our native commerce, have in all succeeding years been proved to be fallacious. The demand for our wool was so large, and the consequent increase of the breed of sheep was so great, that an impolitic legislature in 1533 endeavoured to check it. The preamble of the act states, that "divers of the king's subjects, to whom God of his goodness hath disposed great plenty and abundance of moveable substance, now of late, within few years, have daily studied, invented, and practised ways and means to accumulate into few hands, as well great multitudes of farms as great plenty of cattle, and in especial sheep, putting such lands as they can get to pasture and not to tillage, whereby they have not only pulled down churches and towns, and enhanced the old rates of the rents, and that no poor man is able to meddle with it, but also have raised the prices of all manner of corn, cattle, &c. almost double above the prices accustomed, to the great injury, &c. of his majesty's subjects; and as it is thought that the greatest occasion of this accumulation is the profit that cometh of sheep, which now be come to a few persons' hands of this realm, that some have 24,000, some 20,000, &c. by which a good sheep for victual, that was accustomed to be sold for 2*s.* 4*d.* &c. is now sold for 6*s.* &c.; which things thus used be principally to the high displeasure of Almighty God, to the decay of the hospitality of this realm, to the diminishing of the king's people, and to the let of cloth-making," &c. It then enacts, that no one shall have more than 2000 sheep; though, as a subsequent section declares every hundred to consist of six score, the limited number was 2400. And it further enacts, that no man shall have above two farms. (25 H. 8. c. 13.)

Harrison, who died in 1593, describes our sheep as very excellent, "sith for sweetness of flesh they pass all other. And so much are our wools to be preferred before those of Milesia and other places, that if Jason had known the value of them that are bred and to be had in Britain, he would never have gone to Colchis to look for any there." (*Description of England, prefixed to Holinshed*, 220.) Heresbach, who was a contemporary, gives such a description of the best form and qualities of sheep, that it is evident that the excellence of our breed was not the mere effect of chance. (*Googe's Heresbach.* 1376.) From that period till the latter half of the eighteenth century, we are not acquainted with any efforts further to improve it. This last-mentioned period was the era of the improvements effected by Mr. Bakewell and his pupils, the Messrs. Culley.

Bakewell was born in 1726, at Ditchley in Leicestershire, and about the year 1755 commenced those experiments which finally effected a greater improvement in our sheep than was ever effected in any species of agricultural produce by the exertions of one individual. He travelled over England, Ireland, Holland, and other places, for the purpose of examining the various breeds of cattle, and by careful selections, and judicious crosses, succeeded in procuring a stock that obtained for the Ditchley sheep a previously unheard of excellence. Fortunately the English agriculturists appreciated the importance of his success; and it is a fact that, in 1789, three of his rams, the produce of one birth, were let for the breeding season for 1200 guineas, and the whole produce of his letting was at least 3000 guineas. One of his rams obtained for Mr. Bakewell, in one season, 800 guineas; and when it is taken into the calculation, that the same animal served for his own flock, it produced for its owner in that year 1200 guineas. Mr. Bakewell died in 1795.

Messrs. Culley introduced these improvements into Northumberland, and the other northern counties of this island. When they first settled in that district, the sheep kept there were large, slow-feeding, long-woolled animals; and a breed between those and the Cheviot sheep. These breeds rarely became fat before they were three years old; but the Leicesters introduced by the Messrs. Culley were sold fat at little more than a year old. They at first met with much opposition; but as it was soon seen they were improvers, and not mere innovators, the flocks have generally been made to improve by their example. They became the general patrons of improvement, and their great attention to minutiæ, unremitting industry, and superior cultivation, gave birth to a spirit of emulation, and their own merits were rewarded with a liberal success. For several years they occupied farms to the amount of about 8000*l.* per annum. They had pupils with liberal premiums from all parts; and these again were the means of making known, not only their enlightened husbandry, but the encouraging illustration they afforded of industry, economy, and intelligence duly rewarded.

Merino sheep were imported by George III. in the years 1788 and 1791. This breed attracted much attention in 1804, when his majesty commenced his annual sales. Dr. Parry, Lord Somerville, and others, have paid considerable attention to them; but the climate of this country has a considerable effect in deteriorating their fleeces, and the flesh is too indifferent to permit them to be much encouraged in a country where mutton is so considerable an article of food. (*Hunt's Agricultural Memoirs; Gent.'s Magazine; Encyc. Brit.*)

Mr. Ellman, of Sussex, during an enlightened practice of more than fifty years, has brought the South Down variety of sheep to a state of the highest improvement. Perhaps the best description of the varieties of the sheep reared in this country has been written by this gentleman for "Baxter's Agricultural Library."

Cattle, as we have already noticed, have always been a prominent production of this country. They were mentioned by Cæsar, Strabo, and other ancient writers. They have ever since continued, more or less, particularly to engage the attention of the husbandman, not only for the dairy and the plough, but also as a source of food. The breeding of cattle, however, had been so much neglected for the more profitable pasturage of sheep, that in 1555 an act of parliament was passed to remedy the evil. The preamble states that "Forasmuch as of late years a great number of persons in this realm have laid their lands, farms, and pastures to feeding of sheep, oxen, runts, scrubs, steers, and heifers, &c. having no regard or care to breed up young beasts and cattle, whereby is grown great scarcity of cattle and victual;" and, therefore, it is enacted, that a cow shall be kept wherever are sixty sheep, and a calf reared where there are one hundred and twenty, &c. (2 & 3 *Phil. & Mary*, c. 3.) Many other legislative enactments occur in the records of that and contiguous periods; but reason and interest are better promoters of improvement than acts of parliament. A due attention to the breeding of cattle was first aroused by Mr. Bakewell, who has just been mentioned as an improver of sheep. He let bulls for 150 guineas during four months, and 5 guineas per cow was no uncommon charge. Pedigrees have been preserved of different animals with as much care as those of race-horses. The attention and care that have thus been paid to their breeding have met with an appropriate recompense. In no other country is there to be found such breeds of cattle; and that none are so highly estimated, is proved by the prices that have been given for individuals. (*Marshall's Midland Counties*, i. 334.; *Parkinson on Live Stock*, ii. 469.)

Horses.—That the ancient Britons had horses with which they impelled their war chariots, we know upon the authority of those who had seen them—Cæsar, Strabo, and others. In the epitome of Dion Cassius, by Xiphelin, those horses are described as small and swift. They appear not to have been usually employed in the operations of agriculture; and their employment was not considered desirable; for in the old Cambrian laws, oxen are exclusively directed to be employed. (*Leges Wallicæ*, 288.) Under the Saxons, and still more under the Normans, who flourished here in an age that, from its excelling in noble horsemanship, has been distinguished as the *chivalric*, the breed of horses was undoubtedly improved. "Richard De Rulos, Lord of Brunne and Deeping, was much addicted to agriculture, and delighted in breeding horses and cattle." (*Ingulphus's Chron.* lib. i.)

In the year 1494, the exportation of horses was so extensive, and the price of them in this country was so much enhanced, that an act of parliament ordained that none should go out of the realm without the king's license (2 *H.* 8. c. 6; 32, c. 13; 33, c. 5.); but these being evidently intended for the improvement of war horses, "for the defence of the realm," would only collaterally benefit those employed by the husbandman. It was provided by the second of the acts just quoted, that no stallion should be kept that did not measure fifteen hands from the sole of the hoof to the highest part of the wither; each hand to be four standard inches. We find, however, that at this period our draught horses were fine and powerful animals, for Harrison, who lived at this era, and whose Appendix to Holinshed we have before quoted, after expressing his admiration of them, says, that five or six of them would draw with ease three thousand weight of the greatest tale for a long journey. We must remember, too, that in those days the roads were totally different from what they are at present. It is within the memory of persons still living in the hundreds of Essex, that no more than a load of wheat was ever sent out in a waggon, the roads there being, until within less than half a century, exceedingly bad.

We have already noticed that in the tapestry of Bayeux a man is represented harrowing with a horse. That tapestry was woven in the year 1066, and this representation is the first notice, of which we are aware, of the horse being employed in agriculture. The first attempt that our historians notice, to improve the breed of our husbandry horses, was in the reign of King John. Tyrant and despot as he was, yet his evil qualifications gave two benefits to England. His tyranny gave birth to Magna Charta; and his pride, rendering it hateful to him to see foreigners surpass him in the excellence of their horses, induced him to import 100 stallions from Flanders; and from that era may be dated the improvement of our draught horses. His object did not entirely succeed; for a century subsequently, in the reign of Edward II. we find that horses were still imported from Lombardy and Flanders. We have already noticed some of the enactments to improve our breed of horses, but these shared the fate of most other compulsory measures; for when Elizabeth summoned her forces to defend her realm, in the prospect of a Spanish invasion, she could obtain no more than 3000 cavalry.

Sir A. Fitzherbert, who wrote in the reign of Henry VIII. says, in his *Boke of Husbandry*,—"A husbande may not be without horses and mares, and specially if he goe with a horse-plough, he must have both; his horses to droive, and his mares to brynge colts to upholde his stocke, and yet at many times these may droive well if they be well handled." The roguery of horse-dealers was an early sin; for one of the old Cambrian laws provides, that the purchaser of a horse shall have three nights to ascertain whether he is infected with the *staggers;* three months to prove his *lungs;* and twelve months to discover whether he is infected with the *glanders.* For every blemish not discovered before purchasing, if it was not in the ears or tail, one third of the price was to be returned. (*Laws of Howell Dhu.*) The deceptions practised by the dealers in horses is still proverbial; and there does not appear with their fraternity to have been any intermediate age of innocence; for Sir A. Fitzherbert says, "Thou grayser, that mayest fortune to be of myne opinion or condytion to love horses, and young coltes and foles to go among thy cattle, take hede that thou be not beguiled as I have been a hundred times and more. And first, thou shalt knowe that a good horse has fifty-four properties; that is to say, two of a man, two of a badger, four of a lion, nine of an oxe, nine of a hare, nine of a fox, nine of an asse, and ten of a woman."

Since the days of Elizabeth, every variety of our horses has been gradually improving, and our four kinds, the Suffolk Punch, the Cleveland bays, the Clydesdale, and the Lincolnshire or dray, are surpassed in no country in the world. The numerous cart stallions attending every market town during the covering season, is an attestation that this care is not on the decrease. It is stated, as a further proof, that a few years since a Suffolk cart-mare and her offspring sold at Woodbridge Lady-day fair for 1000*l.*

Pigs have been among the usual animals fostered by the farmer in times at least as early as the Anglo-Saxons. In those days they were evidently the most numerous of their live stock; scarcely an estate is mentioned without its being stated that it afforded *pannage*, or mast in its wood, for such a number of swine. They were a very prominent portion of their wealth; and, indeed, a chief necessary, for they were in winter obliged to use almost exclusively salted meat, and the great preponderance of woodland supported best this kind of stock. (*Turner's Anglo-Saxons*, iii. 22.) Heresbach is particularly earnest in commending the pig; and after mentioning it as abominable to the Jews, says, with a boastful feeling that made him forget its impiety, "I believe, verily, they never tasted the flitches of Westphaly."

Enactments occur in our statute book in 1225 and 1534, regulating the pannage of swine. There are now a great many varieties of pigs, every district of England varying in the size and qualities of those it prefers. Some attention has of late years been paid to improve the stock, but in general they have been too much neglected.

We have not particularised the progress of husbandry in Scotland, because previously to the time of its union with this country Lord Kames and Mr. Fletcher agree that its agriculture was deplorable; and since then the improvement of the art in that most generally enlightened part of our island has in many districts outstripped, and, in most, at least kept pace with that of England; and its future advance will probably surpass that of England, because good education is more completely diffused among its inhabitants.

Ireland is in general deplorably behind us in all the arts of life; nor will this be obviated until the effect of education and wealth is more generally felt and appreciated by its generous and hospitable, but far from wealthy inhabitants.

Wales, for the most part, has an agriculture as bad as that of Ireland; and we cannot have much hope of its improvement, when Mr. Adam Murray, in his evidence before the Committee of Agriculture in 1833, stated that the Welsh have a great antipathy against us Saxons or *Sassenachs;* and that they take every advantage of any *Englishman* that settles among them.

V. CONTINENTAL AGRICULTURE.

We have now brought to a conclusion our sketch of the progress of agriculture. The limits of our work preclude us from giving here more of the ample details that have come under our notice in the research for the materials, of which we have given the abstract. We have not withheld our attention from the husbandry of other nations, but have found little concerning the history of their progress in the art; and the examination of their present operations made it so apparent, that with the exception of Flanders, they are all so much behind us in general practice, that the conviction is forced upon us, that little instruction could be obtained from its detail. Several of them, however, excel us in some particular points; and in noticing these we shall avail ourselves of the opportunity to enforce the importance of extra attention to them upon our own agriculturists.

Flanders.—This country was certainly the first of modern countries to improve the practice of agriculture. Its farmers were our first tutors; and from the time of Sir Richard Weston, who published an account of their husbandry in 1645, till that of the Rev. T. Radcliff in 1819, the Flemish husbandmen have continued models of neat and economical farming. In this respect we fall short of them. It is a leading principle with them to make their farms closely resemble gardens. Consequently, to effect this, they have small farms, and devote their efforts to these three grand points—the accumulation of manure—the destruction of weeds—and the frequent and deep pulverisation of the soil. We recommend for the perusal of our readers the work (*Tour in Flanders*) published by Mr. Radcliff, and the *Flemish Husbandry* of the Society for the Diffusion of Useful Knowledge, and we are convinced that they will benefit by the time so occupied. We do not expect that they will induce them to try to cultivate a large surface of land with the minute accuracy of a garden; but it might persuade them to adopt that more cleanly system of cultivation which is the only one that is permanently profitable.

We shall only remark more particularly upon the assiduous care the Flemish farmers bestow upon the collection of manure.

They were the first among the moderns to raise crops for the sake of ploughing them in whilst growing; and they continue it more extensively than any other nation. This practice, we may say, is entirely neglected by our farmers; but if they knew sufficient of chemistry to understand how much fertilising materials such green crops impart to the soil, it would be a practice more extensively adopted. Every fragment of animal and vegetable matter is preserved by the Flemish farmers for the fertilising of their lands; and the ready sale which all such decomposable substances meet, is one cause of the broom and the barrow succeeding in keeping their towns so scrupulously neat. Saw-dust, chips, and similar refuse, all tend to increase their composts; and on their barren lands trees are frequently planted for the purpose of creating in time a fertile soil by the agency of their fallen leaves.

Their dunghills are so constructed that all the drainage is collected in cisterns, with which liquid is mixed the emptyings of privies, pulverised rape cakes, and the like; and this most fertilising compound is conveyed to their fields by means of barrels fixed on wheels, and is spread by means of a scoop, 2840 gallons per acre being allowed for their flax crop. (*Johns. on Liq. Manure.*)

The slovenly management of his dunghill is one of the most general specimens of the ignorance or carelessness of a farmer. He allows the most soluble and valuable portions to drain away; and treats with ridicule the idea of carrying out manure in a liquid form. As this arises from ignorance, and bigoted attachment to old practice, it should excite our pity more than our anger. Liquid manures, notwithstanding stupidity and prejudice, are amongst the best of fertilizers, and will, in a coming age, be generally employed, since it is a fallacy to argue that they cannot be employed on a large scale; for the comparative expense of preparation and application is unquestionably smaller on a large scale than on a less.

Holland.—The husbandry of this country is almost exclusively confined to the dairy and to stall-feeding. There are two points in their practice in which our farmers would do well to imitate them.

It is a common prejudice that a cow for the dairy should never be fat. This is thus far true, namely, that if a cow inclines to fatten easily, she does not yield so much milk as one that generates fat less readily. But a good dairy cow, that is, one that secretes milk abundantly, will not fatten whilst in that condition, and therefore the abstaining from giving them nutritive food is an erroneous conclusion. The Hollanders know that the contrary is the correct practice, and once a day, or oftener, they give their cows rape cake, and other nutritious preparations. The ignorance of our common practice is evident from this fact, that without one exception we always keep other animals, when suckling, much higher than at other periods.

The other point of their practice that merits imitation is the cleanliness with which they keep all their animals. It will excite a laugh with some of our agricultural readers, when we recommend not only the most scrupulous daily cleaning and washing out of cow-sheds, pig-styes, and the like, but that the animals themselves should be cleaned. This, however, is not a mere speculative precept, for the national example of Holland attests its utility. We have known the beneficial effects of such treatment upon the health of cows and pigs in this country. But in the absence of all facts, if the farmer would but allow his own common sense to direct him; if he would but reflect that no animal will thrive that is not healthy; that his horse becomes diseased if not kept clean; and that by no possibility can it be otherwise but that fetid stenches, and encumbering filth must tend to breed disease, he would not allow so baleful a neglect to continue. It is futile to urge that where the stock is large, the attendance to such treatment is impossible; for if it is beneficial it will pay to adopt it; and no one should engage in a larger concern than he can manage in the most beneficial mode.

Germany.—The inhabitants of the different districts of this extensive empire pay particular attention to the cultivation of timber trees. The number of German books on the subject is excessive.

It is a subject that has of late years been gaining much attention also in this country; and planting will probably be still further extended over many of the poorer soils that at present will not pay whilst producing corn.

The careless and ignorant manner in which the labourer is allowed to mutilate timber trees that grow upon most farms cannot be too severely deprecated. To train trees correctly requires as much judgment as any operation in which the gardener or forester is concerned. Not an unnecessary wound should be inflicted upon them; for the process of healing each wound not only deducts so much from the growth of the tree, but is usually the introducer of decay. Yet the hedger, with no other instrument than his bill, is generally allowed an unguided use of so unfit and mutilating a tool.

Lombardy.—In this, and most of the other Italian states, all rivers, and in some, even, all springs, are considered to be the property of the government, for they are the source of a considerable revenue. Any one desiring a canal from a river has to pay for it to the government; and he may cut it through another person's ground without the latter having the power to prevent it, upon paying the value of the land. Such canals are considered as improving the value of an estate, for they irrigate not only their grass lands, but their corn, vines, and other crops, nu-ous little channels being cut for the ose down the ridges. The water from er is purchased at a certain price for so y hours' or days' run in the year, through uice of a stated dimension. Arthur ng mentions that the fee-simple of an 's run per week through a particular l sluice at Turin, sold in 1788 for 1500 s. Watered lands usually let for one l more than lands that are unwatered.

e have already noticed, and shall again to recur to the subject of irrigation; we could not but notice the above na- l evidence in favour of what we know e one of the most beneficial practices ected by our agriculturists.

scany.—Sismondi informs us that it is ractice in this country, where he was elf for five years a cultivator, to trench third of the farm every year with the e, bringing the lower soil to the top. mode of culture bringing a new soil for romotion of vegetation, for it has been manner lying two years fallow, is sanc- d by reason as well as confirmed by prac- We are not the advocates of a general em of spade husbandry. There are ob- ons to it that at present are insuperable. we do recommend, and that from our n experience, its partial adoption. There is parish in England in which many of the ourers are not out of employ during a siderable portion of the year. Perhaps average of the poor's rates were 10*s*. in pound upon the farmer's rental; and this ht have been reduced more than one half, ery farmer had employed one man in e husbandry for every thirty acres he ivated. Thus he would have had some rn for the money he expended; and the ng of horse labour, and the benefit of extra cultivation, would have turned balance in his favour, and he would thus got rid, in a great degree, of the worst ll outlays—an outlay without a possi- y of a return.

have searched various statements of the culture of the other European countries; though I am gratified by the conviction they are all more or less improving, yet most all their practices, except the cul- of the vine, they are very far behind For that reason I leave them unnoticed, use there is no instruction to be ex- ted from a detail of deficiencies that already been overcome. Upon a re- n of the whole, I may remark that culture, in common with all other kinds nowledge, is always flourishing, in pro- ion to the freedom of the people. Spain, ugated by its despotic monarchy and sthood, has an agriculture imperfect and raded beyond that of any other European nation. Flanders has always had a liberal government, and its agriculture improved before our own, and is its equal now.

By freedom, I mean security of property and person, unrestricted discussion of every virtuous opinion, and an untainted distribution of justice. With us, the era that introduced such freedom was that of the reformation, confirmed and strengthened by the exclusion of the Stuarts in 1688.

The introduction of the scholastic philosophy, which revived that activity of mind which the Grecian vanity had so much abused, and the Romans, by their gross habits, had so long paralysed; the mathematical sciences which the Grecians had imported from Alexandria and had forgotten; that natural and experimental knowledge which neither the Grecians nor Romans had ever much or permanently pursued; the reformation of religion, which removed from the mind that incubus that forbad man to trust to his own reason, but made it the bond-slave of interested ignorance; the invention of printing, which became the mighty engine of diffusing accumulated knowledge; were all events that preceded the seventeenth century, and rendered it an era splendid by the general improvement which it afforded in all the arts and sciences. These have justly been represented as forming a circle, for they are so united, so blended together, and so co-assistant, that one cannot be improved without the benefit being shared in some way by the others.

Agriculture participated in the general progress; and the impetus that was given to the human mind, tutoring it to follow reason rather than habit, was felt by the cultivators of the soil. The eighteenth and present centuries have been those in which the improvement has been marked, and the instances of which have already been noticed. The reason of this is to be found in its having then very generally engaged the attention of a more enlightened class of society. The noblemen, the gentry, and even the monarch of England, became practical agriculturists; and under the patronage of George III., the Duke of Bedford, Lords Sheffield, Suffield, and Albemarle, Coke, Western, and many others, it was sure to obtain the benefit of all the improved knowledge of the day. In 1723 was instituted the Society of Improvers in the Knowledge of Agriculture in Scotland; in 1749, the Dublin Agricultural Society; in 1777, the Bath and West of England Society; in 1784, the Highland Society of Scotland; in 1793, the London Board of Agriculture, and the Royal Agricultural Society of England in 1838. The last chiefly through the exertions of Mr. W. Shaw and Mr. Handley, Lord Spencer and the Duke of Richmond. This, although supported entirely by voluntary subscriptions, promises to be of the highest advantage to agriculture, and by its excellent arrangements, of which carefully avoiding all political discussions is a prominent feature, it now includes in its copious list of members, men of all parties, who are united not for the sake of indirectly forwarding party objects, but for the improvement in all its important branches of practical agriculture. The fate of the Board of Agriculture, which expired about the year 1812, from the withdrawal by government of the annual parliamentary grant for its support, should operate as a warning to all other agricultural societies; for this society failed, not from a want of talent or of industry, but from its efforts being paralysed, and its resources curtailed by its being considered the society of a party, and made the arena for the discussion and promulgation of political doctrines. From none of these have arisen any splendid discoveries, for such are not to be made in agriculture: there can never arise, so far as we can foresee, any Newton or Watt in this art; but they have effected and are accomplishing all that such associations can be expected. They have occasioned the collision of opinion, they have stimulated the desire of improvement, and they have promoted the general communication of its acquirements. The general improvements introduced into agriculture, under the auspices of these valuable societies, have been, amongst several others, 1. the general introduction of green crops; 2. the improvement of agricultural machinery, such as the drill, the thrashing-machine, the plough, &c.; 3. better breeds of all kinds of live stock; 4. better and more numerous varieties of seeds.

Of the benefits conferred by other sciences upon agriculture, by chemistry, botany and physiology, I shall hereafter have much to say. They are branches of knowledge hitherto too seldom combined with practical skill to have yet accomplished much; but of what they are capable of achieving, an estimate may be formed from the perusal of De Candolle's Physiologie Végétale. "It is certain," as the writer of this has elsewhere observed, "that a cultivator of the soil should have a knowledge of botany and of chemistry. Without the first he will be unable to understand terms and observations that must occur in every well-written work on his art; unable to comprehend the nature and habits of the objects of his culture, or to render observations which he makes intelligible to others or even to himself. Chemistry is of as much, if not greater, importance to him. The nature of soils, of manures, of the food and functions of plants, would all be unknown but from the analyses which chemists have made. Science can never supersede the use of the dunghill, the plough, the spade, and the hoe; but it can be one of their best guides—can be a pilot even to the most experienced." (*Baxter's Agricultural Library*, 140.)

Of the literature of agriculture, I have little to say in this place. From the days of Hesiod until the sixteenth century, the authors upon this art were very few; but from that period to the present, they have continued to increase; and its literature, if now collected, would form a copious library.

There have been professorships of agriculture for some time proposed at the Universities of Oxford and Cambridge. There was one appointed at Edinburgh in 1790, and the chair is now (1841) filled by Mr. Low; another at Oxford in 1840, of which Dr. Daubeny is the present holder.

A prejudice too generally existed amongst farmers against the agricultural knowledge contained in books; but, now they are generally better educated, this prejudice will cease. Ignorance is always bigoted and obstinate; and it is the same mental sterility which made them jealous of all new practices, that made the Irish persist in fastening their horses to the plough by their tails, until it was absolutely prohibited by the government. The Irish said in defence of their practice what some English farmers say in defence of theirs, however erroneous, "My grandfather did well enough this way." Such foolish observations amount to no more than this, "We will not try to improve." This race of stagnant cultivators is gradually disappearing; and those who are succeeding them, we see reason to believe, are more enlightened, and consequently more ready to adopt improvements. We most heartily rejoice at this; and we hope to see them more and more a class of reading men. Practice must ever be their chief tutor, as in all other arts; but likewise, as in all other arts, that practice will always be the most correct in its details which is founded upon scientific knowledge. (*G. W. Johnson. Miller's Gard. Dict. by Orr & Co.*)

AGRIMONY. (*Agrimonia.*) This most healing and excellent wild plant grows abundantly in most soils. It is found in barren places upon ditch banks, and wherever herbs can exist. It flowers in June and July, and rises a foot in height, with single, firm, round stalks, and pale green hairy leaves, notched at the edges. Its yellow flowers are pale, small, and numerous, standing in long spikes, and the seed vessels which succeed them are rough like burs. Agrimony is hot, and moderately astringent in quality; detergent, aperient, and resolvent. A decoction of the plant opens obstructions of the liver, and is good against jaundice. It is also a fine remedy in diabetes. An ointment made from the herb is admirable in cleansing and healing ulcers, wounds, sores, burns, and blows. The common people apply a poultice of the freshly-gathered herb for the same purpose. Decoction of agrimony is good in dropsy, and expels worms. The ointment is excellent in drawing out things fixed in the flesh, and it heals luxations, or bones forced out of joint, by rubbing it well into the part affected frequently. The sweet-smelling agrimony possesses equal virtues, and is more palatable than the common agrimony. It is likewise good in coughs when decocted. (*L. Johnson.*)

AGROSTIS. The bent grass. An extensive genus of native grasses, which, from the marshy soil on which they flourish best, are of comparatively small value to the farmer. I shall, however, particularise the different varieties, pointing out their comparative qualities, and nutritive properties.

Agrostis alba, or white bent, flowers in the first week in August, and the seed is ripe about the beginning of September. This grass is late, unproductive, and contains but little nutritive matter. Its creeping roots greatly exhaust the soil: in this variety they are smaller than in the other varieties of *Agrostis*, but equally difficult to extirpate when once in possession of tenacious clays. This property of the roots is the best character of distinction for the purpose of the agriculturist, as it may be found at any season or stage of growth of the plant.

Agrostis canina, var. *mutica*. Awnless variety of brown bent. *Trichodium caninum muticum* (Schrader). Creeping-stalked brown bent. It is the most common grass on deep bogs, even where they are subject to be under water for six months in the year. It is a diminutive plant, very unlike the produce of such soils: the leaves seldom attain to more than two or three inches in length. Hares crop the foliage in the spring. The smallness of the produce, even when cultivated in the most favourable circumstances, affords a sufficient proof of its unworthiness to be regarded by the farmer in any other light than that of a weed which indicates a soil capable of being improved, so as to produce the most valuable grasses by irrigation. It differs but little from the *Agrostis nivea*, except in the want of awns and the length of the culms. The structure varies almost imperceptibly in the *Agrostis canina*, *Agrostis nivea*, and in this species. The like gradual shades of difference may be perceived *in the colour of* the plants; *the canina is of a brownish-green colour*: this awnless variety is of a pale green; the *nivea* of a greenish straw colour. The knots or bundles of leaves attached to the decumbent shoots show it to be connected with the *Agrostis canina fascicularis*. It flowers in the second and third weeks of July, and ripens the seed about the middle of August.

Agrostis canina capillaris. Fine-panicled brown bent. This variety is nearly akin to the *Agrostis canina fascicularis*; it grows pretty common in some parts of Woburn park where the soil is silicious. It is seldom combined with any other species of grass, but grows in a wild state in detached patches on moors and heaths. It flowers about the beginning of August, and the seed is ripe about the end of that month.

Agrostis canina fascicularis. Bundle-leaved bent; tufted bent. In old pastures, or light soils, this bent may be readily distinguished in the autumn by its shoots, which are furnished with leaves in tufts or bundles, that generally run along on the surface of the rest of the herbage, and is occasioned, apparently, by the cattle, which eat the other herbage, and leave the scattered shoots of the tufted-leaved bent untouched. It is a very common grass on poor, light, but moist soils, incumbent on clay, that have long been under pasture. This and the woolly soft grass in some parts of the country are termed *winter fog*. From the above details it will appear to be the least valuable of the bent grasses that have been mentioned. The cultivation of a grass of this value is out of the question; the point of most importance to be ascertained respecting it is, how to remove it from the soil, and to substitute more valuable grasses in its place. I have witnessed the beneficial effects of coal ashes, as a top dressing, when spread on the pasture in sufficient quantity: they appear to act in the manner of a surface drain, by preventing the water from stagnating or remaining too long on the surface of the soil during wet weather in the end of autumn, during winter, and in the early part of spring, which the retentive subsoil causes; a circumstance most favourable to the growth of this grass, but highly injurious to the superior grasses. The ashes thus favouring the growth of the superior grasses, and the pasture being in consequence closely cropped by the cattle, which now find the pasture more palatable, the tufted bent disappears; it will, however, be found by no means destroyed, but only checked in its growth. This grass flowers in the first and second weeks of August, and ripens the seed in the end of the same month.

Agrostis lobata. Lobed bent; sea-side bent. The general appearance of this plant indicates its inferior comparative value. It appears according to the information afforded by Mr. Curtis, to be chiefly confined to the sea coasts. It grows wild on a stiff wet, clayey loam, part of the London blue clay, in the parish of Cuddington, near Epsom, Surrey. It does not appear to be of much value to the agriculturist. Probably, however, in such places as are exposed to the spray of the ocean, it may succeed better, and afford a greater produce; its nutritive powers are far from being inconsiderable. It ripens an abundance of seed which vegetates freely. It flowers in the first week of August, and the seed is ripe about the end of the same month.

Agrostis mexicana, the Mexican bent grass, is, as its name implies, a native of South America, and was introduced into England, by Mr. Gilbert Alexander, in 1780. It delights more in calcareous or clayey soils than in those that are of a silicious sandy nature. It perfects an abundance of seed, which when sown produces plants that soon arrive at perfection. So far, therefore, it possesses the requisite properties of a grass adapted for the alternate husbandry; but it is late in the produce of foliage in the spring, and that herbage is not distinguished by any superior nutritive powers. It is perfectly hardy. Being a native of a warmer climate, its defects may possibly be greatly lessened by being naturalised, and by frequently raising it from seed successively ripened in this country. At present it does not offer any strong reasons to recommend it further to the notice of the agriculturist. It flowers in the third week of August, and the seed is ripe towards the end of September.

Agrostis nivea. Snowy bent; straw-coloured bent grass. *Trichodium caninum* var. *stramineis arista calicem vix excedente.* Schrader.

The seeds of this grass, when sown on a heath soil, and on a clayey loam of equal space, afforded of grass, from the time they were sown, May 10. till the time the produce was collected, on the 20th of August following,

Heath soil, produce of grass -	2 oz.
Clayey loam, ditto -	- 1

On comparing the produce of this grass with those of the common bent (*Agrostis vulgaris*) it will be found inferior in the proportion nearly of 5 to 3. The snowy bent appears to be unfit for the purposes of the agriculturist, and it is apparently too scarce a plant to be at all formidable as a weed. It flowers about the second week of August, and ripens the seed about the beginning of September.

Agrostis palustris, or marsh bent. This is considered only a variety of the *Agrostis stolonifera.* This grass is properly a subaquatic: it will grow on tenacious clays, but it seems only to thrive in very moist soils, or in such as are for the most part covered with water. In moist woods it is more frequent than any other of the creeping-stemmed bent grasses: here the culms often attain to five feet in height, when supported by bushes. The above details show the inferior nature of this grass, compared to the larger, and even to the lesser leaved varieties of the *Agrostis stolonifera.* It cannot, therefore, as yet be considered in any other light than a weed that chokes up drains and underwoods. It flowers about the second week of July, and the seed is ripe about the middle and towards the end of August.

Agrostis ramosissima. Lateral-branching bent grass. This is nearly allied to the *Agrostis mexicana*, and is one of the latest flowering grasses. It is remarkable for the number of branches that issue from the joints of the stem; and the woody substance of the culms makes it approach to the nature of a shrub. It affords little herbage till the beginning of summer, and flowers at so late a period of the season (the first or second week in October), that, excepting once, I have never been able to procure any perfect seed, the frost generally destroying the panicles before the seed is perfected. The herbage is killed by frost, but the roots suffer nothing from its effects; it is propagated by parting and planting the roots early in the spring or late in the autumn. The table on the next page will show that it is neither very productive nor nutritive.

Agrostis repens. Creeping-rooted bent; white bent. The *Agrostis nigra*, or black couch grass of Withering. Though a later growing grass, it is less productive than the *Agrostis alba.* It is subject to the rust, a peculiar disease which dries up the extremities of the leaves and gives it an unsightly appearance. Simple ploughing will be found ineffectual to root out this weed in clayey soils. It will be found ultimately the cheapest and most expeditious mode of extirpating it to follow the plough and fork out the roots. Burning, under such circumstances of soil, would doubtless be highly beneficial, but the roots of this couch grass penetrate so deep that a considerable part of them would escape; and the least particle of the root soon produces a plant. It flowers in the second week of August, and the seed is ripe about the latter end of September.

Agrostis stolonifera aristata. Awned creeping bent. This variety of creeping bent, which is allied to the *Agrostis canina* or awned var. *Agr. vulgaris* of Dr. Smith, is greatly inferior to the larger-leaved variety (*Agrostis stolonifera latifolia*, or fiorin); for the weight of nutritive matter per acre afforded by the *latifolia* is two thirds greater than that of the awned variety. Cattle appear to eat this grass in common with the rough-stalked meadow grass and meadow fox-tail grass. It flowers about a week later than the fiorin, but the seed is ripe about the same time.

Agrostis stolonifera angustifolia. Smaller-leaved creeping bent. This is the most common variety of the creeping bent, on damp, tenacious, clayey soils, and in moist woods. It stands next in value to the longer-leaved variety of creeping bent; but appears, from all the observations that have been made on it, when growing in natural pastures, to be entirely neglected by cattle, while any of the superior pasture grasses presented a sufficiency for a bite. It flowers in the second and third weeks of July, and ripens the seed about the end of August.

Agrostis stolonifera (var. 1. *latifolia*). Longer-leaved creeping bent; fiorin.

The Rev. Dr. Wm. Richardson has introduced this variety of the *Agrostis stolonifera* to the agricultural world, under the name of Fiorin, and has shown its merits and properties, deduced from his own experiments, in a variety of publications on the subject, to which the reader is referred. It is greatly superior in point of produce and nutritive powers to the other varieties of the *Agrostis stolonifera*, which have been enumerated: this will be manifest, on referring to the detailed table of experiments made upon them as given in the table on the next page.

On comparing the specimens of these different varieties, their resemblance to each other is so great, that they may be easily mistaken for each other, without a close inspection, and some knowledge of botany to assist it. This variety appears to be confined to rich ancient pasture land, as its natural place of growth, and the other varieties to various soils and situations; and that when taken from these different soils, and cultivated together under the same circumstances, they retain their discriminating characters. On damp, clayey soils, the second variety (smaller-leaved creeping bent) is the most common. To moors and bog soils, the third variety (awned creeping bent grass) is chiefly or altogether confined. To light sandy soils, particularly when more or less shaded, the fourth variety (wood creeping bent grass) is peculiar; and the fifth variety (marsh creeping bent grass) is seldom found but in the bottoms of ditches, or by the side of rivulets. The first variety being *therefore scarce*, and *the others very common*, there is little room for surprise at the contradictory results of experiments that have been made, on one or other of these inferior varieties, by gentlemen equally eminent for agricultural knowledge, under the conviction of their being one and the same grass as recommended by Dr. Richardson, under the name of fiorin: whereas, though they agree in the general habit of Dr. Richardson's variety, and indeed in every respect, except in the characters before described, their inferiority in every agricultural merit is so great, as to justify the opprobrious epithets that have been bestowed upon them, by those who, from the above causes, have differed from Dr. Richardson's statements of the merits of the first variety, or fiorin, and prevented that justice being done to the discovery which it may have deserved.

The above details will assist the farmer in deciding on the comparative merits of this grass as a constituent of a mixture of grasses for permanent pasture; from which it will doubtless appear worthy of attention, but its value not so great as has been supposed, if its habits or manner of growth be impartially taken into the account, when compared with the produce and nutritive powers of the other grasses. The chief advantage of this grass, in permanent pasture, is its late growth. It remains in a degree inactive, till other grasses have attained to perfection, and when their productive powers become exhausted, those of fiorin and its varieties begin; and it will be found, on inspection, that the latest mouthful of herbage, and sometimes the earliest, in those pastures, is principally afforded by this grass.

There has been much prejudice existing against the different species of *Agrostis* in general; but let the proprietor of a rich ancient pasture divest a part of it of this grass entirely, and the value of the plant will be demonstrated in the comparative loss of late and early herbage. The cock's foot grass is superior to the larger variety of the creeping bent, in the proportion nearly of 11 to 9. The meadow fescue is also superior to fiorin in nearly the like proportion as cock's foot. The meadow fox-tail grass is inferior to fiorin in the proportion nearly of 6 to 7. When cultivated separately, for the purpose of green food or hay, fiorin requires to be kept perfectly clear of weeds, its couchant habit of growth affording great encouragement for the health of upright growing plants — under this circumstance, weeds. It flowers about the second and third weeks of July, and the seed is ripe about the second and third weeks of August. The mode of converting fiorin into hay, during the winter *months, is* amply detailed in Dr. Richardson's *publications* on Fiorin. Full information will there be likewise found on the productive powers, uses, modes of cultivation, &c. of this grass, deduced from the Doctor's own experiments.

Agrostis stricta. Rock bent; upright bent. *Trichodium rupestre* (Schrader). The whole plant is of a fine deep green colour, by which it is distinguished at first sight from every other species of bent grass: if we compare the *Agrostis vulgaris* with this species, it will be found superior, in the proportion nearly of 5 to 3. This species being inferior to the common bent in most points, its value to the agriculturist can be but little. The only property that renders it worthy of notice is, the small degree in which it impoverishes the soil: when cultivated on a poor, silicious, sandy soil, the produce, though somewhat inferior, continued for six years, without diminishing in the yearly quantity, and without any manure being applied; a circumstance which was not manifested in any other species of grass.

Agrostis vulgaris canina. Awned fine bent. (Brown bent, or *Agrostis canina*, Wither. Arr. *Smith's Engl. Flora. Agrostis vulgaris* var. *β.* Do. var. 1.) As this is a much less common plant than the variety of *Agrostis vulgaris* before described, and as it differs so much from that variety in the properties which constitute the farmer's distinguishing characters of grasses, the name *canina* is here added. The *vulgaris mutica* is more common to sandy soils; the *v. canina* to clayey soils. The weight of nutritive matter in which the produce of one acre of the awnless variety of *Agrostis vulgaris canina* exceeds that of the awned variety is 151·8. The comparative merits of the *Agrostis vulgaris* exceed those of the *Agrostis vulgaris canina* nearly as 2 to 1. The crop of the awnless variety is greater than that of the awned, but is much less nutritive, being as 10 to 7; the spring and autumn produce is likewise superior. Neither of these varieties appears to be of much value to the farmer. The rust attacks the culms and leaves of both varieties, which gives the plants a dirty-brown appearance; the *Agrostis vulgaris* is always free from this disease. The brown bent flowers in the second and third weeks of July, and ripens the seed in the end of August.

Agrostis vulgaris mutica. Common bent; fine bent grass. This species has four variations, according to Dr. Schrader. The first is distinguished by being awned (see *Agrostis vulgaris canina*, and *Trichodium caninum*); the second, by awnless and diseased flowers (see *Agrostis pumila* of Willd. Spec. Plant. i. p. 371.); the third, by its diseased awned flowers; the fourth, by having the flowers viviparous, *Agrostis sylvatica.*

The common bent is one of the earliest of the bent grasses: in this respect it is superior to every other of this family; but inferior to several of them in the quantity of produce it affords, and the nutritive matter it consumes. It is the most common grass on natural sandy pastures; and even on more tenacious soils, that are elevated and exposed, it is frequent. It flowers from the third week of June till the second week of July, and the seed is ripe the beginning of August.

The following tabular arrangement shows at a glance the proportional value of the several varieties of Agrostis, in seed and in flower, and their yield per acre of green and dry produce on various soils, and comparative qualities of nutrition.

Description.	Soil.	Green Produce per Acre.			Dry Produce per Acre.			Produce per Acre of Nutritive Matter.		
		lbs.			lbs.			lbs.		
Agrostis alba, in flower	Clay	8,167	8	0	3,471	3	0	2,255	3	12
——— *canina*, in flower	Bog	5,445	0	0	1,497	6	0	148	14	0
——— *canina*, when seed ripe	—	6,125	10	0	2,603	5	0	239	4	8
——— *palustris*, in flower	—	10,209	6	0	4,534	3	0	438	10	0
——— *palustris*, when seed ripe	—	13,612	8	0	5,445	0	0	584	14	0
——— *repens*, in flower	Clayey loam	6,125	10	0	2,679	15	6	287	2	0
——— *stolonifera aristata*, in flower	Bog	8,848	0	0	4,210	12	0	368	10	0
——— *stolonifera aristata*, in December	—	10,209	6	0	4,594	3	8	438	10	15
——— *stolonifera angustifolia*, when seed ripe	—	16,335	0	0	7,350	12	0	765	11	0
——— *stolonifera angustifolia*, in December	—	17,015	0	0	8,507	8	0	930	8	0
——— *canina capillaris*, in flower	Sandy loam	4,764	6	0	1,310	3	0	148	14	0
——— *canina fascicularis*, in flower	Sandy	2,722	8	0	680	10	0	85	1	4
——— *canina fascicularis*, in seed	—	4,083	12	0	1,429	5	0	239	4	0
——— *mexicana*, in flower	Rich black, silicious, sandy	19,057	8	0	6,670	2	0	595	8	12
——— *nivea*, in flower	Sandy	6,125	10	0	2,603	6	4	239	4	8
——— *nivea*, when seed ripe	—	4,764	6	0	1,310	3	4	148	14	2
——— *ramosissima*, in flower	Strong clayey loam	28,586	4	0	11,434	0	0	893	5	0
——— *stolonifera latifolia*, in flower	Peat	17,696	4	0	7,742	1	12	967	12	3
——— *stolonifera latifolia*, seed ripe	—	19,057	8	0	8,575	14	0	1,042	3	5
——— *lobata*, in flower	Silicious sand	6,806	4	0	3,403	2	0	319	0	11
——— *lobata*, seed ripe	—	6,125	10	0	2,679	15	6	287	2	3
——— *stricta*, in flower	Bog	9,528	12	0	4,764	6	0	251	3	15
——— *stricta*, seed ripe	—	7,486	14	0	2,713	15	14	175	7	9
——— *vulgaris mutica*, in flower	Silicious sand	10,209	6	0	4,594	3	8	531	11	3
——— *vulgaris mutica*, in seed	—	9,528	12	0	4,764	6	0	251	3	15
——— *vulgaris canina*	Sandy loam	6,125	10	0	2,603	6	4	239	4	8

As this family of grasses has been held in little esteem by farmers, principally on account of their lateness of flowering, it may be of use to bring them into one view, in the order of their early produce of herbage in the spring, and the nutritive matters afforded by equal quantities of each grass.

	Apparent Difference of Time.	Nutr. Powers. dr.	gr.
Agrostis vulg. mutica (common bent)	Middle of April	1	2¾
A. palustris (marsh bent) -	One week later	2	3
A. stolonifera, var. *latifolia* (fiorin)	—	3	2
A. stolonifera, var. *angustifolia* (smaller leaved)	—	3	0
A. stolonifera, var. *aristata* (awned var. of creeping bent)	—	2	6
A. stolonifera, var. *sylvatica* (wood-creeping bent)	—		
A. alba (creeping-rooted bent)	—	2	6
A. stricta (upright bent, *Trichodium rupestre*)	—	1	2
A. vulgaris canina (brown bent)	—	1	3
A. nivea (snowy bent, *Trichodium*, var. *nivea*)	—	2	0
A. lobata (lobed bent grass)	Three weeks later	3	0
A. repens (black couch bent grass)	—	3	0
A. Mexicana (Mexican bent grass)	—	2	0
A. fascicularis (bundled-leaved bent)	—	2	0
A. lateriflora (branching bent grass)	—	2	0

(*Sinclair's Hort. Gram.*; *Smith's Eng. Bot.*)

AIR. (*Air*, French, *aër*, Lat.) The element or thin medium in which terrestrial animals move and breathe, and which surrounds the earth to a considerable height. See ATMOSPHERE and GASES.

AIRA. A genus of native grasses, of which there are but few species capable of being cultivated to advantage as field grasses, on account of their aquatic nature.

Aira aquatica. Water hair-grass. This plant is an aquatic, found naturally growing in the mud of standing pools, or running waters. It is, therefore, unfit for cultivation. Mr. Curtis says, that it is the sweetest of the British grasses; but there are several species which contain more sugar, in proportion to the other ingredients which compose their nutritive matter, as the *Glyceria fluitans*, *Elymus arenarius*, *Poa nemoralis* var. *angustifolia*, *Poa aquatica.* It flowers in the second and third weeks of July.

Aira cæspitosa. Turfy hair-grass; hassock-grass. This grass is of a very innutritious nature; but even if it had greater nutritive powers, the extreme coarseness of the foliage would render it unfit for cultivation. It delights in moist clayey soils, where the water stagnates; but is found in almost every kind of soil, from the dry sandy heath to the bog. It forms dense tufts in pastures very disagreeable to the sight, which are termed hassocks, bull's faces, &c., by farmers. It is a most difficult plant to extirpate, when in considerable quantity. Some persons, to get rid of it, dig up the tufts, and fill up the holes with lime compost; this, no doubt, would answer the end, at least for a few years, if all the roots were destroyed; but this is never the case: a circle of roots is left, which, in one or two seasons, produce larger hassocks than before; and besides, when the hassocks are numerous, the expense attending this process is considerable. Others depend on occasional mowings to keep the hassocks under; but this is productive of little good, particularly if the mowing of the tufts be deferred till the autumn, which I believe is the common practice. I have found no treatment weaken or retard the growth of grass so much as cutting it closely, before and after the first tender shoots appear in the spring. But the only effectual and most profitable mode of extirpating this grass is by first paring and burning the surface of the land, and by making proper drains, to correct, as much as possible, the tenacious nature of the soil; in this case surface-drains are as necessary as those termed hollow. Sand should likewise be applied during the course of crops taken previous to returning the land again to permanent pasture, if such should be desirable, from its local situation; as that, for instance, of a park or policy. This grass flowers about the third week in July, and the seed is ripe towards the end of August.

Aira cristata. Crested hair-grass. *Poa cristata.* Crested meadow-grass. *Host.* ii. p. 54. t. 75. This native grass was formerly ranked by botanists under the genus *Poa*, but has since been referred to that of *Aira*, to which it is more closely allied. The produce of this species, and the nutritive matter it affords, are equal to those of the *Festuca ovina* at the time the seed is ripe: they equally delight in dry soils, though the *Aira cristata* will thrive well and remain permanent in soils of a moist and clayey nature, which is different with the *Festuca ovina.* The greater bulk of the produce of the *Aira cristata*, in proportion to its weight, makes it of inferior value to the *Festuca ovina.* In some parts of the country it grows on dry pastures plentifully, where it appears to be but sparingly eaten by cattle, particularly if the pasture be not overstocked. Rye-grass (*Lolium perenne*), sheep's fescue (*Festuca ovina*), yellow oat-grass (*Avena flavescens*), crested dog's-tail (*Cynosurus cristatus*), meadow barley (*Hordeum pratense*), flexuose hair-grass (*Aira flexuosa*), are all preferred by cattle to the crested hair-grass. The nutritive matter of this grass differs but little in its composition from those of the above: it approaches nearest to that of the *Aira flexuosa*, differing only in having less bitter extractive matter and of more tasteless mucilage; but the soft hairy foliage of the grass appears at once the cause of this dislike in cattle to eat it. It flowers about the first week in July, and the seed is ripe about the beginning of August.

Aira flexuosa. Zig-zag hair-grass; wavy mountain hair-grass. The *Aira flexuosa* is much more productive on its natural soil than the *Festuca ovina;* but it requires a deeper soil, though not a richer. The *Festuca ovina* is more common among heath, the *Aira flexuosa* among furze, though both grasses frequently grow intermixed on the same soil. To those who attempt the improvement of such soils in a secondary manner only, this species of hair-grass appears to be the best of those grasses natural to the soils in question, and may form a principal part of a mixture of seeds for that purpose of improvement. The produce of this grass on a heath soil is superior to that on a clayey loam in the proportion of 2 to 1. The proportional value in which the grass at the time of flowering exceeds that of the latter-math, is as 8 to 7. Flowers in the first week of July. Seed ripens in August.

The proportionate value of the different varieties of *Aira* as deduced from experiments may be ascertained by reference to the following classified table of results: —

Description.	Soil.	Green Produce per Acre.	Dry Produce per Acre.	Produce per Acre of Nutritive Matter.
		lbs.	lbs.	lbs.
Aira aquatica, in flower - -	Mud covered with water	10,890 0 0	3,267 0 0	382 13 10
— *cæspitosa*, seed ripe - - -	Clay	10,209 0 0	3,318 0 0	319 0 11
— *cristata*, in flower - - -	Sandy loam	10,890 0 0	4,900 8 0	340 5 0
— *cristata*, seed ripe - - -	—	6,806 4 0	3,403 2 0	127 10 0
— *flexuosa*, in flower - - -	Heath on clay	10,209 6 0	3,318 0 12	319 0 11
— *flexuosa*, seed ripe - - -	—	9,528 12 0	3,573 4 8	297 12 6

(*Sinclair's Hort. Gram. Wob.*)

AIRING. In the management of horses, implies the exercising them in the open air, which is of the greatest advantage to them when performed with moderation, and according to the circumstances or state in which they are in respect to their health and the nature of their keep. By this means their legs are prevented from swelling, their stomachs improved, and their wind rendered more free and perfect.

AIR VESSELS, of vegetables, are certain horizontal vessels of large diameter, that pass through the bark of trees to the alburnum, which Dr. Darwin thinks probably contain air, as they are apparently empty, he believes, in the living vegetable. The air vessels of the bark of trees consist of longitudinal fibres, which are joined together, and appear to inosculate at certain distances, and recede from each other between those distances like the meshes of a net, in which spaces, several horizontal apertures are seen to penetrate through the bark to the alburnum, according to Malpighi, who has given a figure of them. Very fine horizontal perforations through the bark of trees are also mentioned by Duhamel, which he believes to be perspiratory or excretory organs; but adds, that there are others of much larger diameter, some round and some oval, and which, in the birch tree, stand prominent, and pierce the cuticle or exterior bark. These vessels probably contain air during the living state of the tree, as they pierce the external bark, which frequently consists of many doubles, like a roll of linen cloth; as a new cuticle is annually produced beneath the old one, like a new scarf-skin beneath a blister in animal bodies; and the old one sometimes continues, and sometimes peels off like the cuticle of a serpent, as is seen on the trunks of many cherry trees and birches. These vessels, when contracted in dry timber, appear like horizontal insertions in many planed boards, in which the spiral absorbent vessels become by their contraction the longitudinal fibres, as appears in the figure of a walking-cane given by Dr. Grew. These horizontal vessels Dr. Darwin supposes to contain air, enclosed in a thin moist membrane, which may serve the purpose of oxygenating the fluid in the extremities of some fine arteries of the embryo buds, in the same manner as the air at the broad end of the egg is believed to oxygenate the fluids in the terminations of the placental vessels of the embryo chicken.

AITON, WILLIAM. A writer upon plants, was born in 1731, near Hamilton in Lanarkshire. In 1754 he visited London in pursuit of employment as a gardener, to which profession he had been brought up. Philip Miller discerned his abilities, and obtained for him a situation in the royal gardens, and, in 1759, he was appointed botanical superintendent at Kew In 1783 he obtained the charge of the royal kitchen and pleasure gardens. Six years afterwards he published a catalogue of the plants, under the title of *Hortus Kewensis*, 3 vols. 8vo.

He died in 1793. T. Aiton his son published an enlarged edition of the *Hortus Kewensis*, London, 1810-13, in 5 vols 8vo., and an epitome in 1814, to which is added a selection of the esculent vegetables and fruits cultivated in the royal gardens. It needs scarcely be remarked, that the *Hortus Kewensis* is a work of the first authority as regards botanical nomenclature, &c.

ALABASTER. (Greek ἀλάϐαστρον; Teut. *alabast.*) The name is said to be derived from Alabastion, a town in Egypt, where there was a manufactory for small ornamental vessels, from stone procured from the mountains in the neighbourhood. These vessels were used by the ancients to contain perfumes of various kinds, with which it was the custom of the country to anoint the heads of guests. There are many allusions to this custom in Horace; and in the Scripture we find Mary, the sister of Lazarus, pouring "very precious ointment" upon the head of our Saviour from an *alabaster* box.

There are two kinds of white stone to which antiquaries and artists give the name of alabaster—the one is a *carbonate* of lime, and the other is gypsum or *sulphate* of lime. Savary tells us there are "some specimens of the colour of horn and transparent, and some yellow, like honey marked with veins." Alabaster differs from marble in being easier to cut, and less durable, the basis being a calcareous earth, which is soluble in five hundred times its weight of water at a temperature of about 60°. (See CARBONATE OF LIME and GYPSUM.) Alabaster is found in Derbyshire and Staffordshire, and is frequently manufactured into small toys.

ALBUMEN is the name given by chemists to the impure glossy viscid liquid, which forms the *white* of an egg. This white is composed chiefly of albumen mixed with some mucus, soda, and sulphur.

Albumen unites readily with water, and when heated to 165° it coagulates into a white solid mass; but when mixed with ten times its weight of water, it no longer is coagulated by heat. It is composed, according to the analysis of MM. Gay Lussac and Thénard, of

Carbon - - -	52·883
Oxygen - - -	23·872
Hydrogen - - -	7·540
Azote - - -	15·705
(*Rech. Phys. Chem.* ii. 332.)	100·000

Albumen (which is nearly identical in composition with the gluten of vegetables), is one of the most important and common of all the animal substances. It abounds in bones, muscle, the membrane of shells, sponges, &c.; and, according to the experiments of Hatchett, cartilage, nails, horns, hair, &c. are almost entirely composed of it. (*Thomson*, vol. iv. p. 407.)

ALBURNUM. An integument composed of a soft white substance, scarcely perceptible in some sorts of trees, situated between the *liber* and the wood. In the oak and elm it is hard and very conspicuous. It is as it were an imperfect wood, not having acquired that state or consistence necessary to perfect wood; hence it may be compared to the cartilage in animals, which at length becomes bone. This state must necessarily be passed through before wood can be formed. The hardness of this substance is in proportion to the vigour of the plant or tree. In respect to its formation Dr. Darwin observes, that the umbilical vessels of the new buds of deciduous trees, which are analogous to those which permeate the lobes of the seed, are extended downward in the bark about Midsummer, and terminate in certain reservoirs of nutriment, which are at this time secreted from the vegetable blood oxygenated in the leaves. This bark now consists of an intertexture of the caudexes of the present leaves, which were buds in the last summer, and are now adult vegetable beings, and of the embryo caudexes of the new buds, and of the umbilical vessels of the new buds; it will become alburnum or sap wood during the autumn or ensuing spring, and will be gradually covered over with a new bark consisting of the mature caudexes of the new buds, while that which was the alburnum in the preceding spring will become a circle of lifeless timber, interior to the circle of alburnum.

The vessels of the alburnum in their living state possess the property of conveying the sap-juice, which is propelled upwards in the early spring, by the absorbent terminations of the roots, as visible in decorticated oaks, the branches of which expand their buds like those of the birch and vine in the bleeding season. That the vessels of the alburnum in their living state occasionally act as capillary syphons, through which the sap-juice is first pushed upwards by the absorbent extremities of the roots, and afterwards returns downwards, partly by its gravitation, in branches bent below the horizon, appears from an experiment of Dr. Walker; and lastly, that the vessels of the alburnum, after their vegetable life is extinct, possess a power of capillary attraction of the sap-juice, or of permitting it to pass through them occasionally, appears from the following experiment:—A branch of a young apple-tree was so cankered, that the bark for about an inch round it was totally destroyed. To prevent the alburnum from becoming too dry by exhalation, this decayed part was covered with thick white paint: in a few days the painting was repeated, and this three or four times, so as to produce a thick coat of paint over the decayed part, or naked alburnum, extending to the ascending and descending lips of the wound; this was in spring, and the branch blossomed and ripened several apples.

ALCOHOL is the name first given by the alchemists (it came originally from Arabia) to the liquid obtained by the distillation of wine, beer, and other fermented spirits. These seem to have been known in the earliest ages: Noah, who planted a vineyard, drank wine; and the heathen writers deemed the invention worthy of being ascribed to their greatest kings and heroes. Beer, there is little doubt, was invented by the Egyptians. They certainly used it in the days of Herodotus. The Germans drank it extensively when Tacitus wrote. These were probably the purest varieties of alcohol then generally made; although they were *known* in the dark ages, and it is probable have been employed in the North of Europe from a very remote period. The process, however, of separating the impure alcohol from these is very easy: upon subjecting the wine or *wash* to a moderate heat, the spirit arises, and is easily collected in a worm surrounded by cool water. It is in this way that gin is procured from the distillation of fermented barley or other grain; rum from molasses; brandy from wine. It must not be supposed, however, that the product of these distillations is pure alcohol, for even the strongest brandy contains between forty and fifty per cent. of water. The first who procured alcohol in a state of tolerable purity is supposed to have been Arnold of Villa Nova, a celebrated alchemist of the fourteenth century. When impure alcohol is concentrated by repeated distillations, and by mixing it with some salt, like the salt of tartar, that has a strong attraction for water, it gradually parts with a considerable portion of its water, and becomes reduced in specific gravity to about 0·820; that of commerce, however, is rarely of less specific gravity than 0·8371. At the greatest strength, however, at which it has been observed, such as that of 0·792, which M. Lowitz obtained by repeatedly distilling rectified spirits from potash, it possesses the following properties:—it is transparent, colourless, of a strong agreeable penetrating taste, and produces when swallowed intoxication. It does not freeze, even by exposure to the most intense cold; it is very volatile, boiling at 176° of Fahrenheit, and in a vacuum at 56°. It unites with water in all proportions, and is entirely combustible, burning without leaving any residuum. Alcohol, according to the analysis of M. Saussure, is composed of

Hydrogen	13·70
Carbon	51·98
Oxygen	34·32
(*Thomson's Chem.* vol. ii. p. 39.)	100·00

The following table will show the ordinary proportion of alcohol per cent. by measure in various fluids, according to the experiments of Professor Brande.

Port	21·40
Ditto	25·83
Madeira	19·34
Ditto	24·42
Sherry	18·25
Ditto	19·83
Claret	12·91
Calcavella	18·10
Lisbon	18·94
Malaga	17·26
Bucellas	18·49
Red Madeira	18·40
Malmsy Madeira	16·40
Marsala	25·87
Ditto	17·26
Red Champagne	11·30
White Champagne	12·80
Burgundy	14·53
Ditto	11·95
White Hermitage	17·43
Red Hermitage	12·32
Hock	14·37
Ditto	8·88
Vin de Grave	12·80
Frontignac	12·79
Coti-Roli	12·32
Roussillon	17·26
Cape Madeira	18·11
Cape Muschat	18·25
Constantia	19·75
Tent	13·30
Sheraz	15·52
Syracuse	15·28
Nice	14·63
Tokay	9·88
Raisin	25·77
Grape	18·11
Currant	20·55
Gooseberry	11·84
Elder	9·87
Cyder	9·87
Perry	9·87
Brown Stout	6·80
Ale	8·88
Brandy	53·39
Rum	53·68
Hollands	51·60

The spirits distilled from different fermented liquors, says Davy, differ in their flavour, for peculiar odorous matters or oils rise in most cases with the alcohol. The spirit from malt usually has an empyreumatic taste, like that of oil formed by the distillation of vegetable substances. The best brandies seem to owe their flavour to a peculiar oily matter, formed probably by the action of tartaric acid upon alcohol; and rum derives its characteristic taste from a principle in the sugar cane. The cogniac brandies contain prussic acid. (*Davy*, *Chem. Phil.* 135.)

ALCOVE. (Span. *alcoba;* Dan. *alkove;* but originally from the Arab *alkobba.*) A recess in gardens or pleasure grounds.

ALDER TREE. (*Alnus glutinosa*, Gærtner; *Betula Alnus*, Linn.) The common Alder appears generally as a shrub; but if allowed to attain maturity it will grow to a stately tree. The bark in old trees is blackish, and full of clefts; on the young shoots it is smooth, and of a purplish hue. The leaves have a dark green colour, and roundish shape, resembling those of the hazel, nicked on the margin, smooth, and clammy to the touch. The foot-stalk is about an inch long; the leaf-ribs on the under side have spongy balls at the angles, as in the leaves of the lime tree. The male catkins are cylindrical, appear in the autumn, and remain on the tree till spring. The female catkins are of a short conical form, like a small fir cone.

The alder is often planted as a coppice-wood in wet and boggy places where no other trees will thrive, and cut down every tenth or twelfth year for poles. It may also be often used to advantage on swampy ground for fences, and may be conveniently trained to any desired height. The young trees may be planted to great advantage for securing the banks of water-courses from the torrents. We certainly know of no tree so well adapted to this purpose as the alder; for, on account of the numerous suckers which it constantly sends up from the bottom, and the very fibrous nature of their roots, the banks become in time one mass of strongly interwoven roots.

Wherever it may be desirable to complete a prospect by extending plantations over sterile cold ground, water-galls, or boggy swamps, no tree we know of is equal to the alder, even in a picturesque point of view. Mr. Gilpin in his *Remarks on Forest Scenery* observes that, "He who would see the alder in perfection, must follow the banks of the Mole in Surrey, through the winding and delightful vales of Dorking and Mickleham into the groves of Esher. The Mole, indeed, is far from being a beautiful river; it is a silent and sluggish stream; but what beauty it has, it owes greatly to the alder, which everywhere fringes its meadows, and in many places forms very pleasing scenes, especially in the vale between Box Hill and the high grounds of Norbury Park."

The generality of trees acquire picturesque beauty by age; but it is not often that they are suffered to attain this venerable period: some use is commonly found for them long before that period. The oak falls for the greater purposes of man, and the alder is ready to supply a variety of his smaller wants.

The remark as to the wants and purposes of man tending to prevent the growth of trees to their full maturity, is too well exemplified in the case of the alder; yet they are sometimes allowed to come to perfection. Mr. Beevor mentions an alder in his garden, which, at four feet from the ground, measured upwards of sixteen feet in circumference.

Some of the largest alders we have seen in England are growing in the Bishop of Durham's park at Bishop-Auckland, and some very fine ones are to be found in his Grace the Duke of Northumberland's grounds at Sion House. We fully agree with Mr. Gilpin in his commendation of the alder. It is always associated in our minds with river scenery, both of that tranquil description most frequently to be met with in the vales of England, and with that of a wilder and more picturesque cast, which is to be found amidst the deep glens and ravines of Scotland. Whoever has traversed the banks of the North and South Esks, winding their rocky way through the extensive domain of his Grace the Duke of Buccleuch, Dalkeith Park, near Edinburgh — the Marquis of Lothian's, Newbattle Abbey — and Lord Melvil's at Melvil Castle, — will bear testimony to the picturesque effect of the alder. The romantic scenery about Roslin Castle and Hawthorndean is much indebted to the alder for fine effect.

Sir Thomas Dick Lauder says, "In very many instances we have seen the alder put on so much of the bold resolute character of the oak, that it might have been mistaken for that tree except for the intense depth of its green colour. The Mole may doubtless furnish the traveller with very beautiful specimens of the alder, as it may also furnish a specimen of that species of quiet English scenery we have alluded to; but we venture to assert, that nowhere will the tree be found in greater perfection than on the wild banks of the river Findhorn and its tributary streams, where scenery of the most romantic character everywhere prevails."

"The alder, like the birch," says Marshall, "suffers as an ornamental tree from an association of ideas; we not only see it very common, but we see it in low, dreary, dirty situations; nevertheless, if the alder be suffered to form its own head, in an open advantageous situation, it is by no means an unsightly tree. In Stowe Gardens, in what is called the old part, there are some very fine ones; and in coming round from the house by the road leading to Buckingham, there is one which is truly ornamental. Hacked and disfigured in the manner in which alders in general are, they have but little effect in doing away the unsightliness of a swamp; but if they were suffered to rise in groups and singlets, open enough to have room to form their full tops, and close enough to hide sufficiently the unseemliness of the surface, even a moor or a morass, seen from a distance, might be rendered an agreeable object." (*On Planting*, ii. 37.)

The wood of the alder is used for making charcoal and heating ovens, and is valuable for piles, pumps, sluices, and in general for all works under water; "because," says Pliny, "it will endure for many years." It is said to have been used under the Rialto at Venice; and we are told that the morasses about Ravenna were piled with it in order to lay foundations for building upon. In Flanders and Holland it is raised in great quantities for this purpose. It serves also many domestic and rural uses, such as for cart-wheels, spinning-wheels, milk-vessels, bowls, spoons, and other turnery ware, troughs, handles of tools, clogs, pattens, and wooden heels. The roots and knots furnish a beautiful veined wood for cabinets. The Scottish Highlanders often make chairs of it, which are very handsome, and of the colour of mahogany.

Sir Thomas Dick Lauder tells us that the old trees, which are full of knots, cut up into planks, make very handsome tables. "We have seen some of these," says the baronet, "made from some enormous trees that grew at Dalwick, on the property of Sir John Nasmyth, in Peebleshire; and no foreign wood we have ever seen can match them for beauty."

The bark, though nearly superseded by logwood, is used by dyers, tanners, and leather-dressers; and also by fishermen for dyeing their nets. Both the bark and young shoots dye yellow, and with a little copperas, a yellowish grey, very useful in the demi-tints and shadows of flesh colour in tapestry. The shoots cut in March will dye a cinnamon colour; and a fine tawny, if they be dried and powdered. The fresh wood yields a dye the colour of rappee snuff. The catkins dye green, and the bark is used as a basis for black. The bark and leaves have been sometimes employed in tanning leather, the whole tree being very astringent.

The Alder delights in a very moist soil, where few other trees will thrive:—

"The Alder, owner of each waterish soil."
Fairfax's Tasso.

It is also an old opinion that it does not in*jure grass, but rather nourishes* its growth:—

"The Alder, whose fat shadow nourisheth;
Each plant set neere to him long flourisheth."
W. Browne.

Marshall is of a very different opinion. "In low swampy situations," he says, "where the ground cannot be drained but at too great an expense, the alder may be planted with propriety and advantage; but wherever the soil is or can be made pasturable, the alder should by no means be allowed to gain a footing. Its suckers and seedlings poison the herbage; and it is a fact well known to the observant husbandman, that the roots of the alder have a peculiar property of rendering the soil they grow in more moist and rotten than it would be if not occupied by this aqueous plant. Plantations of alders should therefore be confined to swampy, low, unpasturable places; except when they are made for the purposes of ornament; and in this case the native species ought to give place to its more ornamental varieties, of which Hanbury makes five, namely, the log-leaved alder, the white alder, the black alder, the hoary-leaved alder, and the dwarf alder." (*On Planting*, ii. 37.) The cut-leaved is a pretty variety.

It is propagated by layers, cuttings, or truncheons, about three feet in length. Such truncheons are often employed for securing the banks of rivers, either by planting them very close, or crosswise. For general purposes, however, we approve of raising the young trees by layers. This operation should be performed in October, and by the autumn following they will have taken root sufficiently to be transplanted. The distance at which these trees should be placed, if intended for a coppice, is a yard square; and at the expiration of seven years, when they may be felled for poles, every other stool may be taken away; and if the small lateral shoots be taken off in the spring, it will very much strengthen the upright poles, provided a few small shoots be left at certain distances upon the trunk, to detain the sap for the increase of its bulk.

The alder may be raised from seeds sown in beds in the same way as is usual for birch; but propagation by truncheons or layers is the most speedy process for obtaining young plants.

The best time for planting alder truncheons is in February or March. They should be about three feet in length, sharpened at one end, and the ground loosened with an instrument before they are thrust into it, lest by the stiffness of the soil the bark should be torn off, which may prevent their growing. They should be put into the earth about two feet, to prevent their being blown out of the ground by strong winds. After they have made stout shoots, the plantations should be cleared from all such weeds as grow tall, otherwise they will overbear the young shoots; but when they have made good heads, they will keep down the weeds, and will require no further care.

If they be raised by laying down the branches, it must be performed in October; and by the October following, they will have taken root sufficiently to be transplanted out; which must be done by digging a hole, and loosening the earth in the place where each plant is to stand, planting the young trees at least a foot and a half deep, cutting off the top to about nine inches above the surface, which will occasion them to shoot out many branches.

Mr. South in the sixth volume of the *Letters and Papers of the Bath and West of England Society* has stated, that, on planting a waggon-load of truncheons in such situations as have been described above, they all appeared to succeed by throwing out strong shoots the first summer, but that the year following they all died, not having struck a single root. Concluding that this did not depend on any defect in the soil, he planted it again with small-rooted slips, taken from old stubs, few of which failed, most of them having been since repeatedly cut for brushwood, poles, and other purposes; and of those planted single, he observes, one has formed a conical top of great beauty, and that its bole is three feet seven inches in circumference midway between the branches and the ground. From this statement it would seem, that the best mode of securing the growth of those trees is the planting of the rooted slips, which can be easily done, as great quantities of young shoots are annually thrown out from about the roots of this sort of trees.

Where there are plantations, or much of this sort of wood on a farm, Arthur Young advises that it should be cut when the bark will peel, and be immediately soaked in a pond for two months, as by this means the wood is so much hardened as to be greatly improved in its quality.

The leaves of the Alder are often extensively devoured and the trees injured by the caterpillar of a saw-fly (*Selandria alni*), as observed by M. Réaumur in France, and by ourselves in England. There is a small beetle, also, with shining dark violet-blue wing-cases (*Chrysomela betulæ*), which we remarked to be very injurious to the extentensive plantations of alder, intended for charcoal, on the Rhine, near Obercassel. (*Miller's Dictionary.*)

ALDER TREE, BLACK. (*Alnus nigra, Frangula.*) This shrub grows *in* moist low places and *woods, flowering in spring, and fruiting in autumn. Its shoots* are brittle, and covered with a brown bark. Its roundish formed leaves are bright green, veined, and terminate in a point. Its small white flowers are followed by large black berries. Its inner yellow rind is an excellent purgative, taken in decoction or infusion, which is milder. The patient must take it in very mild doses at first, to ascertain its effect upon his constitution, as weak and delicate subjects might suffer from its powerful effects, if overdosed. It is good against jaundice, and opens obstructions of the liver. The bark bruised in vinegar is a safe and excellent cure for the itch, applying it outwardly till it takes effect. The decocted outward bark is a fine astringent and styptic. The leaves, bruised and applied, heal ulcers, hot swellings, and inflammations. (*L. Johnson.*)

ALDER FLY, also known to anglers as the orange tawny, or orange brown camlet fly. "It is in season," says Taylor, "from the latter end of February to about a week in April, and is the first fly which begins the diversion of fly-fishing."

ALDERNEY COWS. This admired breed of cows is in general fine-boned, but small and ill-made, and of a light red or yellowish colour. Cows of this breed are most frequently met with about the seats of the opulent, from their milk, though smaller in quantity, being more rich in quality than that of most other kinds, and yielding from the same measure a larger proportion of cream and butter, which is of a beautiful yellow colour and fine flavour. They are much inclined to fatten, and their beef has a very fine grain, and is well tasted, but rather more yellow or high-coloured than that of other sorts.

Mr. Lawrence in his general treatise on cattle, however, supposes, "that the cattle of the islands on the French coast are collectively known by the name of Alderney;" and that "these are a variety of, and smaller than, the Norman; light red, yellow, dun, and fawn-coloured; short, wild-horned, deer-necked, with a general resemblance to that animal; thin, hard, and small-boned; irregular, often very awkwardly shaped." But he considers this description to refer chiefly to the cows. He thinks "they are amongst the best milkers in the world as to quality, and in that respect are either before or immediately next to the long horn, but that in weight of butter for inches they are far superior to all. He has been assured by a respectable friend, that "an Alderney strayed cow during the three weeks she was kept by the finder made nineteen *pounds of butter* each week; and the fact *was held so* extraordinary, as to be thought worth a memorandum in the parish books."

And it is added, that "the Norman and island cattle make fat very quick, and for their bulk arrive at considerable weight. The beef," in his opinion, "is of the first class, very fine grained, in colour yellow, or of a high colour, with a bluish cast and elastic feel, which denotes the closest grained, most savoury, and finest meat." It is in his recollection, that, "some years since, a heifer, bred between Alderney and Kentish home-bred stock, and fattened on cabbages and carrots, made one hundred and fifty stone, dying uncommonly fat." On this ground he supposes, that "this species is, in course, a proper cross for the large and coarse-boned; but in that view he would prefer the real Normans from the Continent, as generally better shaped than the islanders." He likewise states, that "many persons near the metropolis, and along the south and western coast, make a trade of importing these cattle, which are extremely convenient for private families, and make a good figure in parks and lawns."

Mr. Culley, however, remarks, that they are a breed of cattle too delicate and tender to be much attended to by the British farmer, and not capable of bearing the cold of this island, especially the northern parts of it.

By an experiment which is stated in the *Report for the County of Kent*, made between a large home-bred cow of eight years old and a small Alderney of two years old, it appears that the home-bred cow in seven days gave thirty-five gallons of milk, which made ten pounds and three ounces of butter, and the Alderney cow, in the same length of time, gave only fourteen gallons of milk, but which made six pounds and eight ounces of butter.

Very useful cattle may be bred by crossing these cows with short-horned bulls. The late Mr. Hunter also produced a very beautiful cow from the Alderney by a buffalo, which is said, in the *Middlesex Report*, to have kept plump and fat, both in summer and winter, on much less food than would be sufficient to support a beast of the same size of the ordinary breed.

ALE. (Sax. eale.) A liquor obtained from the infusion of malt and hops by fermentation. Ale differs from beer chiefly by having a smaller proportion of hops. There are different sorts of ale brewed, such as strong ale, table ale, pale ale, and brown ale. The pale ale is made from malt which has only been slightly dried, and is generally considered as of a more viscid quality than the brown ale, which is produced from malt that has been roasted, or very hard dried. (*Miller.*) See Beer and Brewing. The *fertility of the soil in grain*, and its being *not proper for vines*, put the Egyptians upon drinking *ale*, of which they were the inventors. (*Arbuthnot.*)

A liquor made from fermented barley is mentioned by Herodotus (l. ii. c. 77.): the earliest manufactured kind of intoxicating liquid was probably, however, mead. Tacitus notices the use of beer by the Germans. Pliny describes it as common to all the nations of the west. It has long been a favourite beverage of the inhabitants of this island. Our Saxon and Danish forefathers drank beer to excess. They regarded it as the drink allotted to those admitted into the Hall of Odin. Ale is named amongst the laws of king Ina; and it was long the custom, when the Norman princes were on the throne, to regulate its price by statute: thus in 1272 it was ordained that a brewer should sell two gallons of ale in a city for a penny, or three or four gallons for the same price in the country.

Hops were apparently first used for beer in Germany, and in the Dutch breweries about the year 1400; but they were not used generally in England until about the year 1600. Henry VIII. in 1530 even forbade the brewers to mix hops in their beer; and yet, according to Rickmann (*Hist. of Inv.* vol. iv. p. 386.), plantations of hops had begun to be formed in England A. D. 1552. The distinction between ale and beer is thus stated by Dr. Thomson: "Both are obtained by fermentation from the malt of barley, but they differ from each other in several particulars, ale is light-coloured, brisk, and sweetish, or at least free from bitter; while beer is dark-coloured, bitter, and much less brisk. *Porter* is a species of beer, and is what was formerly called strong beer. The original difference between ale and beer was owing to the malt, from which they were prepared. Ale malt was dried at a very low heat, and consequently was of a pale colour; while beer or porter malt was dried at a higher temperature, and had in consequence acquired a brown colour. This incipient charring had developed a peculiar, and agreeable bitter taste, which was communicated to the beer along with the dark colour. This bitter taste rendered beer more agreeable to the palate, and less injurious to the constitution than ale. It was manufactured in larger quantities, and soon became the common drink of the lower ranks in England. When during the wars of the French Revolution the price of malt was very materially increased, the brewers found out that a greater quantity of wort of a given strength could be procured from pale malt, than from brown malt; the consequence was, that pale malt was to a considerable extent substituted for brown malt in the brewing of porter and beer. The wort now, however, was paler, and wanted that agreeable bitter flavour which characterised porter. The porter brewers endeavoured to remedy these defects by several artificial additions, such as burnt sugar, quassia, &c. and most of which the chief London porter brewers have, I believe, long since discontinued." Brewers are obliged, under the 6 Geo. 4. c. 81., to take out an annual license, for which they pay, if brewers of strong beer,

	Barrels.	L.	s.
Of not exceeding	20	0	10
Of exceeding 1,000 and not exceeding	2,000	3	0
— 10,000 —	20,000	30	0
— 30,000 —	40,000	60	0
Exceeding	40,000	75	0

Considering the increase of population in England, the consumption of beer has not materially increased since 1787, as the following table of the beer brewed in this country in various years will show.

Years ending 5th July.	Strong Beer.	Table Beer.
	Barrels.	Barrels.
1787	4,426,492	485,620
1797	5,839,627	584,422
1807	5,377,176	1,732,710
1817	5,296,048	1,453,960
1825	6,500,664	1,485,750

The number of barrels of beer exported from England is considerable and increasing, amounting in the years ending the

5th of January, 1826 to 53,013 barrels.
— 1828 — 59,471 —
— 1830 — 74,902 —
(*M'Culloch's Dict. of Com.*)

ALEHOOF. (*Hedera terrestris.* From *ale*, and hooꝼꞇ, head.) Ground-ivy, so called by our Saxon ancestors, as being their chief ingredient in ale. This wild plant creeps upon hedge banks, at the foot of trees, and in every shady place, flowering in spring. It takes root at every joint, like the strawberry runners, and its leaves are roundish and notched at their edges, becoming a purple colour as the spring advances. Its flowers are blue, and its roots fibrous. This plant has a peculiar and strong smell; and it is best gathered when in flower. It is an excellent vulnerary or wound-herb, applied outwardly, and taken inwardly. An ointment made from alehoof, or ground-ivy, is very healing to ulcers and fistula. The decoction of the herb drank daily for a continuance is admirable in cleansing the stomach, promoting the proper secretions, and sweetening the blood; also a fine strengthening eye-water. The old writers affirm, that "equal quantities of ground-ivy, celandine, and daisies, decocted, strained, and applied as a wash to the eyes, will remove all inflammations, spots, web, smarting, and any grief whatsoever." *It is very strengthening to weak and aching backs.* Ground-ivy, or alehoof, operates as a diuretic, and it is excellent in disorders of the lungs and breast. It obtained its name of Alehoof among the poor, who infuse it in ale or beer, and drink it warm, for all internal ailments. (*L. Johnson.*)

ALEHOUSE. (Sax. ealhuꞅ.) A house where ale is publicly sold, more generally known now by the term "beer shop." Beer shops are regulated by the 1 W. 4. c. 64. and by the 4 & 5 W. 4. c. 85. By these a license is now only granted to any person to sell beer to be drank on the premises, on the applicant depositing with the commissioners of excise a certificate of good character, signed by six rated inhabitants of the parish, and certified by one of the overseers of the parish, which certificate if false in any particular, renders the license void. And for the license for the selling by retail of beer *not* to be drank or consumed in or upon the house or premises where sold, the annual sum of 1*l.* 1*s.* And where the beer shall be drank or consumed in or upon the house or premises where sold, the annual sum of 3*l.* 3*s.*

ALEXANDER (*Hipposelinum*). This garden vegetable has been superseded by celery, yet it was an excellent vegetable, and grows abundantly wild almost every where. The seeds and root are hot and dry like those of parsley, cleansing and alternating in quality. The root and seed decocted in wine promote the proper secretions during childbirth. They are also excellent against flatulence and strangury. The leaves applied as a poultice reduce wens and cleanse ulcers and wounds. The root is good decocted, in asthma and coughs. (*L. Johnson.*)

ALIEN. (Lat. *alienus.*) Foreign, or not of the same family or land. Thus Dryden,

> "The mother plant admires the leaves unknown,
> Of *alien* trees, and apples not her own."

In law, an alien is one born in a strange country and never naturalized.

ALIMENT. (Lat. *alimentum.*) That which nourishes, nutriment or food.

Of *alimentary* roots, some are pulpy and very nutritious, as turnips and carrots. These have a fattening quality. (*Arbuth. on Aliments.*) See GASES, EARTH, WATER, &c.

The food of animals, whether of a solid or liquid kind, should be adapted to their different organs, both in quantity and quality, in order that they may exist in the most perfect state. It is observed, that nature directs every animal, instinctively, to choose *such substances* for food as are best adapted *to its health* and support; but as some are *withdrawn* from their natural condition for the convenience of man, and, in their domesticated state, are fed on artificial productions not of their own choice, it becomes a matter of serious importance to the owners of cattle, horses, &c. to make themselves acquainted with their nature and habits, and also with the qualities of those substances which are usually designed as food for them, since there is no doubt but errors in the choice of the latter must be a fruitful source of disease. Besides, in the view of the grazier, some sorts of food may be much more advantageous in the quality of fattening animals than others—a circumstance of vast importance. See FOOD.

ALKALI. The word *alkali* comes from a herb called by the Egyptians *kali*; by us glasswort. This herb they burnt to ashes, boiled the ashes in water, and after having evaporated the water, there remained at the bottom a white salt—this they called *sal kali* or *alkali*. (*Todd's Johnson.*) The word is of Arabic origin; according to Albertus Magnus it signifies "the dregs of bitterness." (*Thomson*, vol. ii. p. 49.)

The chief alkalies found in plants are potash and soda; ammonia, it is true, is produced by the distillation of certain vegetables, but it is a product of the distillation; and again, morphia is obtained from opium, quinia from the Peruvian bark, &c.; but these alkaline substances are but rarely met with by the cultivator, and do not involve any very important facts of vegetable chemistry.

Potash is found in all vegetables growing at a distance from the sea; that of commerce is procured by merely burning the vegetable, washing the ashes in water, and evaporating the solution of potash thus obtained to dryness. In this manner the potash of commerce is made. The proportion, however, of potash existing in plants varies very considerably, as may be seen from the following table of the quantities of ashes and potash obtained from 100 parts of various plants:—

	Ashes.	Potash.
Sallow	2·8	0·285
Elm	2·36727	0·39
Oak	1·35185	0·15343
Poplar	1·23476	0·07481
Hornbeam	1·1283	0·1254
Beach	0·58432	0·14572
Fir	0·34133	
Rue branches	3·379	0·55
Common nettle	10·67186	2·5033
Common thistle	4·04265	0·53734
Fern	4·00781	0·6250
Stalks of Turkey wheat	8·86	1·75
Wormwood	9·744	7·3
Fumitory	21·9	7·9
Trifolium pratense		0·078
Vetches		2·75
Beans, with their stalks		2·0

Thomson's Chem. iv. 189.

The potash thus obtained, however, must not be regarded as a pure alkali, for it contains almost always a small portion of various salts, such as the sulphate of potash, muriate of potash, sulphate of lime, phosphate of lime, &c.

Soda abounds in marine plants generally to a much greater extent than potash does in the vegetables of inland districts; the barilla of Spain is extracted from the salsola sativa and vermiculata, and some of these plants yield nearly 20 per cent. of ashes, which contain about 2 per cent. of soda.

The union of alkalies with acids forms the class of bodies known as the alkaline salts.

ALKANET. (*Anchusa*, Lat.) This plant is a species of bugloss with a red root, brought from the southern parts of France, and used in medicine. It grows wild in Kent and Cornwall, but in other counties only in gardens. It flowers in summer, and its root becomes red in autumn. The root is astringent: the leaves not so much so. The root boiled with butter or lard into an ointment, is good for bruises; a decoction of it mixed with honey and drank freely, is excellent in the jaundice, in ague, and in diseases of the kidneys; sliced into beer, and made hot, it is a good drink in the measles and small-pox. The leaves with hyssop, drank in infusion, kill worms; and the leaves and root in wine are considered good in disorders of the womb. The leaves, applied with honey and meal, are healing in luxations.

ALKEKENGI. A medicinal fruit or berry, produced by a plant of the same denomination; also popularly called *winter-cherry*. The plant bears a near resemblance to Solanum nigrum or Nightshade, whence it is frequently called in Latin by that name, with the addition or epithet of *vesicarium*. (*Chambers.*)

ALLEY. In husbandry, implies the vacant space between the outermost row of corn on one bed, and the nearest row to it on the next parallel bed.

Alley. In gardening, implies a straight walk, bounded on both sides with trees or shrubs, and commonly covered with gravel or grass.

ALL-HALLOWS. *All-Hallowmas*, *All-Hallowtide*, or simply *Hallowmas*, the old English name for All-Saints Day, or the 1st of November. (From *all* and *hallow*, to make holy.) All-Hallowmas was the Saxon term, as is evidenced by the rubric prefixed to the 5th chapter of Matthew, in the Saxon version of the Scriptures. Boucher, in his learned and valuable *Glossary of Archaic and Provincial Words*, remarks, that while the other ancient forms, Christmas, Michaelmas, &c., have been generally preserved, that of All-Hallowmas is now only used in the northern counties. All-Hallowmas derives its greatest importance from the popular usages which in our own, and various other countries, have distinguished sometimes the day itself, but more generally the night preceding, called its eve or vigil. For a particular account of the various modes in which its observances are to be made, I must refer the curious reader to Burns's poem on the subject, and the notes by which it is illustrated. (*Penny Cyclopedia.*)

ALL-HEAL, CLOWN'S. (*Panax Coloni.*) A species of *iron wort* which is found in moist lands. It has long hairy leaves, and small red flowers in clusters round the stalk-joints. They are not unlike the dead nettle, only smaller. The All-heal is a perennial, and its root creeps: it flowers in August. The leaves of the All-heal must be used quite fresh, bruised, and laid upon a new wound, or cut, and bandaged over: it heals, and stops the bleeding, without any other combination. This most useful little herb flowers from May till September, and loves moist places. Whatever is most useful, is wisely and beneficently allowed to remain long with us. (*L. Johnson.*) "At Yule-tide, which was the most respectable festival of the Druids, mistletoe, which they called *All-heal*, was carried in their hands and laid on their altars, as an emblem of the salutiferous advent of Messiah." (*Stukeley's Medallic Hist. of Carausius*, b. 2.)

ALLIUM. See Onion, Garlic, Leek, Shalot, Chives, &c.

ALLODIAL TENURE OF LAND. A free tenure in some parts of Scotland, in which the tenant pays no quit rent, or acknowledges any superior. From the end of the fifth to the end of the eighth century, allodial tenure prevailed in France.

The etymology of the word has given rise to much controversy. Sir H. Spelman, Dr. Robertson, Sir W. Blackstone, and others, have proposed several ingenious solutions of the difficulty, which are, however, founded on mere conjecture. (*Knight's Cyclopedia.*)

ALLOTMENTS OF LAND. Are those portions of ground that are allotted to claimants on the division and inclosure of commons, or other waste lands, and which ought to be proportionate to the extent of common right which they enjoy upon them, from the possession of lands, tenements, &c., in the same parish in which they are situate.

ALLOTMENT SYSTEM. This designation has been applied to a plan for bettering the condition of the poor, by allotting to each family in a parish an extent of ground for the purpose of cultivation with the spade. Under the article Agriculture it is noticed, that in England, during the feudal times, an allotment system existed. Its object, however, was different: the lords of the soil, having an interest in obtaining as many tenants as they could, for their power was proportionate to their number, portioned their estates into as many small allotments as they could obtain family tenants, receiving in return certain days of military or other service.

When the feudal system was destroyed, the lords let their lands in a similar manner, receiving as rent certain quantities of labour from the tenant, or produce of the land he rented; although, it not being now an object to maintain the number of their tenants, but rather to acquire an increased return of produce, and to obtain a prosperous tenantry, no obstacle was thrown in the way of increasing the size of farms. Land was left like any other subject of investment, and a man obtained as much as his means of cultivating permitted, or as he found to be profitable. These were powerful limitations, for money was scarce, and the agriculturists were chiefly tenants, labourers for hire being few.

In the fourteenth century occurred the greatest revolution that ever happened to the agriculture of this country. The increased demand for wool in the Netherlands and at home, rendered the breeding of sheep much more profitable than the growing of corn, and consequently the arable lands were converted into pastures. England had been very closely cultivated, and the small or cotter farms were extremely numerous. These were now generally exterminated, and the land-proprietor becoming a great flock-master, converted them all into one breadth of grazing land. "Your sheep," says Sir Thomas More in his *Utopia*, "that were wont to be so meek and tame, and such small eaters, are now become such great devourers, and so wild, that they eat up and swallow down the very men themselves."—"One covetous and unsatiable cormorant, and very plague of his native country, compasses about and encloses many thousand acres of ground together within one pale or hedge, the husbandmen are thrust out of their own, or else, either by covin and fraud, or by violent oppression, they are put beside it, or by wrongs and injuries they be so wearied that they be compelled to sell all; by one means or other, either by hook or by crook, they must needs depart away, poor, silly, wretched souls, men, women, husbands, wives, fatherless children, widows, woeful mothers with their young babes, and their whole household, small in substance and much in number, as husbandry requireth many hands. For one shepherd or herdsman is enough to eat up that ground, to the occupying whereof about husbandry many hands were required."

Some few of the cotter farmers were reduced to the grade of hired shepherds; others became artisans, a still smaller number retained a plot of land, but a large portion (for even monastic support was now abolished) became beggars, who, as all records agree, infested England. This gave birth to the poor laws, and the same reign of Elizabeth was the era of an effort to remedy the evils which had arisen from this destruction of small farms.

It had been experienced that though the tenants of those small farms had been poor, yet none of them were paupers; it was therefore thought that every mode of recurring to such a system must be beneficial; and in accordance with this opinion an act of parliament was passed, commanding that to every cottage that should be erected, four acres of ground should be allotted. This first suggestion of the allotment system failed. The quantity of ground allotted was too large, and from its interfering with the just liberties of the landed proprietors, this act was repealed in the last century.

As the value of all farming produce increased from various causes, the profits becoming commensurately large, cultivators required more extensive farms, consolidation proceeded, and in 1709 the first inclosure act passed; and from that time to the present the small occupiers have gradually further diminished, as their right of commonage and the like was taken away by the four thousand enclosure bills that have since been enacted.

When small farmers are deprived of their tenements, they become, if they continue agriculturists, farming labourers. It becomes a subject of very great political importance, therefore, to ascertain how the character and comfort of these, who are now by far the most numerous class in society, can be best promoted. It would be here misplaced to examine how the system of poor laws has served in various ways to debase and depress them; our present object must be to consider how the allotment system may be the best made to promote contrary effects.

This system, we have noticed, suggested itself to the legislature in the reign of Elizabeth, but it was of very limited operation.

On the Continent, a system of larger allotments was partially adopted in the year 1707, in the Duchy of Cleves, but we are not aware that the example was followed, till, after the lapse of more than a century, the Dutch government, in 1818, divided tracts of poor soil at Frederick's Oord, and other places, into allotments of seven acres. The government provided overseers to notice the moral conduct and industry of the tenants; advanced capital when needed, which was to be repaid; and an annual rent was to be returned. Manual labour was exclusively adopted. The expense of establishing each individual was 22*l.* 6*s.* 4*d.*; and the annual excess of produce over the subsistence of the family, after deducting the rent, twelve shillings per acre, was 8*l.* 2*s.* 4*d.* (*M. de Kirchoff. Jacob on the Corn Trade*, &c.)

About the year 1800, Dr. Law, Bishop of Bath and Wells, commenced the allotment system; Sir H. Vavasour communicated to the Board of Agriculture, about the same period, some experiments demonstrating the great benefit of "the Flemish," or "field-gardening husbandry;" and, in 1802, Charles Howard, Esq. followed the example.

"On Pulley Common, in Shropshire," says Sir W. Pulteney, "there is, at least there was, a cottager's tenement of about 512 square yards, somewhat more than one ninth of an acre. The spade and the hoe are the only implements used, and those chiefly by his wife, that he may follow his daily labour for hire. The plot of land is divided into two parcels, whereon she grows wheat and potatoes alternately. In the month of October, when the potatoes are ripe, she takes off the stalks of the plants, which she secures to produce manure by littering her pig. She then goes over the whole with a rake, to collect the weeds for the dunghill. She next sows the wheat, and then takes up the potatoes with a three-pronged fork; and by this operation the wheat seed is covered deep. She leaves it quite rough, and the winter frost mellows the earth; and by its falling down in the spring it adds vigour to the wheat plants. She has pursued this alternate system of cropping for several years without any diminution of produce. The potatoe crop only has manure. In 1804, a year very noted for mildew, she had fifteen Winchester bushels of wheat from 272 square yards, being four times the general averaging crop of the neighbouring farmers. It is to be wished such instances of cottage industry were more frequent; and more frequent they would be, were proper means made use of to invigorate the spirit of exertion in the labouring class."

Since that period the patrons of the system have been very numerous, and under the influence of Lords Winchilsea, Brownlow, Beverley, and Carrington, Sir John Rushout, Sir John Swinburne, the late Sir Thomas Bernard, Mr. Burdon of Castle Eden, Mr. Babington of Leicestershire, Cap-

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allotment; *3. that he shall pay the*
t for it, and all other dues; 4. that every tenant shall be ejected, after due notice, who does not pursue a cleanly and non-exhausting course of cultivation; and, 5. that the allotment tenant hold directly of the proprietor, and not of any middleman nor parish officer, and that he be prohibited from sub-letting.

Where this system, and so regulated, has been tried, and the experience is now very extensive, the results have been most happy. The condition of the poor has been ameliorated; by rendering them more independent, they have become more contented and more careful; better as citizens, and better as individuals.

If they do not pay the marketable worth of their allotment; if it is at all compulsory; if the land is held of a middleman or parish officer; or if the bad tenant stands upon an equal footing with the good, so in proportion is the cheering feeling of independence and the desire of excellence checked.

If the allotments much exceed a quarter of an acre, or in any way approach to the nature of cotter farms, a proportionate blow is made at that employment of capital and talent in agriculture which has raised it to its present improved state.

"The advantages attending this system," says a clerical writer in the *Christian Observer* for 1832, "besides the comfort of the poor man, are the diminution of the poor's rate, and the moral improvement of the labourer. Since this plan has been in operation, the poor-rate has been steadily declining from about 320*l.* to about 180*l.* per annum, with the prospect of still further diminution. When the farmer's work is scarce, the poor man finds profitable employment on his patch of ground, which if he had not to occupy him, he would be sent to idle upon the roads at the expense of the parish. The system has the further and very important effect of improving his character. When the labourer has his little plot of ground, from which he feels he shall not be ejected as long as he conducts himself with propriety, he has an object on which his heart is fixed; he has something at stake in society; he will not hang loose on the community, ready to join those who would disturb it; so much so, that in the late riots no man in the parish showed any disposition to join them."

From the year 1828 to the present time, numerous pamphlets upon this subject have appeared, and I may refer my readers for further information to those of Dr. Law, and of Messrs. Scobell, Scrope, Banfill, Denson, Blackiston, Withers, &c.

Speaking of the vicinity of High Littleton, *Captain Scobell* says, "There are in this *division twenty* parishes, fourteen of which are agricultural, and the other six have, besides the usual operations of agriculture, one or more coal-pits situated in each. The population of the division is nearly 18,000, the area about forty-eight square miles, and the number of acres from 30,000 to 35,000; and all the parishes are from five to ten miles from any city or town. In the spring of 1831, field gardens were introduced in High Littleton and Midsomer Norton; in 1832, they were commenced in three other parishes, two of them solely agricultural; and in March 1833, seven additional parishes followed the example. The results are, that of the twenty parishes forming the division of Chewton, *twelve* of them (comprehending about thirty-two square miles) have adopted the field garden system; that these gardens, in these twelve parishes, contain *one hundred and four acres of good fresh land*, occupied by *five hundred and three families*, 271 of which are of the agricultural population, and 232 of which are of the coaling population. The whole of this land is let, and the arrangements are managed by the landlords, or a representative of their appointment. The rents charged ranged from 2½*d.* per pole, or 1*l.* 16*s.* 8*d.* per acre, to 3½*d.* per pole, or 2*l.* 6*s.* 8*d.* per acre; and the average quantity in each garden is between thirty-three and thirty-four poles. As an exemplification of the operation of these field gardens, in one main arrangement, I can say, that of the 503 tenants I have spoken, 500 have paid the whole of their rent; and I happen to know, of the three not yet having done so, one is a widow dangerously ill. But it is a greater evidence of the happy influence of the system, that I can testify that during the *three years'* occupation of the 179 tenants, in High Littleton and Midsomer, *not one has been convicted of any crime whatever.* Many of my tenants assured me that, from the one-third portion of their ground, which is planted in succession with vegetables, not being potatoes, that there has not been a day, for the past year, in which their wives could not go and gather *something* towards a dinner. I have, at some pains, satisfied my curiosity, by ascertaining how the plan operates in promoting the presence of the poor man's friend, the pig. Of my forty-seven occupiers here, I find that sixteen have usually kept pigs; and that ten others have done so in consequence of their allotments. Some I found had premises without sties, and others had sties without pigs or money to buy them. To test the effect of confidence, even indiscriminately applied, I offered to lend the means to any in the latter situation. I have done so to seven of them, and have no doubt I shall be repaid, by instalments, to the last farthing. In one case only, the promised time of repayment has yet arrived, and that man has refunded the whole amount, leaving with me a written account, showing he had cleared 1*l.* 7*s.* 2*d.* by his pig. I will here remark, that of my own seventy tenants at High Littleton and Midsomer Norton, none are my workmen, *in any way*, but two of the husbandmen, and that but three others are my cottage renters.

"The provision of manure, an important consideration, continues to increase, which, I think, is attributable to the cartage being done at a penny per pole, without reference to quantity or distance. Into the eight fields, adjacent to the four hamlets of Midsomer Norton, the average, per acre, has this year been seventeen loads; and at High Littleton, in its two hamlets, it has been twenty-one. But to return to these details of the two parishes with which I am more immediately connected, I will now append a table of reference.

"*Field Gardens established in the Division of Chewton, Somersetshire.*

Parishes.	When established.	No. of Acres in Field Gardens.	No. of Families occupying.	Of these Husbandmen, &c.	Of these Coaling Population.	Remarks.
Midsomer Norton	1831	30	132	60	72	More than one coal-pit.
High Littleton	—	8½	47	9	38	One coal-pit.
Stone-Easton	1832	4	16	16	—	
Emberrow	—	2	8	8	—	
Clutton	—	14½	63	20	43	More than one coal-pit. Five of these acres now letting to additional occupiers.
Stowey	1833	8	18	18	—	
Camely	—	6½	50	33	17	
Farrington	—	3¾	20	9	11	One coal-pit.
Chewton	—	8	32	32	—	
Chilcompton	—	5½	22	19	3	
Timsbury	—	8	59	11	48	More than one coal-pit.
Compton Martin	—	6	36	36	—	
Totals		104½	503 *	271	232	

* At an average of five in each family, 2505 persons.

"Here then we have 271 husbandry or rural families in the occupation of field gardens."

In another place Captain Scobell says, "Notwithstanding the thirty acres of old pasture apportioned were of the best quality, it was deemed an expedient preservative for the fertility of the land, to stipulate that, after the first year, not more than two-thirds of each allotment should be cropped with potatoes; but from the unusual strength and fruitfulness of the soil, the produce having reached in some cases 140 sacks an acre, and from the unexpected supply of manure, it was decided to relax this regulation for another year, but strictly to enforce it hereafter. Small beds of other vegetables have, however, from preference, been cultivated; and the last summer has diffused among the tenants a repetition of cheerfulness and abundance.

"The average of potatoes per acre, has been quite 100 sacks, or 300 Winchester bushels.

"Let us now see, by the test of figures, how the account stands between the labourers and their land.

The number of occupiers is 132, and of acres 30.

The average produce, 100 sacks per acre. — Total, 3000 sacks, or 9000 Winchester bushels, at 5s. 6d. per sack - - -		£825 0 0
Rent, at 2l. 6s. 8d. per acre -	£70 0 0	167 17 6
Seed: 7½ sacks per acre, at 5s. 6d.	62 17 6	
Haulage of manure (400 loads), at a penny per pole,—18s. 4d. per acre - - - -	20 0 0	
Tithes, rates, and sustaining fences, charged at three farthings per pole—10s. per acre	15 0 0	
Profit — not deducting the cost of labour		£657 2 6

Profit, per acre, 21l. 18s.—an average of 5l. to each occupier, or ten weeks' wages at 10s. per week.

"But it may be said that the price of labour, as if it had been paid in *money*, should be deducted. I will do so, although I know that it was by all performed at times which would otherwise have been valueless. The account will then stand thus:—

	£	s.	d.
Profit, including labour - - - -	657	2	6
Money value of the labour for the year, at 10d. per pole, 7l. per acre - - -	217	0	0
	440	2	6
Add the value of the after-crop, Turnip, Cabbage, &c., not noticed before, 3d. per pole —2l. per acre - - - -	60	0	0
The profit, deducting the money value of labour - - - -	500	2	6

Profit, per acre, 16l. 13s. 4d.,—an average of 3l. 15s. 9d. to each occupier, or 7½ weeks' wages, at 10s. per week.

"The question whether the labour, or a large portion of it, is not a clear profit as well as the produce, is a material one, and is worth our consideration."—*G. W. Johnson.*

Of all those who have sought to extend the *cottage allotment* system, there is no one who has exerted himself more zealously or successfully than Captain Scobell. He has had nine years' experience of the working of the system, and has therefore fairly tested it. The following is an extract from a letter upon this subject which he addressed recently to Mr. Leigh Lye, the secretary of the Bath and West of England Agricultural Society:—

"The greater part of the remarks I shall offer on those parishes, with which I am closely connected, will apply to from twenty to thirty other contiguous parishes, in which the field garden system is also in operation. The parishes, then, to which I can best advert, are three, namely—High Littleton, with 80 tenants, occupying, as field gardens, 14 out of 1,250 acres which it contains; Midsomer Norton, 135 garden occupiers, renting 28 out of 3,800 acres; and North Bruham (wholly an agricultural parish), near Bruton, having 35 tenants, with 9 out of 1,838 acres. I repeat these figures to quiet the still unallayed alarm of some, who imagine that an appalling quantity of land is requisite to carry out the system.

"The culture, then, of the gardens around here, and the manure furnished, continue to be good and ample. The tenants are cheerful in their demeanour—comfortable in their homes—contented in their stations. They pay their small, but equitable and sufficient rents (from 2¾d. to 3½d. per pole) with readiness and regularity. I have lately held my annual rent meeting at High Littleton, and to sit down with eighty labourers is no common circumstance. I hold out no inducement to punctuality. I do not offer them any thing to eat or to drink. At each anniversary that I thus assemble with them, I am taught, more and more, to understand and to value the general honest and intelligent bearing of their minds, and their willing and full appreciation of confidence reposed in them. To me, as I believe, also to themselves, such an evening is one of the happiest and most satisfactory of the year. The system, if disinterestedly and permanently carried on, must, and does, gradually, but closely bind minds together. The field gardens, themselves, are an ever-visible and heart-speaking index of mutual good-will. The mere worldly man will only value the plan, because 'in all labour there is profit,' whilst he who looks to a higher source will see in it an evidence that 'we have fellowship one with another.'" Excellent testimony to the success of the allotment system is borne by Mr. H. Weatherly, *Quarterly Jour. of Agr.* vol. iii. p. 1065.; to the advantages of allotting muir lands to crofters, *ibid.* vol. v. 531., and also in the *Mag. of the Soc. for bettering the Condition of the Poor.*

ALLOWANCES TO TENANTS. Such as are agreed to be made to them on their quitting farms, or under any other circumstances. See *Customs of Counties*.

ALLSPICE, CAROLINA. (Lat. *Calycanthus floridus.*) A very odoriferous shrub, native of North America. It is very hardy, and grows eight feet high; blows a ruddy brown flower from May to August, which has a spicy smell when rubbed in the hand. It loves a shady situation and heath mould, but it will thrive in any deep fresh soil.

Fruitful Calycanthus (Lat. *C. fertilis*), is also hardy, and a native of North America. It grows three or four feet in height, blowing its reddish-brown flowers from May to August. It prefers heath mould; propagate both sorts by layers, and remove the layers the third year. If propagated by seed, sow it in a hot-bed, or the plants will not appear for two years. (*L. Johnson.*)

ALLUVIAL LIMESTONE. A sort of soft chalky limestone found in many districts, supposed to have been formed in the early ages of the world by the deposition of matters held in the state of solution in water. This kind of limestone Dr. Darwin supposes to contain magnesia, which it probably may have acquired from the sea-water, in which it was originally dissolved. Limestone that contains magnesia has been found, by the experiments of Mr. Tennant, to be much less useful when burnt into lime, for the purposes of agriculture, than such as is purely calcareous. See *Limestone*.

ALLUVIUM, or ALLUVION, (from the Latin *Alluvio*, " an inundation,") is a term which, in the English language, has no very defined meaning. Some authors use it to designate all those rocks which have been formed by causes now acting on the surface of the earth, including those of volcanic origin; while others, adhering to the literal meaning of the original term, confine its application to deposits, whatever be their character, that have resulted from inundations. Neither of these definitions convey the same meaning as is usually attached to the word, the one including too much, the other too little. The term has been badly selected, but is used in its proper application to designate all those deposits recently formed, or now forming, by the agency of water, whether from an uninterrupted and constant stream, or from a casual inundation.

All streams, lakes, rivers, seas, and the ocean itself, hold a large quantity of earthy mechanical solution, which they deposit in their beds. The character of the sediment is governed by the nature of the rocks over which the waters flow; and the quantity depends partly upon the constitution of the rocks, and partly upon the power of the water. If the rock be easily destroyed, and a large body of water flow over it with a considerable velocity, the destructive effect will be great, and much worn materials (*detritus*) being formed, the stream will have a thick and turbid appearance. The same effect is frequently produced by the discharge of a number of tributary streams into a river, all of which accumulate a greater or less quantity of the earths over which they flow.

The distribution of water at the present time, and I more particularly refer to rivers, is very different from that of former periods. The majority of the valleys through which rivers are now flowing, have been produced by the action of water, which, running from higher lands, has not only scooped them out, but has spread over them the worn material which it accumulates in its passage. By the operations which have since been going on, the waters have been collected together in comparatively narrow channels of considerable permanency. On this account, the influence of water that flows over the portions of the earth inhabited by terrestrial animals, is greatly restricted; and the production of new beds of rock or soil is rather an accidental than a necessary consequence.

But, although the influence of water has been thus confined, all lands, and especially the surfaces of mountainous districts, are undergoing change, and the superficial covering of one district is conveyed to another. The showers of heaven are constantly sweeping away the soil and decomposed rocks of the uplands into the valleys, over which they are transported by streams and rivers, the larger and heavier particles falling to the bottom, the smaller being united with the water in mechanical mixture. That portion of earthy matter which is carried away from a district by the running water, is, as far as the district itself is concerned, the most valuable, being the superficial covering or soil, and would be for ever lost to that portion of the earth inhabited by man, were it not arrested in its passage to the ocean, by deposition in the bed of the river, or on those lands which the waters may happen to overflow.

It is well known to those who have visited elevated districts, that many mountains are already deprived of their soils, and are but the skeletons of the earth without covering or life. By this action the valleys are in the process of elevation, and the mountains of depression; and if we could conceive it to proceed without limitation, we may imagine a time when all the varieties of elevation and depression, which now give beauty

he level of the sea, the atmosphere
s more rarified, and the cold more
, both of which are injurious to vege-
n general, and unsuited to promote
fort of animal life. The plains are,
e, preferred by men when they con-
together, and form societies. It
be considered an unwise or unfit
hat the lowlands should be enriched
uvial soils, produced by the destruc-
the rocks and natural soils of moun-
regions. It is reported of Diocle-
at he told his colleague, Maximilian,
more pleasure in the cultivation of
potherbs which, in the gardens of
ro, grew in the soil that on the top of
t Hæmus had only produced moss and
y, than in all the honours the Roman
e could confer. From the definition
e given of the word "alluvium" I
include the gravels and sands that are
ent formation among the alluvial de-
; but our attention is chiefly directed
soils, or those beds which are suited
tain vegetable life. It is true that the
s may be made available for the cul-
n of some plants, but the beds which
used belong rather to that class of
denominated *diluvial*, by geologists,
o the deposits of which we are speak-

e trace the circumstances under which
al soils are formed to their cause, we
find that they have their origin in the
heavy rains, and the melting of snows,
untainous regions. The water, in its
ge to the valleys, collects the super-
soil and decomposed earthy material
lies in its path, and transports them

navigable, have ceased to be so, on account of the large amount of alluvial matter deposited in their beds, and many of our towns, which were once populous and wealthy, have on this account become poor and almost deserted. If we would see the effect of the transport of worn materials into lakes, we cannot have a more favourable opportunity than in Switzerland. Many of the lakes of this sublime and majestic country are rapidly filling from this cause; and, in some of them, water plants are seen above the surface of the water. But when a river suffers inundation, the earthy matter, which is held in mechanical mixture, is arrested, and deposited on the land that is overflowed, and a richly productive soil is formed. One or two examples may illustrate these remarks.

The Ganges annually overflows its banks, and deposits a rich alluvial soil over the country it inundates. This magnificent river was supposed to take its rise on the northern side of the Himalaya mountains, until it was proved, in 1819, by Lieutenant Webb, that all the streams which unite to give its existence, take their rise on the south side of the Hindoo Coast, or Snowy Mountains. The melting of the snows, and the heavy periodical rains augment the volume of the water, and by the end of June, before the rainy season has commenced in the low country, the river has generally risen fifteen feet; but after the rains in Bengal it usually attains a height of thirty-two feet above its ordinary level. By the end of July all the low countries adjoining the Ganges and the Burrampooter are overflowed, and nothing but houses and trees are and the poppy, are all cultivated with success on the alluvial soils.

It is well known that Egypt has been from time immemorial indebted to the overflow of the Nile for a rich alluvial soil, as well as for the means of irrigating the land. The ancients seem to have been altogether at a loss to account for the periodical overflow of this river; and when we consider the appearances before them, we are not surprised at the difficulties they experienced. They observed it in a country that was not moistened by a drop of rain, and where it was unaided by a single stream, and yet, at its stated period, it began to lift its waters from their bed, and rising higher and higher, overflowed its banks and spread itself like a sea over Lower Egypt, refreshing the parched earth with moisture, and aiding its productiveness with the formation of a superficial covering of rich loam. The philosophers speculated without success upon its cause; but while they were disputing as to the origin of the phenomenon, year by year the Nile rose, and left the evidence of its beneficial sway in the richness of the crops and the luxuriance of the country. From the investigations that have now been made, we know that the rise of the Nile is occasioned by the rains which fall on the high mountains in the interior and tropical regions, and not, as many of the ancients supposed, from the Etesian winds, which, blowing periodically from the north, prevent the waters from reaching the sea.

The great importance of rivers, as agents in the production of alluvial soils, cannot be more strongly proved by any positive evidence than by a consideration of the state of Australia, a country remarkable for the fewness of its rivers, and the general poverty of its soil. Contrary to all precedents, the richest soils in this land, excepting the alluvial, are found on the summits of hills. The fires which so frequently happen on the plains, the peculiar character of the vegetation (chiefly consisting of evergreens), and the sparing distribution of water, are the principal causes of the sterility of this otherwise desirable country. There are, however, spots which, covered with alluvial soil, can rival the richest and most cultivated districts of England; and the comparison of these with other lands impresses the observer the more strongly with the great importance of the natural provision for the restitution of that portion of the earth inhabited by man, by the deposition of new earthy matter and a virgin soil. The alluvial flats of the Nepean, the *Hawkesbury, and the* Hunter rivers, are *spoken of by all writers* as remarkable for
their fertility. The rich valley in whi
Lake Alexandrina is situated may
ticed as another example of the influ
alluvial soils. The country aroun
lake appears to be one of the most be
and fertile in Australia; and a gla
the map will immediately inform t
quirer of the cause. It is so situate
receive the worn materials of the
tain chain that ranges along the pr
tory of which Cape Jervis is the so
point, and also to obtain moisture
times from the lake, and a renovati
whenever it may overflow its banks.

Alluvial soils are produced by t
charge of mountain streams into vall
well as by the overflow of rivers. W
already explained the manner in whi
collect the superficial covering of
tainous districts, and being charge
earthy matter bring it into the plains.
may be deposited before the strea
united together in an individual cha
well as after, and should this be do
valley may be covered with alluvi
ducts. The formation of a river is
cess which requires time, and many c
must happen before the flowing wat
form for themselves a local habitatio
stacles must be removed, a bed m
scooped out, and an outlet must be f
in the performance of which earthy
must be accumulated, and extensi
posits be formed.

A third cause in the production o
vial deposits may be mentioned. T
is making great inroads upon many
shores, carrying on a destructive war
the cliffs that vainly endeavour to
its force; while on the other hand i
some instances receding from the
against which it once beat; and t
though to recompense man for what i
away, gives to him a portion of its o
ritory. Those districts which are thus
to the land are usually superposed b
rich alluvial soil, as also are those whi
at a former period been covered by t
and would be at the present day,
not for the ingenuity and works of m

The American States of New Orlea
Missolonghi are chiefly alluvial; an
land, as is well known, has the sam
racter, and can only be described
district of which man has robbed the
That part of the coast of Germany w
bordered by the North Sea is alluvi
additions are constantly made to the
by the gradual depositions of earthy
upon the immense flats which extend
them. The first sign of vegetation o
lands is the appearance of the s
(*Salicornia maritima*), which is suc

by the sea grass (*Poa maritima*), and when the land is very rich, by the marsh starwort (*Aster Tripolium*). The land is afterwards dyked and used as pasture for sheep and cattle, so that the spot over which the sea has perhaps for ages exercised an undisputed control is brought under the power of man in a state most admirably adapted to suit his wants.

It is not, however, necessary that we should go to foreign countries for examples of the formation of alluvial soils by the ocean. In Lincolnshire and other parts of the English coast, where the land is beneath the level of high-water mark, unfruitful districts are often restored to a state of fertility by the removal of the artificial banks that prevent the sea-water from flowing over it. In this way the land is thrown open to the sea, and as the tide rises it is covered by water, which, being overcharged with earthy matter, deposits in two or three years a bed five or six feet thick of rich soil, which may be brought under cultivation by the exclusion of the agent that was instrumental in its production. (See WARPING.)

But it may be asked, whence does the sea obtain the earthy matter with which it abounds? Rivers discharge themselves into the ocean, and it has been already stated that their waters are charged, more or less, with the superficial soil of mountainous countries, and the destroyed materials of rocks. A part of this may be arrested by occasional or periodical inundations, and by deposition in the bed of the river, but a large quantity must still be carried into the ocean. It must also be remembered that the water which is conveyed in a channel is constantly endeavouring so to arrange its course as to suffer the least possible resistance. In this attempt it attacks the banks that confine it, and widens its course, precipitating much earthy matter into the stream, to be removed by the flowing water. It frequently happens, and especially after the fall of heavy rains, that the water at the mouths of rivers is thick and turbid from the quantity of alluvial matter it holds in solution, and very many large rivers are rendered unsafe for navigation by the existence of large bars of sand or clay at their outlet.

But the sea is not merely a passive recipient of the product of destructive causes, but is itself a cause. Sea coasts are constantly suffering depredation by the action of the waves that beat upon them. Whether we look at the soft and almost unresisting rocks of our eastern coast, or the hard primary rocks of Devonshire, Cornwall, and the Shetland Isles, the *same results will be observed. During the stormy months of* winter, when the waves are tossed upon the coasts with an almost uncontrolled violence, no rock is sufficiently hard to resist its energy, and when unruffled by a passing breeze in the months of summer, its influence upon the softer rocks is hardly less destructive, though more insidious, for it then attacks the base of the cliffs, and removing the support of the superincumbent mass, causes the precipitation of large portions into the sea. By these two causes the sea is provided with the materials for the formation of alluvial soils. Some estimate may be formed of the violence and extent of these causes, by an examination of the present state of the German Ocean, one fifth of which is covered by banks that appear to have been produced in the same way as the alluvial soils on the northern coast of Germany.

Water, then, is a most powerful agent in the destruction and production of rocks, and were there no conservative principle, the changes that are going on would be more extensive than they are in the present day. The floods to which some rivers are subject are so impetuous that they frequently sweep away all opposing objects, and involve an entire district in ruin. These effects, however, are much more common in countries that are thinly covered by vegetation, than in those where it is luxuriant, for it acts as a conservative agent, increasing the power of the resistance, by binding the soil more closely together. This, therefore, will account for the diminished influence of floods upon lowlands, and for the frequent deposition of rich and fertile alluvial soils.

The composition of the alluvial soils that have been brought under cultivation is exceedingly various; but they are generally remarkable for their fertility, and are admirably suited for pasture lands. "In general," says Sir Humphry Davy, "the soils, the materials of which are most various and heterogeneous, are those called alluvial, or which have been formed by the deposition of rivers; many of them are extremely fertile. I have examined some productive alluvial soils, which have been very different in their composition. A specimen from the banks of the river Parrett, in Somersetshire, afforded me eighty parts of finely divided matter, and one part of silicious sand; and an analysis of the former gave the following result:—

Carbonate of lime - -	360 parts.
Alumina - - -	25
Silica - - -	20
Oxide of iron - -	8
Vegetable, animal, and saline matter	19

"*A rich* soil from the neighbourhood of the Avon, in the valley of Evesham, in Worcestershire, afforded me three-fifths of fine sand, and two fifths of impalpable matter. This last consisted of—

Alumina - - -	41 parts.
Silica - - -	42
Carbonate of lime - -	4
Oxide of iron - -	5
Vegetable, animal, and saline matter	8

"A soil yielding excellent pasture, from the valley of the Avon, near Salisbury, afforded one eleventh of coarse silicious sand, and the finely divided matter consisted of,—

Alumina - - -	7 parts.
Silica - - -	14
Carbonate of lime - -	63
Oxide of iron - -	2
Vegetable, animal, and saline matter	14."

Another striking cause of the fertility of alluvial soils will come more properly under IRRIGATION. —(*Miller's Dictionary.*)

ALMANAC. The derivation of this word has been a fruitful source of controversy to etymologists. Some assert it to be from the Arabic, *al* and *manah*, Heb. to *count* or *compute;* but others from *al*, Arab. and μὴν, a month, or μανακὸς, the course of the months; by others from a Teutonic original, *al* and *maan*, the moon, an account of every moon or month; all of them are probable. Nor may Verstegan's remark be omitted. *Al-mon-aght*, he says, is the Saxon *al-mon-heed*, *i. e.*, the regard or observation of all the moons; whence the word *almanac*. A calendar; a book in which the revolutions of the seasons with the return of feasts and fasts is noted for the ensuing year. (*Todd's Johnson.*)

A compendium, entitled *The Farmer's Almanac* is published regularly by the author of this work and W. Shaw, Esq., editor of the *Mark Lane Express*, and *Farm. Mag.*

ALMOND, *Silver-leafed.* (Lat. *Amygdalus argentea.*) A beautiful shrub origiginally from the Levant. It grows from eight to ten feet high, and blows rose-coloured flowers in April. Its leaves are covered on both sides with a silvery-coloured down, but they do not appear till the flowers are gone. All the almond tribe are hardy, and will bear any situation, if the soil is tolerably good. Propagate by grafting upon the bitter almond or a plum stock. The *double dwarf almond*, Lat. *Amygdalus pumila*, is a smaller shrub with pale rose-coloured double flowers blowing in May, and again in September. The *common dwarf almond*, Lat. *Amygdalus nana*, grows only three feet high, and is a native of Russia. It blows its pink flowers in March and April. Propagate by seed, or grafting upon the bitter almond or plum stocks. Trim away dead wood, but prune seldom: they rarely require pruning. (*L. Johnson.*)

ALMOND TREE. (*Amygdalus*, Linnæus; *amand*, Fr.) Derived by *Menage* from *amandala*, a word in low Latin; by others from *Allemand*, a German, supposing that almonds come to France from Germany. But the Spanish have *almendra;* and perhaps *amand*, *amandola*, and this, are all referable to *amygdalum*, as that is to ἀμυγδαλίον. (*Todd's Johnson.*) More than one species, and several varieties, of this well known genus are cultivated in this country, chiefly for the beauty of their early spring flowers, which did not escape the poetical eye of Spenser, and this tree is introduced in a fine description of Prince Arthur's plumed helmet:—

> "Upon the top of all, his lofty crest,
> A bunch of hairs discolour'd diversely,
> With sprinkled pearl and gold full richly drest,
> Did shake, and seem'd to dance for jollity,
> Like to an almond tree ymounted high,
> On top of green Selinis all alone,
> Whose tender locks do tremble every one,
> At every little breath that under heaven is blown."
> *Faerie Queene.*

The common almond tree (*Amygdalus communis*, Linnæus) is a native of northern Africa, and so late as the time of Cato had not been introduced into Italy, as he calls the fruit Greek nuts (*nuces Græcæ.*) It was introduced into Britain about 1548. It will grow to the height of twenty or thirty feet, dividing into a head of numerous spreading branches. The leaves very much resemble those of the peach, but they proceed from buds both above and below the flowers. There are also small glands on the lower saw-toothing of the leaves. The form of the flowers is not very different from those of the peach, but they come out usually in pairs, and vary more in their colour, from the fine blush of the apple blossom to a snowy whiteness. The chief obvious distinction is in the fruit, which is flatter, with a leather-like covering, instead of the rich pulp of the peach and the nectarine, and it also opens spontaneously when the kernel is ripe. The shell of the almond is never so hard as a peach stone, and is sometimes even tender and exceedingly brittle. It is flatter, smoother, and the furrows or holes are more superficial than those of the peach stone.

Varieties of the common almond.—1. The nuts about an inch and a quarter long, with a hard smooth shell; the kernel not valuable. The seedlings are used in France to bud peaches upon.

2. Bitter: fruit of a large size.

3. Bitter: with a tender shell; fruit of a large size.

4. Bitter: with a hard shell; fruit of a large size.

5. Sultan: fruit of a small size.

6. Grand Sultan: fruit of a small size.

7. Sweet: with a tender shell, or tender-shelled Sultan; fruit of a moderate size.

8. Sweet: with a half hard shell.

9. Sweet: with a hard shell.

10. Long-fruited: hard-shelled; fruit of a large size.

11. Peach almond: fruit of a large size.

12. Brittle: fruit of a moderate size.

We are not certain whether the French varieties, called, 1. *Amande douce à coque dure*; 2. *Amande douce à coque tendre*; 3. *Amande des dames*; and 4. *Amande princesse*, coincide with any of the preceding.

The whole of the varieties generally produce a profusion of blossoms, which vary a little in colour from a fine rose to a pale blush. They closely resemble each other in foliage, the principal distinction being in the fruit, which differs either as to its form, its size, or its taste.

In the south of Europe, as in France, Spain, Portugal, and Italy, the almond is cultivated very extensively as a standard fruit tree, the varieties there being far more numerous than in this country; while the tree also grows more vigorously. They export the fruit to every quarter of the globe. The kernel of the almond is the part used, and when it is green, ripe, or dried, it furnishes a most agreeable addition to the dessert. It is also used to a very great extent in confectionary, perfumery, cookery, and medicine.

The general purpose of introducing the tree into our gardens and pleasure grounds in this country is for the great beauty of its blossoms, which are not only handsome, but being produced in such profusion as they usually are at so early a period of the spring season, before the foliage appears, become extremely conspicuous and highly ornamental; a circumstance which renders the tree a most desirable shrubby plant.

The common almond, and its varieties, blossom earlier than the dwarf kinds, from which circumstance the blossoms of the latter are very rarely damaged by spring frosts, but the other kinds, when planted in situations sheltered from the east winds, are generally preserved from sustaining damage.

Propagation.—All the species and varieties are propagated by seeds, budding, grafting, layers, and occasionally they will produce suckers, which may be successfully planted out. When stocks for budding or grafting upon are wanted, or new varieties desired, these are obtained by sowing the fruit stones, though they may be budded or grafted on mussel-plum stocks.

The stones of the last season's produce should be sown in October, upon a bed of light rich soil, about three inches apart, and covered four inches deep with fine soil. This is indispensable; for when the soil is left in lumps the shoots are often forced into a crooked direction, and this causes the trunk to be deformed, and unfit to become a fine tree. When the surface of the seed-bed has been smoothed, a covering of rotten tanner's bark, or leaf mould, to the depth of two inches, must be laid upon it, which being light, prevents the fruit-stones from being damaged by any severity of winter. At the beginning of May this covering of bark or leaves must be raked clean off the bed. The stones might be reserved till spring and be sown at the end of March, but the plants do not come so certainly as when sown in autumn. An additional advantage of an autumn sowing is, that the plants come up about six weeks or two months earlier than those sown in spring; consequently the plants become vigorous and well rooted the first year, and thereby not liable to be thrown out of the ground by thaws succeeding frost in the following winter.

During summer, care must be taken to pull up all weeds, when very young, for if they be allowed to get strong before pulling out, this operation is apt to injure the roots of the almond plants.

When almond stones have been sown in spring, it will be necessary at the approach of the succeeding winter to have the beds covered with rotten tanner's bark, or leaf mould, scattering it an inch deep, or more, amongst the plants, a covering which will tend to prevent the plants being injured or thrown out by frost.

In the second spring after the sowing, the plants should be taken up, carefully preserving all the fibrous roots, a care which, as they are but sparingly produced, will be essentially necessary. The plants must be transplanted in rows, at two feet apart, row from row, and a foot and a half distant in the rows. Here they may be trained to form standards, half standards, or dwarfs, and be regulated and prepared either for wall training or shrubbery plantations. For both purposes, attention will be requisite during summer and winter, to thin out the branches, reserving only a suitable number for the future limbs of the tree, and these so far apart that they may not, in any future stage of growth, be liable to rub against each other, which standard trees would be liable to; for if this be not avoided, gum would be exuded at such injured parts, and the speedy decay of the tree be the consequence.

Almond plants intended for training against walls should have some stakes fixed in the form of a trellis, to which the branches should be secured in a proper form, so that they may be suited to the position of the wall on their final removal. (*Miller's Dictionary.*)

ALOES. (אחלם, as it is supposed, Dr. Johnson says. Sax. alepa. John, xix. 39.) A medicinal juice extracted not from the odoriferous, but the common aloes tree, by cutting the leaves and exposing the juice that drops from them to the sun. It is distinguished into socotorine and caballine or horse aloes; the first is so called from the island of Socotora; the second, because, being coarse, it ought to be confined to the use of farriers. It is a warm and strong cathartic. (*Todd's Johnson.*) In veterinary medicine, a very important production, well known under the name of bitter, or purging aloes. It is the chief, and almost the only purgative used for the horse; but as far as regards other quadrupeds we could do very well without it. Formerly we had choice of three kinds, the Barbadoes, the Cape, and the socotrine; but we believe the last is not now to be had. What is now sold in the shops for socotrine is merely a compound of Barbadoes and Cape aloes. The Barbadoes aloes, as being safer, more certain, and less irritating in its operation, is generally preferred in veterinary practice. We are aware that Mr. Percival speaks of the Cape aloes as being as efficacious as the other; "and this I say," he adds, "although I myself am at present in the practice of using the Barbadoes."

Aloes has long been in use as the best purgative for the horse. When given in sufficient quantity it produces a copious discharge from the lining membrane of the stomach and bowels, acting more especially, however, upon the large intestines than on the small intestines or on the stomach. In most cases it requires about twenty-four hours to operate, though particular circumstances may hasten or retard it. Mr. Percival says he has known a dose of physic remain sixty hours before it operated. "This shows," he adds, "the impolicy, and danger even, of administering a second dose of physic at an interval of less than three or four days after the first, supposing the latter not to have taken effect."

The usual dose of aloes when wanted to produce what is called *physicking*, varies from four to eight or ten drachms. Except in certain diseases, or in peculiar constitutions, more than eight should never be given, even to the strongest horse; and, indeed, in by far the greater number of cases, this is too much. An under-dose will do no harm whatever; but an over-dose may, and often does destroy the horse, or it may leave him in such a state that he will be an invalid for weeks or months afterwards. Six or seven drachms, with proper management, are a full and sufficient dose for an ordinary saddle or carriage horse. Professor Coleman used to mention a horse of his own that used to be purged by three drachms of Cape aloes; "in opposition to which," says Mr. Percival, "I may set the case of a thoroughbred filly, the property of Mr. O'Connor, at Newmarket, who took, under every advantage of preparation, fourteen drachms of Barbadoes to produce purging." These are anomalous cases, and do not often occur. We have heard of a horse that was purged by six drachms after fourteen had been given without effect. Instead of increasing the dose to such a dangerous extent, it is better to try some other purgative. (See Purgatives and Purging.)

Small doses of aloes, from one to four drachms, are often given merely to evacuate the contents of the bowels of the horse; and still smaller doses are given in inflammations for reducing the force and frequency of the pulse. While they do so, they at the same time produce nausea, which is often very desirable.

Mode of administering.—Aloes may be given in either the solid or dissolved state. The former has advantages over the latter. Finely powdered, and beat up with any simple, such as syrup, soap, flour and water, or honey, aloes forms a stiff paste, which, when rolled into proper shape, may be easily placed at the root of the horse's tongue, and he will then swallow, without tasting it. It is not so easy to give the aloes in solution; and in this state it annoys and disgusts the patient; part of the solution is spilt and wasted; and, after all, no advantage of any consequence is thereby gained. It is said the solution operates quicker than in the solid form, and so in many cases it does, but not always, and the difference is but trifling. If the requisite quantity of aloes be beat up with two drachms of ginger, two drachms of flour, and four drachms of hog's lard or palm oil, it will dissolve, by the heat of the stomach, in a few minutes.

Effects of Aloes on Oxen, Sheep, and Dogs.—Cattle are sometimes griped and have their bowels slightly relaxed by aloes; but enormous doses have been given without producing any effect; and as we have an excellent substitute in Epsom salts, we do not attempt purgation on the ox by aloes. Sheep appear to be equally unsusceptible of their action. In doses from twenty, to thirty, or forty grains, the dog is briskly purged by aloes; but even for this animal we have better agents in castor oil, Epsom salts, jalap, and calomel. The hog is purged by a small quantity of aloes; but it is difficult to administer; and it gripes him, and in a few cases produces prolapsus of the vent-gut (*anus*).

Compound tincture of aloes is made by digesting two ounces of aloes and one of gum myrrh in two pints of spirits of wine for fourteen days; strain, and it is fit for use. (*Miller's Dictionary.*)

ALOES TREE. (*Aquilaria Malaccensis*, Lamarck.) A lofty tree, which has no relation to the genus *Aloes*.

The wood of the aloes tree, also called eagle tree, ligne aloes, or wood aloes, is resinous, and has an agreeable aromatic perfume. It is so much esteemed in the East, as frequently to be sold for its weight in gold, to be burnt in censers like incense. It is this wood-aloes which is mentioned in the Scriptures: "Thy plants," says Solomon, "are an orchard of pomegranates, with pleasant fruits; camphor, with spikenard; spikenard and saffron; calamus and cinnamon, with all trees of frankincense; myrrh and *aloes*, with all the chief spices." (Canticles, iv. 14.) "All thy garments," says David, in the Psalms, "smell of myrrh, and *aloes*, and cassia." Chaucer introduces it more than once in a similar manner.

> "My chamber is strewed with myrrhe and incense,
> With swete savouring aloes and sinnamone
> Brething an aromatike redolence." *Remedie of Love.*

Again he alludes to the bitterness of the ligne aloes, from which, probably, this wood has been called aloes:—

> "The woeful tears that they letten fall
> As bitter werin, out of tearis kind
> For paine, as is *ligne aloes* or gall."
> *Troilus and Cresseide.*

The Jesuit missionaries describe the aloes tree to be as tall as an olive, and similar in form. The same individual furnishes three sorts of wood: the first sort, immediately under the bark, is what our dealers would term soft wood, and is black, compact, and heavy: it is this which is termed eagle-wood. The second sort, found next to the eagle-wood, is shining, darkish-coloured, and as light as touch-wood; this, termed calambouc, or calamba wood is exported to Europe, and is esteemed as an excellent perfume, burning like wax, and used for making pastiles. The third sort is what our dealers would term heart-wood, lying next the pith: this is termed tambac, and is the most valuable of all; but is rarely to be procured genuine, even in the East, the other sorts being sold instead. Most authors, in giving an account of this tree, confound its productions with the genus *aloes*, as well as with *agave*. (*Dictionary of Gardening.*)

ALOPECURUS. A genus of grasses of the foxtail kind, of which there are several species, some of which may be cultivated to advantage in the field.

Alopecurus agrestis. Slender foxtail-grass. (*Alopecurus myosuroides*, Curt. Lond.) One of the most inferior species of this grass. The herbage it produces is comparatively of no value whatever. It appears to be left untouched by every description of cattle. The seed is produced in considerable abundance, and is eaten by the smaller birds, as well as by pheasants and partridges. This annual species of foxtail-grass is distinguished from the perennial meadow foxtail (*Alopecurus pratensis*) by the total want of woolly hairs on the spike, so conspicuous in that of the *A. pratensis*. The Rev. G. Swayne observes, that it is a very troublesome weed in many places among wheat, and execrated by farmers under the name of black bent.

"I have always," says Mr. Sinclair, "found it prevalent in poor soils, particularly such as had been exhausted by avaricious cropping. It is most difficult to extirpate when once in possession of the soil; for it sends forth flowering culms during the whole summer and autumn, till frost arrests it; so that it can bear to be repeatedly cut down in one season, without suffering essentially by the process. Indeed, it will be found a vain and unprofitable labour to attempt the removal of this grass by any other means than the opposite to that which gave it possession of the soil, which is judicious cropping. To return land, in this state, to grass, in the hope of overcoming this unprofitable plant, will be found of little avail. I have witnessed this practice, and the slender foxtail, instead of disappearing in these instances, re-appeared with the scanty herbage, and in greater health and abundance. The soil must first be got into *good heart* by very moderate and judicious cropping, which includes the proper application of manure, a skilful rotation of crops, and the most pointed attention to the destruction of weeds; which last can only be effected, in this sense, by adopting the drill or row culture for the crops. After this, the land may be returned to grass for several years with every prospect of success. It flowers in the first week of July, and successively till October.

Alopecurus arundinaceus. Reed-like foxtail-grass. The substance of the culms and leaves of this grass is coarser than that of the *Alopecurus pratensis*; and the root is so powerfully creeping as to render its introduction into arable land a matter of great caution. The produce and nutritive powers are very considerable: it is an early grass, producing culms at an early period of the spring, and continuing to vegetate vigorously through the summer and autumn. It cannot be recommended as a constituent of permanent pasture; but as a grass to cultivate by itself, to a certain extent, for green food, or for hay, it offers advantages in the superior produce and nutritive powers above stated. It grows stronger, and attains to a greater height, than the *A. Tauntoniensis;* but, owing to the roots spreading wide, being large, and requiring a consequent greater supply of nourishment from the soil, the produce stands thinner and proves less weighty than the crops afforded by that variety. It flowers in April or early in May, and continues to produce flowering culms until the autumn.

Alopecurus bulbosus geniculatus. Bulbous-rooted, knee-jointed, foxtail-grass. The produce and nutritive powers of this perennial grass are so inconsiderable as to justify a conclusion that it is comparatively of no use to the agriculturist. I have found it but seldom in a wild state. It grows on a soil of a drier nature than the fibrous-rooted variety, to be spoken of hereafter. When raised from seed on a moist soil, it still retains the bulbous root, which goes the length to prove, that if it is not a distinct *species*, it is at least a permanent *variety*.

Alopecurus geniculatus. Knee-jointed foxtail-grass. There are two varieties of this species of foxtail-grass: the present, which is by far the more common, is distinguished from the other by its fibrous root and greater size; the less common variety has a bulbous root. The *A. bulbosus* may be distinguished from the bulbous-rooted variety of the knee-jointed species, by its upright culms, which want the knee-jointed form so conspicuous in the culms of the former. (*Sm. Engl. Flora.*) It is a perennial, and grows commonly in surface drains, and at the entrance of cattle ponds, particularly where the soil is clayey. It does not appear to be eaten with much relish by either cows, horses, or sheep. Its nutritive powers are not considerable, and its sub-aquatic natural place of growth excludes any recommendation of it for cultivation. Flowers in the first week of June, and during the summer.

Alopecurus pratensis. Meadow foxtail-grass. This grass is a native of Britain and most parts of Europe, from Italy, through France, Germany, Holland, to Denmark, Norway, Sweden, and Russia.

Under the best management, it does not attain to its fullest productive powers from seed till four years; hence it is inferior to the cock's-foot grass for the purposes of ultimate cropping, and to many other grasses besides. The herbage, however, contains more nutritive matter than that of the cock's-foot, though the weight of grass produced in one season is considerably less. It thrives well under irrigation, keeping possession of the crowns of the ridges; and is strictly permanent. Sheep are very fond of it: when combined with white clover only, the second season on a sandy loam, it is sufficient for the support of five couple of ewes and lambs per acre. As it only thrives in perfection on lands of an intermediate quality as to moisture and dryness, and also being somewhat longer in attaining to its full productive state than some other grasses, its merits have been misunderstood in many instances; and in others, as in the alternate husbandry, it has been, by some persons, set aside altogether. In many rich natural pastures, it constitutes the principal grass. Though not so well adapted, therefore, for the alternate husbandry, it is one of the best grasses for permanent pasture, and should never form a less proportion than one eighth of any admixture of different grasses prepared for that purpose: its merits demand this, whether in respect to early growth, produce, nutritive qualities, or permanency. It has been observed by the Rev. Mr. Swayne, (in his *Gramina Pascua*, a work which contains much valuable information on the subject of grasses,) that nearly two-thirds of the seed is constantly destroyed by insects: according to my experiments, this evil may be almost entirely obviated by suffering the first culms of the season to carry the seed. It flowers in April, May, and June, according as it may have been depastured earlier or later. Seed ripe in June and July, according to the season of flowering. The meadow-foxtail constitutes part of the produce of all the richest pastures I have examined in Lincolnshire, Devonshire, and in the vale of Aylesbury. In Mr. Westcar's celebrated pastures at Creslew I found it more prevalent than in those of Devonshire and Lincolnshire.

Experiments tend to prove that there is nearly three-fourths of produce greater from a clayey loam than from a silicious sandy soil, and that the grass from the latter soil is of comparatively less value in the proportion of 3 to 2. The culms produced on the sandy soil are deficient in number and in every respect smaller than those from the clayey loam; which satisfactorily accounts for the difference in the quantity of nutritive matter afforded by equal quantities of the grass. It is not the strength and rankness of the grass that indicates the fitness of the soil for its growth, but the number and quality of the culms. The proportional value in which the grass of the latter-math exceeds that of the flowering crop is as 4 to 3; a difference which appears extraordinary when the quantity of flowering culms is considered. In the An-

thoxanthum odoratum the proportional difference is still greater, the latter-math being to the flowering crop in nutriment nearly as 9 to 4. In the *Poa trivialis* they are equal; but in all the later-flowering grasses that have culms resembling those of the meadow-foxtail and sweet-scented vernal, the greater proportional value is always, on the contrary, found in the grass of the flowering crop. Whatever the cause may be, it is evident that the loss sustained by taking these grasses at the time of flowering is considerable. In ordinary cases, this seldom happens in practice, because these grasses perfect their seed about the season when hay-harvest generally commences, unless where the pasture has been stocked till a late period in the spring, which cannot, in this respect, be productive of any ultimate advantage, but rather loss. The proportional value which the grass, at the time the seed is ripe, bears to that at the time of flowering is as 3 to 2. The superiority of the produce from a light loam over that from a clayey soil is as 4 to 3.

Alopecurus Tauntoniensis. Taunton's meadow foxtail-grass. This holds a middle station between the *Alopecurus pratensis* and *Alopecurus arundinaceus*. The lanceolate, strong, reed-like leaves, and powerful creeping root of the *A. arundinaceus*, at first sight, when growing, distinguish it from every other species of *Alopecurus*. The strongly-ribbed lower leaves of the *A. Tauntoniensis*, with its slightly, though evidently creeping roots, in like manner, when growing, distinguish it from the *A. pratensis* and *A. arundinaceus*.

The following comparison of the nutritive powers of some other species of grass with the *Alopecurus Tauntoniensis* may be satisfactory:—

	Nutr. matter from 64 drs. of grass. oz.	gr.
Alop. arundinaceus, at the time the seed is ripe, from Cheam, Surrey. (W. P. Taunton's, Esq.) - -	3	10
Alop. arundinaceus, produce of the grass garden, Woburn, at the time the grass was in flower - -	3·26	
Alop. Tauntoniensis, at the time of flowering, from the produce of the grass garden - - - - -	3	4
Alop. pratensis, at the time the seed is ripe - - - - - -	2	15
Triticum elongatum, ditto - -	4	14
Festuca heterophylla, various-leaved fescue, produced on Cheam farm -	3	0

The superior productiveness of this grass throughout the season, furnishing very early and late herbage, equal to the very best species, are properties which recommend it very highly for permanent pasture, in company with other kinds particularly adapted for the purpose. The roots, although only slightly creeping, yet seem to forbid any recommendation of the plant for the alternate husbandry for permanent pasture. However, this habit is here of advantage, as securing the extension and continuance of the plant without the serious objection of impoverishing the soil by the unprofitable production underground of vegetable matter, which occurs in the growth of the powerful creeping roots of *Poa pratensis*, *Triticum repens*, *Holcus mollis*, &c. Should the seed of this species prove obnoxious to the same diseases as the seed of the *A. pratensis* (which I suspect will prove to be the case) the slight creeping habit of the roots will add to the comparative value of this new species, as allowing of its cultivation with more certainty of success and smaller cost, than the general defects of seed in the *A. pratensis* permits in its cultivation. It comes into flower in April or early in May, and continues to emit flowering culms until September and October.

The produce and nutritive powers of the several species of *Alopecurus*, may easily be seen by a reference to the following analytical classification (*Sinclair's Hort. Gram.*):—

Description of Grass.	Soil.	Green Produce per Acre.	Dry Produce per Acre.	Produce per Acre of Nutritive Matter.
		lbs.	lbs.	lbs.
Alopecurus agrestis, in flower - -	Sandy loam	8,167 8 0	3,164 14 8	223 5 4
A. bulbosus geniculatus in flower - -	—	5,445 5 0	1,089 0 0	85 1 0
A. pratensis, in April - - -	Clayey loam	9,528 12 0	- -	483 14 0
———, in flower - - -	—	20,418 12 0	6,125 10 0	478 9 0
———, in flower - - -	Silicious sand	8,507 13 0	2,552 5 8	132 14 5
———, seed ripe - - -	Clayey loam	12,931 14 0	5,819 5 8	454 10 2

ALP. A local name for the bullfinch.

ALPACA. A peculiar breed of Peruvian sheep, for whose introduction into this country considerable efforts have been recently made. A very excellent "*Memoir*" upon these interesting animals, has recently (1841) been published by Mr. William Walton, from whose work I gather the following interesting facts:—"When the Spanish adventurers under Pizarro crossed the isthmus of Panama and reached the shores of the Pacific, they bent their steps towards Peru, and arriving there found the inhabitants in possession of two domestic animals, the beauty and utility of which excited their admiration. They also ascertained that two others, alike in species, although varying in properties, existed in a wild state. Struck with the analogy, and always disposed to see objects of comparison with the productions of their own land, the Spaniards called this new breed of cattle *Carneros de la tierra*, or country sheep, and in their use of them imitated the natives. Acosta, one of the earliest naturalists who embarked for the New World, wrote an account of these interesting animals, derived from personal observation; and that account, which made its appearance in 1590, is perhaps the best ever penned. He says (*Historia Natural y Moral de los Indias*, lib. iv. c. 41.), "There is nothing in Peru more useful, or more valuable, than the country sheep called llamas, and they are as economical as they are profitable. From them the natives obtain both food and clothing, as we do in Europe from sheep, and besides use them as beasts of burden. They require no expense in either shoeing, packsaddles, bridles, or even barley, serving their masters gratuitously, and being satisfied with herbage picked up on the wastes. Thus did Providence provide the Peruvians with sheep and beasts of burden, united in the same animal, and on account of their poverty seems to have wished that they should enjoy this advantage, free from expense, as pastures in the highlands are abundant. These sheep are divided into two kinds; the one called *paco* bears a heavy fleece of wool, while the others have only a short coat, and are better adapted for carrying burdens. They have a long neck, similar to the camel, and this they require; for being tall and upright, they stand in need of an elongated neck to reach their food. The colours of both animals vary, some being entirely white, others entirely black, and occasionally party-coloured. The meat is good; that of the fawn is best and most delicate, although the Indians use it sparingly, their principal object in rearing this breed of cattle being to avail themselves of its wool for clothing and of its services to carry loads. The wool they were accustomed to spin and weave into garments, one of their kinds of cloth, called *huasca*, being coarse, and in more general use; while the other, known by the name of *cumbi*, was of a finer and more delicate quality. Of the latter they still make mantles, table-covers, quilts, and various articles of ornamental dress, which are durable, and have a gloss upon them, as if partly made of silk. Their mode of weaving is peculiar to themselves, each side of the web being alike; nor in a whole piece is it possible to discover an uneven thread or a knot. The Peruvian incas, or emperors, kept experienced masters to teach the art of making the *cumbi*, or superfine cloth, the principal part of whom resided in the district of Capachica, where they had public establishments, and with the aid of plants gave to it various colours, bright and lasting. The men and women in the highlands were mostly manufacturers, having looms in their own houses, which precluded the necessity of going to market to purchase clothing."

"The Indians still possess large droves, consisting of 400, or 1000 head each, which they load, and with them perform journies, travelling like a string of mules and carrying wine, coca, corn, chuño, (a nutritive food made from potatoes, first frozen and afterwards reduced to powder,) quicksilver, and other articles of merchandise, and more especially that which, of all others, is the most valuable, viz. silver, ingots of which they bear from Potosi to Arica, a distance of seventy leagues, as they formerly did to Arequipa, more than twice as far. Often have I been astonished at seeing these droves carrying 1000 or 2000 ingots, valued at more than 300,000 ducats, journeying slowly on with no other guard than a few Indians, who chiefly served to load and unload, or, at most, two or three Spaniards. They sleep in the open country; and though the journey is long, and the protection afforded so extremely weak, no part of the silver is ever missing. The load usually carried by each animal is from four to six *arrobas* (each *arroba* has twenty-five lbs.); and if the journey is long they do not travel beyond three or four leagues per day. The drivers have their known resting-places, where they find pasture and water, and on arriving there, unload, pitch their tents, light a fire and dress their own food, while the bearers of their burdens are turned out loose."

He further remarks that the flesh of these animals was jerked and made into *cusharqui*, or, as the Spaniards call it, *cecina*, which kept good for a considerable time, and was in very general request. "Both species," he says, "*are accustomed to a cold climate, and thrive best in the highlands*. Often does it happen that they are covered with snow and sparkling with icicles, and yet healthy and contented." Speaking of the vicuñas, the same author observes that they are wild and timid, inhabiting the *punas*, or snowy cliffs, and are affected by neither rain or snow. To this he adds that they are gregarious, extremely fleet, and that on meeting a traveller, or beast of the forest, they fly away, collecting and driving their young before them. He further affirms that the vicuña wool is as soft as silk, made into fine stuffs, and requires no dyeing; adding, that many persons also considered it medicinally useful in cases of pains in the loins and other parts of the body, in consequence of which they had mattresses made of it.

Inca Garcilasso de la Vega, a native of Peru, was the next Spaniard of note who described the *Carneros de la tierra*, and subjoined are his leading remarks:—"The domestic animals which God was pleased to bestow on the Indians, congenial to their character and like them in disposition, are so tractable that a child may guide them, more particularly those accustomed to bear burdens. Generally they are called llamas, and the keeper *llama-michec*. As a distinction, the larger kind is called *huanacu-llama*, owing to its resembling the wild one of that name, from which it only differs in colour, the tame breeds being seen of all hues, whereas the wild ones have only one, and that is a light brown. The height of the domestic breeds is that of a deer, and to no animal can they be likened so justly as the camel, excepting that they are smaller and have no hunch on the back. The skin was anciently steeped in tallow, in order to prepare it, after which the Indians used it for shoes, but the leather not being tanned, they were obliged to go barefooted in rainy weather. Of it the Spaniards now make bridles, girths, and cruppers for saddles. The llama formerly served to bear loads from Cusco to the mines of Potosi, in droves of 800 or 1000, each animal carrying three or four *arrobas*. The paco was chiefly valued for its flesh, but more especially for its wool, long, but excellent, of which the natives made cloths, and gave to them beautiful and never-fading colours."

The Peruvian sheep are peculiar to that part of South America, bordering on the Pacific, which extends from the equator beyond the tropic of Capricorn, that long and enormous range of mountains known as the Andes Cordilleras. Along this massive pile every imaginable degree of temperature may be found in successive gradation. Below stretches a narrow strip of land, washed by the sea, where the heat is intense and it never rains, but where, owing to heavy dews and filtration from the mountains, vegetation is luxuriant and an eternal spring reigns. As one ascends, the aspect of the country changes and new plants appear; but no sooner are the middle summits gained, and the sun has lost his power, than those cold and icy regions rise up, one above the other, called by the natives *punas*, which are again crowned with rocky crests, broken by deep ravines and rugged chasms, and presenting a wilderness of crags and cliffs never trodden by the human footstep, and never darkened, except by a passing cloud, or the eagle's wing. In this land of mist and snow, or rather in the hollows which surround it, feed the guanaco and vicuña, at an elevation of 12,000 or 14,000 feet above the level of the sea; while in the lower regions, stretching immediately under the snowy belt, and where the Indian fixes his abode at a height from 8000 to 12,000 feet, may be seen pasturing those flocks of llamas and alpacas which constitute his delight, and at the same time the principal part of his property.

Here, amidst broken and precipitous peaks, on the parapets and projecting ledges, slightly covered with earth, or in the valleys formed by the mountain ridges, like the Pyrenean chamois, the llama and alpaca pick up a precarious subsistence from the mosses, lichens, tender shrubs, and grassy plants which make their appearance as the snow recedes; or, descending lower down, revel in the *pajonales*, or, as they are called in some parts of the country, *ichuales*—natural meadows of the *ichu* plant, the favourite haunts of the tame and wild kinds. Thus the hand of man never prepares food for either species—both readily find it on their native mountains. Besides the extremes of cold, these animals have equally to endure the severities of a damp atmosphere, for while below it seldom rains, in the summer months, when evaporation from the sea is abundant, clouds collect, and being driven over the lower valleys by strong winds from the south and west, and condensed by the cold, burst on the highlands, where the rain falls in torrents, amidst the most awful thunder and lightning.

However bleak and damp the situation, little does it matter for an animal requiring neither fold nor manger, and living in wild and desolate places, where the tender is often obliged to collect the dung of his flock to serve as fuel for himself. Although delicate in appearance, the alpaca is, perhaps, one of the hardiest animals of the creation. His abstinence has already been noticed. Nature has provided him with a thick skin and a warm fleece, and as he never perspires, like the ordinary sheep, he is not so susceptible of cold. There is, therefore, no necessity to smear his coat with tar and butter, as the farmers are obliged to do with their flocks in Scotland, a process which, besides being troublesome and expensive, injures the wool, as it is no longer fit to make into white goods, nor will it take light and bright colours. In the severest winter the alpaca asks no extra care, and his teeth being well adapted to crop the rushes and coarse grass with which our moors abound, he will be satisfied with the refuse left upon them. In a word, he would live where sheep must be in danger of starving.

The importations of sheep's wool from Peru into Liverpool, principally alpaca, have steadily advanced since the article became known to the manufacturer,—the best proof of its worth. In 1835 they amounted to 8000 bales; in 1836, to 12,800; in 1837, to 17,500; in 1838, to 25,765; in 1839, to 34,543; and in 1840, to 34,224—more than quadrupled in six years.

In the Custom House returns, it is to be regretted that alpaca wool is not distinguished from the ordinary kinds arriving from Peru. The total imports for the last five years of all sheep's wool, distinguishing from Peru (including alpaca) and other parts, and also of red, or vicuña wool, together with raw and thrown silks, and goat's hair or wool, and mohair yarn, are here subjoined:—

	1836.	1837.	1838.	1839.	1840.
Sheep's wool:	lbs.	lbs.	lbs.	lbs.	lbs.
From Peru -	953,974	1,914,137	2,303,794	2,145,106	2,762,439
Other parts -	63,284,677	46,464,957	50,289,846	55,228,349	46,630,638
Total -	64,238,651	48,379,094	52,593,640	57,373,455	49,393,077
Red Wool:					
From Peru -	1,248	614	294	4,465	7,940
Other parts -	78	- -	421	2,003	34,377
Total -	1,326	614	715	6,468	42,317
Raw silk -	4,453,081	4,146,481	3,458,959	3,746,248	3,758,841
Thrown silk -	396,660	231,203	265,130	225,268	288,994
Goats' hair or wool	1,117,629	602,373	942,770	992,188	989,257
Mohair yarn -	89,298	29,199	20,546	13,645	2,664

With regard to the number of these sheep now in England, and their capability of being naturalised, Mr. Walton adds, "Mr. Bennett, of Faringdon, had a pair of llamas sent to him from Peru twenty years ago, and fed them as sheep are usually fed, with hay and turnips, in the winter. From his own experience he found that they are particularly hardy and very long-lived. He increased his stock, and has actually had six females at a time which have had young ones. Of these very few have died. The number of Peruvian sheep in the kingdom at present (July, 1841) may be estimated thus:—the Earl of Derby, Knowsley Hall, Lancashire, sixteen; Marquis of Breadalbane, one; Duke of Montrose, three; Earl Fitzwilliam, one; Zoological Gardens, Phœnix Park, Dublin, six; ditto, Regent's Park, two; J. J. Hegan, Esq., Harrow Hall, Cheshire, seven; Charles Tayleure, Esq., Parkfield, near Liverpool, five; John Edwards, Esq., Pye Nest, Halifax, six; Mr. Stephenson, Oban, six; Wm. Bennett, Esq., twelve; Mr. Cross, Surrey Zoological Gardens, one; Mr. Atkins, Zoological Gardens, Liverpool, three; and in travelling caravans, four—total seventy-nine. Lately six more arrived in Liverpool. The existence of this number among us, supported by their healthy appearance, as reported to me from every quarter where I have been able to institute inquiries, is a better proof of the capacity of Andes sheep to adapt themselves to our climate, than any further arguments or elucidations which I could adduce."

ALTERATIVE MEDICINES. In farriery, are such medicines as possess a power of changing the constitution, without any sensible increase or diminution of the natural evacuations.

ALTERNATE HUSBANDRY. That sort of management of farms, which has one part in the state of grass or sward, while the other is under the plough, so as to be capable of being changed as there may be occasion, or as the nature of the lands may require. This system of management is supposed to lessen the expense of manure, and keep the land more clean. (See HUSBANDRY.)

ALTHÆA OFFICINALIS. See MARSH-MALLOW.

ALTHEA FRUTEX. (Lat. *Hibiscus Syriacus.*) This is a very beautiful hardy shrub, but it does not throw out its leaves till the middle of June. It is a native of the Levant, Syria, and North America, and it grows well in any loose soil. It blooms through August and September. There are four varieties. One bears pale purple flowers with dark bottoms; a second variety has bright purple flowers with black bottoms; a third bears white flowers with purple bottoms, and the fourth has variegated flowers with dark bottoms. The flower grows at the side of the last year's wood as well as on the present year's wood. It reaches from six to ten feet high. Propagate from seed, or from cuttings and layers. Seed produces the finest plants. It may be sown in the open ground, and the young plants appear the same year. This shrub is a beautiful appendage to all gardens. If the frosts pinch the young late shoots, cut below them in the spring following; they will shoot afresh. (*R. Johnson.*)

ALTITUDE. (Lat. *altitudo*, from *altus*, high.) In vegetable physiology, altitude or elevation of surface above the level of the sea is equivalent to a receding, whether north or south, from the line of the equator, 600 feet of altitude being thought to be equal to a degree. Hence it follows that all varieties of climate, and consequently all varieties of vegetable habitat, may exist even in the same latitude, merely by means of variety in the altitude of the spot. This was found by Tournefort to be literally the fact, during his travels in Asia. At the foot of Mount Ararat he met with plants peculiar to Armenia; above these he met with plants which are found also in France; at a still greater height he found himself surrounded with such as grow in Sweden, and at the summit, with such as vegetate in the polar regions. Baron Humboldt, in his *Personal Narrative*, gives us a similar account of the several zones of vegetation existing in a height of 3730 yards on the ascent of Mount Teneriffe. The first zone is the region of vines, extending from the shores of the ocean to a height of from 400 to 600 yards, well cultivated, and producing date trees, plantains, olives, vines, and wheat. The second zone is the region of laurels, extending from about 600 to 1800 yards, producing many plants with showy flowers, and moss and grass beneath. The third zone is the region of pines, commencing at 1920 yards, and having a breadth of 850 yards. The fourth zone is the region of *Retama*, or broom, growing to a height of nine or ten feet, and fed on by wild goats. The last zone is the region of grasses, scantily covering the heaps of lava, with cryptogamic plants intermixed, and the summit of the mountain bare.

This accounts for the great variety of plants which is often found in no great extent of country; and it may be laid down as a botanical axiom, that the more diversified the surface of the country, the richer it will be in species, at least in the same latitudes. It accounts, also, for the want of correspondence between plants of different countries, though placed in the same latitudes; because the mountains, or ridges of mountains, which may be found in the one and not in the other, will produce the greatest possible difference in the character of the genera and species. To this cause we may ascribe the diversity that often actually exists between plants growing in the same country and in the same latitudes; as between those of the north-west and north-east coasts of North America, as also of the south-west and south-east coasts; the former being more mountainous, the latter more flat. Sometimes the same sort of difference takes place between the plants of an island and those of the neighbouring continent; that is, if the one is flat and the other mountainous; but if they are alike in their geographical delineation, they are generally alike in their vegetable productions.

ALUM. (Lat. *Alumen.*) The sulphate of alumina, and potash of the chemist, is composed, according to the analysis of Berzelius (*Ann. de Chim.* 82—258.), of

Sulphuric acid - - -	34·23
Alumina - - - -	10·86
Potash - - - -	9·81
Water - - - -	45·00
	99·90

In veterinary practice, alum in powder is sometimes used externally for destroying trifling excrescences, arresting bleeding, &c. A little, very finely powdered, is occasionally blown through a quill into the eye for the purpose of removing specks of long standing. Internally, alum is administered in from one to two drachm doses, with other astringents, in diarrhœa, diabetes, and other immediate discharges.

Alum lotion is prepared by dissolving from six to eight drachms of alum powder in two pints of water. This forms an inexpensive and tolerably efficacious application for mild forms of grease, cracks in the heels of horses, and for superficial sores of all kinds. It should not be used till the surrounding inflammation has been subdued by time or proper remedies. In its weakest state, the alum lotion is serviceable in the cankered ear of dogs, and wounds or ulcers of the mouth in any animal.

Alum ointment is composed of one drachm of the powder to one ounce each of turpentine and hog's lard, incorporated by heating. This supplies the place of the lotion when the sores are apt to become dry and hard. It is, however, very little used.

Alum whey is prepared by throwing two drachms of the powder into two pints of hot milk. It is given internally as an astringent, either by the mouth, the vent-gut (*rectum*), or vagina, according to circumstances. It now and then succeeds in diarrhœa, after other and better astringents have failed.

Burnt alum is made by boiling a solid

piece of the salt on an iron plate over a fire till it becomes quite dry and white, taking care not to make the heat so strong as to decompose it. This is somewhat milder than the alum in powder, and is therefore sometimes substituted for it when wanted for specks in the eye. (*Miller's Dictionary.*)

ALUMINA. The pure earth of clay, was so named from having been obtained in a state of the greatest purity from alum, in which salt it exists combined with sulphuric acid, and potash. This earth when pure has but little taste, and no smell. The *earthy* smell which clay emits when breathed upon, is owing to the presence of oxide of iron. Its specific gravity is 2·00. When heated it parts with a portion of water, and its bulk is considerably diminished. Hence most *clay* lands are apt to crack, by their contraction in dry weather. There is little doubt, from the experiments of Davy, but that alumina is the oxide of a metal, which has been denominated aluminum, although he did not succeed in procuring it in a separate state.

Of all the earths alumina is found in plants in the smallest proportions, 32 ounces of the seeds of wheat only contain 0·6 of a grain, and those of the barley and the oat only about 4 grains. It has been found in the largest proportions in the entire plant of Turkey wheat, 100 parts of which yield 7·11 parts; and the same proportion of the sunflower yielded 3·72 parts, and the fumitory 14 parts. Small as these proportions usually are, still there is no reason to doubt but that these are absolutely essential to the growth of the plant. It exists in all cultivated soils in varying proportions, and these are invariably smaller than those of the other earths. (See EARTHS; their use to vegetation.) (*Davy, El. Chem. Phil.; Thomson's System; Professor Schübler, Jour. Roy. Ag. Soc.* vol. i. p. 177.)

ALVEARIUM. A term sometimes employed to signify a bee-hive.

ALVEOLI. The sockets of the jaws of animals in which the teeth are placed. They are lined by a very sensible membrane, which also encloses the roots of the teeth. The number of them differs in various animals, as well as in animals of different kinds.

ALVEOLUS. The waxen cells in bee-hives.

AMARYLLIS. Lily Daffodil, Autumnal Narcissus. (Lat. *Amaryllis lutea.*) This is a hardy bulbous root, coming originally from the south of Europe, and throwing out its yellow flowers in September. It is a hardy plant, which increases very rapidly by offsets, taken between May and the end of July, but not later. It thrives very healthily almost any where, provided it be not planted under trees, or too near walls. The offsets should be planted in a be themselves for two years, previousl setting down in the flower beds. If pl in well dug, tolerably rich mould, the ryllis will bear very splendid flowers. *Johnson.*)

AMAUROSIS. In farriery, is a blindness, without any altered appea in the eye.

AMBARVALIA. A superstitious mony practised by the ancient Roman order to procure from the gods a h harvest. It consisted of a processic which the victims, a sow, a sheep, a bull, were conducted thrice round the fields before they were sacrificed. T priests walked at the head of the proce which consisted of all the neighbourin habitants, every one being crowned leaves of oak, and singing hymns in ho of Ceres, the goddess of corn. (*Virg.* 339. and 345. *Cato de R. R.* c. 141.)

AMBLE. In horsemanship, is a pec kind of pace, in which both the horse's of the same side move at the same In this pace the horse's legs move near the ground than in the walk, and a same time are more extended: but wh most extraordinary in it is, that the legs of the same side, for instance, th hind and fore leg, move at the same t and then the two near legs, in ma another step, move at once; the m being performed in this alternate ma so that the sides of the animal are a nately without support, or any equilib between the one and the other, which necessarily prove very fatiguing to being obliged to support himself in a f oscillation, by the rapidity of a motio which his feet are scarcely off the gro For if in the amble he lifted his feet the trot, or even in a walk, the oscill would be such, that he could not avoid ing on his side.

Those who are skilled in horsema observe, that horses which naturally a never trot, and that they are conside weaker than others. Colts often mo this manner, especially when they themselves, and are not strong enoug trot or gallop. Most good horses, w have been over-worked, and on the de are also observed voluntarily to a when forced to a motion swifter th walk. The amble may, therefore, be sidered as a defective pace, not being mon, and natural only to a very few h which, in general, are weaker than o Add to this, that such amblers as seem strongest are spoiled sooner than which trot or gallop.

AMBURY. See ANBURY.

AMEL-CORN. A diseased sort of grain, the same with spelt.

AMELIORATING CROPS. In husbandry, are such as are supposed to improve the lands on which they are cultivated. Carrots, turnips, artificial grasses, such as contain a large proportion of nutritious materials, and many other green vegetable products, especially if fed off, are considered as ameliorating; but all kinds of crops, carried off the land, are in some degree or other exhausters of the ground; and green crops, such as have been just mentioned, are only less so than crops of grain or other ripe vegetables. The improvement of lands, therefore, by what are commonly termed ameliorating crops, depends, in a great measure, upon the culture which the ground receives while they are growing, and the returns which they make to it in the way of manure, after being consumed by animals.

AMELIORATING SUBSTANCES. In agriculture, are such substances, as, when applied to land, render it more fertile and productive.

AMERICAN BLIGHT. A popular but very inappropriate name for an insect (*Eriosoma mali*, Leach; *Aphis lanigera*, Illiger), very injurious to apple trees, supposed, though on no very clear evidence, to have been introduced from America. Mr. Knapp says he was informed that it was first observed in the west of England in 1819, in the nursery gardens of Messrs. Millar and Sweet, near Bristol, introduced, as was supposed, by some imported plant. Mr. Salisbury again says, "I have, from good authority, heard that it was brought to this country from France, in the reign of Louis XIV., when a colony of refugees settled at Paddington; and there it was first observed to begin its depredations on the apple trees. I am in some measure warranted in my belief, that the insect in question was introduced from France, as an old French gardener who worked in my garden stated that he was well acquainted with the bug, as he termed it, since his childhood; and that it had been the destruction of many fruits, not apple trees in particular, in the neighbourhood of Montpelier, where he had been brought up." (*Hints on Orchards*, p. 39.) M. Blote again informs us that it is exceedingly destructive to the apple trees in the department of Calvados. (*Mém. Société Linn. de Caen, pour* 1824, p. 104.) We seem to be indebted for the supposition of its American origin to Sir Joseph Banks, who traced the supposed first appearance of the insect to a nursery in Sloane Street, Chelsea; and upon being informed that it was unknown in France, concluded that it was most probably imported from North America, with some apple trees which had been brought over to this nursery. But in whatever way it originated, it spread rapidly, though it was at first confined to the vicinity of the metropolis, where it destroyed thousands of trees. Subsequently it found its way into other parts of the kingdom; and, in 1810, so many of the cider apple trees in Gloucestershire were infested with it, that it was apprehended the making of cider would have been abandoned for the season. A periodical writer, who signs Rusticus, has described this insect on the wing, as having "the appearance of a bit of cotton or a downy seed, floating in the air, and as readily driven about by every breath of wind," a description which applies as well to the poplar plant louse (*Aphis populi*, Lin.; *Eriosoma populi*, Leach), a very different insect, harmless to fruit trees. A detailed account of the insect is given in the *Journal of a Naturalist*, which, with the correction of a few errors and oversights of the author, we shall now follow.

Early in summer, and even in spring, about March, a slight hoariness is observed upon the branches of certain species of our orchard fruit. As the season advances this hoariness increases, and becomes cottony; and toward the middle or the end of summer, the upper sides of some of the branches are invested with a thick, downy substance, so long as at times to be sensibly agitated by the air. Upon examining this substance, we find that it conceals a multitude of small, wingless creatures, which are busily employed in preying upon the limb of the tree beneath. This they are well enabled to do, by means of a beak terminating in a fine bristle; this being insinuated through the bark, and the sappy part of the wood, enables the creature to extract, as with a syringe, the sweet, vital liquor that circulates in the plant. This terminating bristle is not observable in every individual, from being usually, when not in use, so closely concealed under the breast of the animal, as to be invisible. In the younger insects it is often manifested by protruding, like a fine termination, to the vent (*anus*); but as their bodies become lengthened, the bristle is not in this way observable. The pulp wood (*alburnum*) being thus wounded, rises up in excrescences and nodes all over the branch, and deforms it; the limb, deprived of its nutriment, grows sickly; the leaves turn yellow, and the part perishes. Branch after branch is thus assailed, until they become leafless, and the tree dies.

Plant lice (*Aphides*), in general, attack the younger and softer parts of plants; but this insect seems easily to wound the harder bark of the apple, and does not always make choice of the most tender branch. They give a preference to certain sorts, but not always the most rich fruits, as cider apples, and wildings, are greatly infested by them; and from some unknown cause, other varieties seem to be exempted from their depredations. The Wheeler's russet, and Crofton pippin, have never been observed to be injured by them; and the insect is so fastidious in its selections, that it will frequently attack the stock or the graft, leaving the one or the other untouched, should it consist of a kind not to its liking. This insect is viviparous, or produces its young alive, forming a cradle for them by discharging from the extremities of its body a quantity of long, cottony matter; which, becoming interwoven and entangled, prevents the young from falling to the earth, and completely envelopes the parent and offspring. In this cottony substance, we observe, as soon as the creature becomes animated in the spring, and as long as it remains in vigour, many round pellucid bodies, which at the first sight look like eggs, only that they are larger than we might suppose to be ejected by the animal. They consist of a sweet glutinous fluid, and are not the eggs but the discharges of the insects. In the autumn, the winds and rains of the season partly disperse these insects; and we observe them endeavouring to secrete themselves in the crannies of any neighbouring substance. Should the savoy cabbage be near the trees whence they have been dislodged, the cavities of the under sides of its leaves are commonly favourite asylums for them. Multitudes perish by these rough removals, but numbers yet remain; and we may find them in the nodes and crevices, on the under sides of the branches, at any period of the year, the long, cottony vesture being nearly all removed; but still they are enveloped in a fine short downy clothing, to be seen by a magnifier, proceeding apparently from every suture or pore of their bodies, and protecting them in their dormant state from the moisture and frosts of our climate. This insect, in a natural state, usually awakens and commences its labours very early in the month of March; and the hoariness on its body may be observed increasing daily; but if an affected branch be cut in the winter, and kept in water in a warm room, these creatures will awaken speedily, spin their cottony nests, and feed and discharge as accustomed to do in a genial season.

Salisbury says these insects winter beneath the surface of the soil in crevices of the root-bark; but though this may certainly occur, we have found them more commonly in cracks, and under the angles of branches at a considerable distance from the ground; and in all cases much diminished from their summer numbers by the cold, as well as by the depredations of their enemies. We have observed the insect to be very fastidious as to its feeding places. A tree, for example, which has been much infested one season, not having one, or only a very few of the insects on the succeeding season; while a tree a few yards distant, previously free, shall become all over a prey to the pest. An espalier stock, also, may have one half of its branches covered with the insects, while another half is entirely free from them.

It does not appear to us, that the feeding organs (*trophi*) of this insect are capable of easily penetrating old bark; for, though numerous colonies of them be found on the oldest trunks, these appear to begin in some recent crack or wound in the bark; and hence, from the extravasation and oozing out of the organic juices, new bark is formed, and this affords a substance easily penetrable; while, as the colony increases, new perforations are made, irregular excrescences are produced, deforming the tree, and draining off the nutriment which would otherwise have gone to the production of flowers and fruit. The young branches, however, are always the most infested during the summer; and the crevices in the old bark are only resorted to when cold weather renders shelter necessary.

Remedies. — A considerable number of methods have been proposed for getting rid of the insect in question. White-washing, or washing with lime-water, has been tried, but is not so efficacious as the application of any glutinous substance, which may cover the insects and dry over them. Double size or glue, liquefied by heat, and applied by means of a brush, particularly in March, when the insects begin to show more cottony than in winter, is a very effectual remedy, if no crevice of a tree is left unsized. This, however, may be dissolved by the rain, and therefore a varnish is recommended by Mr. Knapp, as follows: "Melt about three ounces of resin in an earthen pipkin, take it from the fire, and pour it into three ounces of fish oil; the ingredients perfectly unite, and when cold, acquire the consistence of honey. A slight degree of heat will liquefy it, and in this state paint over every node or infected part in your tree, using a common painter's brush. This I prefer doing in spring, or as soon as the hoariness appears. The substance soon sufficiently hardens, and forms a varnish, which prevents any escape, and stifles the individuals. After this first dressing, should any cottony matter appear round the margin of the varnish, a second application to these parts will, I think, be found to effect a perfect cure. The prevalence of this insect," adds this author, "gives some of our orchards here the appearance of numerous white posts in an extensive drying ground, being washed with lime from root to branch; a practice, I apprehend, attended with little benefit. A few of the creatures may be destroyed by accident; but as the animal does not retire to the earth, but winters in the clefts of the boughs, far beyond the influence of this wash, it remains uninjured, to commence its ravages again when spring returns."

All oily or resinous substances, however, being prejudicial to trees, Mr. George Lindley recommends vinegar as a wash for young trees; and, as less expensive for old trees, a sort of paint, composed of one gallon of quicklime, half a pound of flowers of sulphur, and a quarter of a pound of lamp-black, mixed with boiling water to the consistence of whitening for white-washing, and laying it on rather more than blood warm with a brush. This should be done in March, and again in August when the winged insects spread from tree to tree.

Mr. Couch, as a cheap and certain remedy, recommends three quarters of an ounce of sulphuric acid, by measure, to be mixed with seven ounces and a half of water. It should be applied all over the bark by means of rags, the only parts excepted being the present year's shoots, which it would destroy. This destroys moss and lichens, as well as insects; and if applied in showery weather, will be washed into every crevice in which they can harbour.

AMERICAN CRESS. (*Lepidium virginicum.*) From λεπις, a scale, on account of the form of the seed-vessel. For the winter standing crops, a light dry soil, in an open but warm situation, should be allotted to it, and for the summer, a rather moister and shady border is to be preferred. In neither instance is it required to be rich. It is propagated by seed, which must be sown every six weeks from March to August, for summer and autumn, but only one sowing is necessary, either at the end of August, or beginning of September, for a supply during winter and spring. It may be sown broadcast, but the most preferable mode is in drills nine inches apart. Water may be given occasionally during dry weather, both before and after the appearance of the plants. If raised from broadcast sowings, the plants are thinned to six inches apart; if in drills, only to three. In winter they require the shelter of a little litter or other light covering; and to prevent them being injured by its pressure, some twigs may be bent over the bed, or some light bushy branches laid amongst them, which will support it. The only cultivation they require is to be kept clear of weeds.

In gathering, the outside leaves only should be stripped off, which enables successional crops to become rapidly fit for use. When the plants begin to run, their centres must be cut away, which causes them to shoot afresh. For the production of seed, a few of the strongest plants raised from the first spring sowing are left ungathered from. They flower in June or July, and perfect their seed before the commencement of autumn. (*G. W. Johnson's Kitchen Garden.*)

AMERICAN GRASS. A term sometimes applied to a species of agrostis.

AMMONIA. The name given by chemists to the volatile alkali, from its being first prepared in the East, from camels' dung near to a temple dedicated to Jupiter Ammon. It is known in commerce under the name of *hartshorn*, *sal volatile*, &c. and is prepared by the dry or destructive distillation of animal substances. It is formed also most commonly wherever animal substances undergo putrefaction. It is composed of

Hydrogen	-	-	0·125
Azote or nitrogen		-	1·75

Ammonia is usually produced in the state of carbonate of ammonia, or united with carbonic acid gas, and in this state, or in fact in combination with most other acids, it forms salts, which possess peculiarly fertilising properties. This alkali fulfils, there is little doubt, a very important part in many organic manures. It is a very universally diffused substance, has been detected in rain water and even in snow, and there is little doubt but that it exists, and prejudicially too, to the health of the inhabitants, in the atmosphere of many places crowded with animal life. (*Liebig's Organic Chem.* 76, 77.) Wherever this alkali is detected in a substance, such as it commonly is, for instance, in urine, gas-water, &c. the most excellent effects may be anticipated to vegetation by its use. Fresh urine contains phosphate of ammonia, muriate of ammonia, and lactate of ammonia, and there is perhaps no fertiliser more powerful in its effects than this.

AMNIOS. The name which anatomists have given to a peculiar membranous covering which envelopes the fœtus in the uterus. Within this amnios there is a liquid distinguished by the name of the *liquor of the amnios*, which surrounds the fœtus in every part. (*Thomson's Chem.*)

AMOMUM, COMMON, or BASTARD STONE PARSLEY. This plant is common among hedges and groves, to about three feet in height. The stalk is slender. The flowers are small and white, growing in little clusters at the extremity of all the branches. The seeds have a peculiar flavour of mace, and the plant is distinguished by the slenderness of its stalks and branches; and the smallness of its umbels. This plant is nearly equal in its cordial properties to the foreign amomum. It is good for many disorders. The root is excellent for all diseases connected with the urinary passage, and the seeds are used in all disorders of the stomach and bowels.

It is also an aperient, and useful in all obstructions. The root should be dried, and always kept ready for use, being a most valuable medicine. The root boiled in ale is almost an immediate cure for colic; and dried or fresh, the root and seeds are an admirable ingredient in bitters. (*L. Johnson.*)

AMYLACEOUS. A term applied to such farinaceous seeds, grains, and roots, as contain much of the fine flour from which starch is made, and in which chiefly conists their nutritive principle.

ANALEPTIC. In farriery, a term applied to remedies of a restorative and cordial quality.

ANALYSIS (Gr. ἀνάλυσις). In a general sense, signifies the resolution of compound bodies into their original or constituent principles.

Analysis of Soils.—The means of ascertaining the nature, properties, and proportions of the different materials of which they are composed. The chemical examination of the soil affords perhaps more certain and more valuable information to the farmer, for the improvement of its fertility, than any other mode of investigation. The apparatus and the experiments, necessary for even the most accurate experiments, are by no means so difficult as it is often believed is the case. It is, in fact, a very erroneous conclusion, that an extensive or an expensive apparatus is necessary to carry on even the most valuable chemical researches. The laboratory of one of the most celebrated chemical philosophers of his day, that of Dalton of Manchester, contained apparently but a poor collection of glass bottles, retorts, crucibles, fragments of wine glasses, &c.

The following descriptions of the philosophically-accurate mode adopted by Sir Humphry Davy for the analysis of soils, and that of the more easily repeated plan of the Rev. W. Rham, I will give nearly in their own words. The first I take from his *Elements of Agricultural Chemistry*, and the last from the first volume of the *Journal of the Royal Agricultural Society of England*, p. 46. It may be well to premise that four earths are almost always the chief constituents of all cultivated soils, viz. silica (flint), alumina (clay), carbonate o (chalk), and carbonate of magnesia. are mixed together in an endless var proportions, and are interspersed wit mal and vegetable remains, salts, &c. equally varying extent. It is to as the presence, and the extent of thes stances that the analysis of soils is so sary and so valuable to the farmer.

" The instruments required for th lysis of soils," said the illustrious " are few and but little expensive. Th a balance capable of containing a q of a pound of common soil, and cap turning when loaded with a grain; a weights from a quarter of a pound t a grain; a wire sieve sufficiently co admit a mustard seed through its aper an Argand lamp and stand; some gla tles; Hessian crucibles; porcelain or q ware evaporating basins; a Wedgewo tle and mortar; some filters made of sheet of blotting paper, folded so as t tain a pint of liquid, and greased edges; a bone knife, and an apparat collecting and measuring aëriform (All these may be had at a small exp Mr. Knight of Foster Lane, Che London.)

" The chemical substances or re-age quired for separating the constituent of the soil are muriatic acid (spirit o sulphuric acid, pure volatile dissol water, solution of prussiate of potas iron, succinate of ammonia, soap lye, lution of potassa, solutions of carbon ammonia, of muriate of ammonia, of carbonate of potash, and nitrate of am

In cases when the general nature soil of a field is to be ascertained, spe of it should be taken from different two or three inches below the surfac examined as to the similarity of thei perties. It sometimes happens that plains the whole of the upper stra the land is of the same kind, and case one analysis will be sufficient; vallies, and near the beds of rivers, th very great differences; and it now an occurs that one part of a field is calc and another part silicious, and in thi and in analogous cases, the portions di from each other should be separatel mitted to experiment.

Soils, when collected, if they can immediately examined, should be pr in phials quite filled with them, and with ground glass stoppers. The q of soil most convenient for a perfe lysis is from two to four hundred It should be collected in dry weath exposed to the atmosphere till it b dry to the touch.

The specific gravity of a soil, or the relation of its weight to that of water, may be ascertained by introducing into a phial, which will contain a known quantity of water, equal quantities of water and of soil, and this may be easily done by pouring in water till it is half full, and then adding the soil till the fluid rises to the mouth; the difference between the weight of the soil and that of the water will give the result. Thus if the bottle contains 400 grains of water, and gains 200 grains when half filled with water and half with soil, the specific gravity of the soil will be 2·, that is, will be twice as heavy as water, and if it gained 165 grains, its specific gravity would be 1825·, water being 1000·. It is of importance that the specific gravity of a soil should be known, as it affords an indication of the quantity of animal and vegetable matter it contains; these substances being always most abundant in the lighter soils.

The other physical properties of soils should likewise be examined before the analysis is made, as they denote to a certain extent their composition, and serve as guides in directing the experiments. Thus silicious soils are generally rough to the touch, and scratch glass when rubbed upon it; ferruginous soils are of a red or yellow colour, and calcareous soils are soft.

1. Soils, though as dry as they can be made by continued exposure to air, in all cases still contain a considerable quantity of water, which adheres with great obstinacy to the earths, and animal and vegetable matter, and can only be driven off from them by a considerable degree of heat. The first process of analysis is to free the given weight of soil from as much of this water as possible, without, in other respects, affecting its composition, and this may be done by heating it for ten or twelve minutes over an Argand lamp in a basin of porcelain to a temperature equal to 300° Fahrenheit; and if a thermometer is not used, the proper degree may be easily ascertained by keeping a piece of wood in contact with the bottom of the dish; as long as the colour of the wood remains unaltered the heat is not too high, but when the wood begins to be charred the process must be stopped. A small quantity of water will perhaps remain in the soil even after this operation, but it always affords useful comparative results; and if a higher temperature were employed, the vegetable or animal matter would undergo decomposition, and, in consequence, the experiment be wholly unsatisfactory. The loss of weight in the process should be carefully noted, and when in 400 grains of soil it reaches as high as 50°, the soil may be considered as in the greatest degree absorbent, and retentive of water, and will generally be found to contain much vegetable or animal matter, or a large proportion of aluminous earth. When the loss is only from 20° to 10°, the land may be considered as only slightly absorbent and retentive, and silicious earth probably forms the greatest part of it.

2. None of the loose stones, gravel, or large vegetable fibres should be divided from the pure soil, till after the water is drawn off; for these bodies are often themselves highly absorbent and retentive, and in consequence influence the fertility of the land. The next process, however, after that of heating, should be their separation, which may be easily accomplished by the sieve, after the soil has been gently bruised in a mortar. The weights of the vegetable fibres or wood, and of the gravel or stones, should be separately noted down, and the nature of the last ascertained; if calcareous, they will effervesce with acids; if silicious, they will be sufficiently hard to scratch glass; and if of the common aluminous class of stones, they will be soft, easily cut with a knife, and incapable of effervescing with acids.

3. The greater number of soils, besides gravel and stones, contain larger or smaller proportions of sand, of various degrees of fineness; and it is a necessary operation (the next in the process of analysis) to detach them from the parts in a state of more minute division, such as clay, loam, marl, vegetable and animal matter, and the matter soluble in water. This may be effected in a way sufficiently accurate, by boiling the soil in three or four times its weight of water, and when the texture of the soil is broken down, and the water cool, by agitating the parts together, and then suffering them to rest. In this case, the coarse sand will generally separate in a minute, and the finer in two or three minutes, whilst the highly divided, earthy, animal, or vegetable matter will remain in a state of mechanical suspension for a much longer time; so that by pouring the water from the bottom of the vessel, after one, two, or three minutes, the sand will be principally separated from the other substances, which with the water containing them must be poured into a filter, and after the water has passed through, collected, dried, and weighed. The sand must likewise be weighed, and the respective quantities noted down. The water of lixiviation must be preserved, as it will be found to contain the saline, and soluble animal or vegetable, if any exist in the soil.

4. By the process of washing and filtration, the soil is separated into two portions, the most *important* of which is generally

the finely divided matter. A minute analysis of the sand is seldom if ever necessary, and its nature may be detected in the same manner as that of the stones or gravel. It is always either silicious sand, or calcareous sand, or a mixture of both. If it consist wholly of carbonate of lime, it will be rapidly soluble in muriatic acid, with effervescence; but if it consist partly of this substance, and partly of silicious matter, the respective quantities may be ascertained by weighing the residuum after the action of the acid, which must be applied till the mixture has acquired a sour taste, and has ceased to effervesce. This residuum is the silicious part: it must be washed, dried, and heated strongly in a crucible: the difference between the weight of it, and the weight of the whole indicates the proportion of calcareous sand.

5. The finely-divided matter of the soil is usually very compound in its nature: it sometimes contains all the four primitive earths of soils, as well as animal and vegetable matter; and to ascertain the proportions of these with tolerable accuracy is the most difficult part of the subject.

The first process to be performed in this part of the analysis is the exposure of the fine matter of the soil to the action of muriatic acid. This substance should be poured upon the earthy matter in an evaporating basin, in a quantity equal to twice the weight of the earthy matter, but diluted with double its volume of water. The mixture should be often stirred and suffered to remain for an hour or an hour and a half before it is examined. If any carbonate of lime, or of magnesia, exist in the soil, they will have been dissolved in this time by the acid, which sometimes takes up, likewise, a little oxide of iron, but very seldom any alumina.

The fluid should be passed through a filter, the solid matter collected, washed with rain water, dried at a moderate heat, and weighed. Its loss will denote the quantity of solid matter taken up. The washings must be added to the solution, which if not sour to the taste, must be made so, by the addition of fresh acid, when a little solution of prussiate of potassa and iron must be mixed with the whole. If a blue precipitate occurs, it denotes the presence of oxide of iron, and the solution of the prussiate must be dropped in, till no farther effect is produced. To ascertain its quantity, it must be collected in the same manner as other solid precipitates, and heated red: the result is oxide of iron, which may be mixed with a little oxide of manganese.

Into the fluid freed from oxide of iron a solution of neutralised carbonate of potash must be poured till all effervescence ceases in it, and till its taste and smell indicate a considerable excess of alkaline salt. The precipitate that falls down is carbonate of lime: it must be collected on the filter, and dried at a heat below that of redness. The remaining fluid must be boiled for a quarter of an hour, when the magnesia, if any exist, will be precipitated from it, combined with carbonic acid, and its quantity is to be ascertained in the same manner as that of the carbonate of lime. If any minute proportion of alumina should, from peculiar circumstances, be dissolved by the acid, it will be found in the precipitate with the carbonate of lime; and it may be separated from it by boiling it for a few minutes with soap lye, sufficient to cover the solid matter: this substance dissolves alumina, without acting upon carbonate of lime.

Should the finely divided matter be sufficiently calcareous to effervesce very strongly with acids, a very simple method may be adopted for ascertaining the quantity of carbonate of lime, and one sufficiently accurate in all common cases.

Carbonate of lime (chalk) in all its states contains a determinate proportion of carbonic acid, *i. e.* nearly 43 per cent.; so that when the quantity of this elastic fluid given out by any soil during the solution of its calcareous matter in an acid is known, either in weight or measure, the quantity of carbonate of lime may be easily discovered.

When the process by diminution of weight is employed, two parts of the acid and one part of the matter of the soil must be weighed in two separate bottles, and very slowly mixed together till the effervescence ceases. The difference between the weight before and after the experiment denotes the quantity of carbonic acid lost: for every 4½ grains of which 10 grains of carbonate of lime must be estimated.

6. After the calcareous parts of the soil have been acted upon by muriatic acid, the next process is to ascertain the quantity of finely divided insoluble animal and vegetable matter that it contains. This may be done with sufficient precision, by strongly igniting it in a crucible over a common fire, till no blackness remains in the mass. It should be often stirred with a metallic rod, so as to expose new surfaces continually to the air: the loss of weight that it undergoes denotes the quantity of the substance that it contains destructible by fire and air.

It is not possible, without very refined and difficult experiments, to ascertain whether this substance is wholly animal or

on of the decomposable substances
ssisted by the agency of nitrate of
, which at the time of ignition
hrown gradually upon the heated
the quantity of 20 grains for every
sidual soil. It accelerates the dis-
f the animal and vegetable matter,
causes to be converted into elastic
d it is itself, at the same time, de-
and lost.

substances remaining after the
on of the vegetable and animal
re generally minute particles of
atter containing usually alumina
, with combined oxide of iron or
nese. To separate these from each
solid matter should be boiled for
hree hours with sulphuric acid, di-
h four times its weight of water;
tity of the acid should be regulated
antity of solid residuum to be acted
ing for every 100 grains two drachms,
rains of acid.

bstance remaining after the action
id may be considered as silicious,
st be separated and its weight as-
, after washing and drying in the
nner. The alumina, and the oxide
nd manganese, if any exist, are all
by the sulphuric acid: they may
ted by succinate of ammonia added
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by soap lye, which will dissolve
na, but not the oxide of manganese:
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e been heated to redness will de-
r quantities.

any magnesia and lime have es-
lution in the muriatic acid, they
found in the sulphuric acid: this,

analysis of stones.

8. If any saline matter, or soluble vegetable or animal matter, is suspected in the soil, it will be found in the water of lixiviation used for separating the sand. This water must be evaporated to dryness in a proper dish, at a heat below its boiling point. If the solid matter obtained is of a brown colour and inflammable, it may be considered as partly vegetable extract. If its smell when exposed to heat be like that of burnt feathers, it contains animal or albuminous matter; if it be white, crystalline, and not destructible by heat, it may be considered as principally saline matter. The saline compounds contained in soils are very various. The sulphuric acid combined with potash or sulphate of potash is one of the most usual. Common salt is also very often found in them; likewise phosphate of lime, which is insoluble in water, but soluble in muriatic acid. Compounds of the nitric, muriatic, sulphuric, and phosphoric acids, with alkalies and earths, exist in some soils. The salts of potash are distinguished from those of soda by their producing a precipitate in solutions of platina; those of lime are characterised by the cloudiness they occasion in solutions containing oxalic acid; those of magnesia, by being rendered cloudy by solutions of ammonia. Sulphuric acid is detected in salts by the dense white precipitate it forms in solutions of baryta; muriatic acid, by the cloudiness it communicates to solution of nitrate of silver; and when salts contain nitric acid, they produce scintillations by being thrown upon burning coals.

9. Should sulphate or phosphate of lime be suspected in the entire soil, the detection of them requires a particular process upon

separated from the soil after the process for gypsum. Muriatic acid must be digested upon the soil in quantity more than sufficient to saturate the soluble earths: the solution must be evaporated, and water poured upon the solid matter. This fluid will dissolve the compounds of earths with the muriatic acid, and leave the phosphate of lime untouched. It will not fall within the limits assigned to this article to detail any processes for the detection of substances which may be accidentally mixed with the matters of soils. Other earths and metallic oxides are now and then found in them, but in quantities too minute to bear any relation to fertility or barrenness, and the search for them would make the analysis much more complicated, without rendering it more useful.

10. Where the examination of a soil is completed, the products should be numerically arranged and their quantities added together, and if they nearly equal the original quantity of soil, the analysis may be considered as accurate. It must, however, be noticed that when phosphate or sulphate of lime are discovered by the independent process just described (9.), a correction must be made for the general process, by subtracting a sum equal to their weight from the quantity of carbonate of lime obtained by precipitation from the muriatic acid. In arranging the products the form should be in the order of the experiments by which they were procured. Thus I obtained from 400 grains of a good silicious sandy soil from a hop garden near Tonbridge Kent,—

		Grains.
Of water of absorption - - -		19
Of loose stones and gravel, principally silicious - - - -		53
Of undecomposed vegetable fibres -		14
Of fine silicious sand - - -		212
Of minutely divided matter, separated by agitation and filtration, and consisting of	Grains.	
Carbonate of lime (chalk) -	19	
Carbonate of magnesia -	3	
Matter destructible by heat, principally vegetable -	15	
Silica - - -	21	
Alumina - - -	13	
Oxide of iron - -	5	
Soluble matter, principally common salt and vegetable extract - - -	3	
Gypsum - - -	2	
	—	81
Loss - -		21
		400

The loss in this analysis is not more than usually occurs, and it depends upon the impossibility of collecting the whole quantities of the different precipitates, and upon the presence of more moisture than is accounted for in the water of absorption, and which is lost in the different processes.

When the experimenter is become acquainted with the use of the different instruments, the properties of the re-agents, and the relations between the external and chemical qualities of soils, he will seldom find it necessary to perform, in any one case, all the processes that have been described. When his soil, for instance, contains no notable proportion of calcareous matter, the action of the muriatic acid (7.) may be omitted. In examining peat soils, he will principally have to attend to the operation by fire and air, and in the analysis of chalks and loams, he will often be able to omit the experiment by sulphuric acid (9.).

In the first trials that are made (adds Davy) by persons unacquainted with chemistry, they must not expect mucn precision of result; many difficulties will be met with; but, in overcoming them, the most useful kind of practical knowledge will be obtained; and nothing is so instructive in experimental science as the detection of mistakes. The correct analyst ought to be well grounded in general chemical information; but perhaps there is no better mode of gaining it than that of attempting original investigations. In pursuing his experiments, he will be continually obliged to learn the properties of the substances he is employing or acting upon; and his theoretical ideas will be more valuable in being connected with practical operations, and acquired for the purpose of discovery.

Such were the excellent rules for analysis prescribed by Sir Humphry Davy. With the still more simple directions of the Rev. W. Rham, I shall conclude this paper.

A portion of the earth to be analysed may be dried in the sun or near a fire until it feels quite dry in the hand. It is then reduced to powder by the fingers, or by rolling it on a deal board with a wooden roller, so as to separate the particles, but not to grind them: any small stones above the size of a pea must be taken out. If these form a considerable part of the soil, their proportion must be ascertained by weight; their nature and quality may be afterwards examined: this being a very simple operation, and obvious to the sight, need not be described. Where the stones and pebbles are evidently accidental, they may be overlooked as having little influence on the fertility: the dry earth, cleared from stones, should be accurately weighed; and it is convenient to take some determined quantity of grains, as 1000, 500, or 250, according to the accuracy of the instru-

nd. This portion should be put
w earthen or metal vessel, and
the fire, or a lamp, for about
, stirring it with a chip of dry
eat should not be so great as to
e wood. It may then be allowed
be weighed again; the loss of
ates the water which remained
after the soil appeared quite
is the first thing to be noted.
f retaining water without any
earance of moisture is greatest
a modern term for very finely
nic matter), next in clay, both
dily absorb it from the atmo-
onate of lime does so in a less
silicious sand least of all. This
upies the pores of the soil, and
rent from the water, which is
th clay as a part of its substance,
it owes its ductility; for when
xpelled by a great heat, the clay
ality, and approaches to the
nd. Pounded brick will not
ater, and porcelain reduced to
has all the properties of silicious
soil. The finer the division of
of the soil, the greater will be
absorbing and retaining water;
l where clay greatly predomi-
mps sometimes become so hard
by the sun that the moisture
trate; and in this case the power
n is much diminished. Hence
ich there is a good proportion
ave a greater power of absorp-
e pure earths. Taking all cir-
into consideration, it will be
the soils which most readily
sture are also the most fertile,
re it is important to ascertain
r of absorption. This can be
omparison. Equal portions of
ls, dried as before, are placed in
e scales of a good balance, and
l for some time to a moist atmo-
t which preponderates has the
wer of absorption; the degree is
y the difference of the acquired
Another important circumstance
ific gravity of a soil. The dif-
hs have very different specific
nd humus being lighter than any
th, the lightness of the soil is a
tion of its richness, excepting
lightness is occasioned by an
ndecomposed vegetable matter,
Humus, when nearly pure, has
vity varying from 1·2 to 1·5; fine
lay, 2; chalk, about 2·3; silicious
2·5 to 2·7; mixed soils have spe-
es, varying according to the pro-
their component parts. Those in which clay, chalk, and humus abound, and which are generally the most fertile, are the lightest. The sandy soils are heavier, and the more so if they contain oxides of iron, or of other metals; and it is well known that the ferruginous sands are the most barren. The common expression of *light*, when applied to a sandy soil, has no reference to its specific gravity, but merely to the force required to plough it. No carrier would say that a loose sandy road was a light one. The easiest and readiest method of determining the specific gravity of earth, or any substance which is of a loose texture, is that described by Dr. Ure in his *Philosophy of Manufactures* (p. 97.), as employed by him to ascertain the specific gravities of cotton, wool, silk, and flax. It is as follows: — Take a narrow-necked phial, capable of holding four or five ounces of water; mark a line round the middle of the neck with the point of a diamond, or a file; fill the phial up to the mark with river or rain water, and poise it with sand, or any other substance, in a scale; then put 1000 grains' weight in the same scale with the phial, and pour out water till the equilibrium is restored. In the vacant space, which is evidently equal to the bulk of 1000 grains of water, introduce the soil till the water rises to the mark in the neck; then put into the opposite scale grain weights sufficient to restore the equilibrium. The number of grains required for this purpose will denote the specific gravity of the soil compared to water as 1000. Suppose, for example, that silicious sand, which is 2·7 times denser than water, is poured into the vacant space, it will require 2·700 grains to fill the space occupied by the 1000 grains of water; and thus we have the specific gravity without any calculation. If, instead of 1000 grains, we use only 500, or 250, the result will be the same, if we multiply the grains in the other scale by 2 or 4.

We will give a few examples of soils, of which the specific gravity has been carefully determined.

A rich garden soil, which contained, per cent., —

Clay - - -	52·4
Silicious sand - -	36·5
Calcareous sand - -	1·8
Carbonate of lime -	2·0
Humus - - -	7·3

had a specific gravity of 2·332.

A good loam, consisting of —

Clay - - -	51·2
Silicious sand - -	42·7
Calcareous sand - -	0·4
Carbonate of lime -	2·3
Humus - - -	3·4

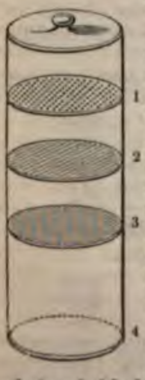
had a specific gravity of 2·401.

A poorer soil, of which the component parts were, —

Silicious sand	64·0
Clay	32·3
Calcareous sand	1·2
Carbonate of lime	1·2
Humus	1·8

had a specific gravity of 2·526.

These examples suffice to show that the specific gravity of a soil is some tolerable indication of its fertility. It cannot, however, be entirely relied upon in the absence of other proofs; for there may be many different mixtures of earths which will have the same specific gravity, although they may differ greatly in their fertility; but it will facilitate the analysis, and often detect mistakes in the process, if the result does not accord with the specific gravity found. We proceed now to the analysis. The portion of soil which has been deprived of all its water, as described above, must be sifted through metallic sieves of different fineness; the first is made of a perforated tin plate, the holes of which are about one twentieth of an inch in diameter: whatever does not go through this is put by. The remainder is successively passed through two or three more sieves, increasing in fineness to the last; which is of the finest wire cloth, having from 150 to 170 threads in an inch: whatever passes through this is an impalpable powder. Thus we have already a division of the soil, according to the size of its particles: — 1. the coarse grit left in the first sieve; 2. the finer grit in No. 2.; 3. fine sand in No. 3.; and 4. impalpable powder, which has passed through the last sieve. To facilitate this part of the operation, the sieves may be made so as to fit into one another, like the filterers in a coffee-biggin, the last fitting into a tin pot which will hold about a pint of water; a cover being made to fit on the top sieve, the instrument is complete. (See fig.) Thus, all the sifting may be done at once without any loss. Any lumps which are not thoroughly pulverised must be broken. The coarser sand left in the sieve No. 1. must now be washed with pure water, to detach any fine dust adhering to it; what runs through may be used to wash No. 2. in the same manner; and then may pass through No. 3. to the impalpable matter which passed through all the sieves. A sufficient quantity of water must be used to render the whole of this last nearly fluid. There will then be three different portions of the washed soil left in the sieves, and a portion of impalpable matter diffused through the water in the lower division of the instrument. This last is the principal object of analysis, and that to which Sir Humphry Davy usually confined his attention, merely noticing the proportion of coarser sand in the soil. It contains, no doubt, the great principle of fertility and nutrition; and the effect of the coarser parts may be considered as chiefly mechanical; but they may much affect the fertility of the finer parts, and are of the greatest importance to the soil in which they are blended: they consequently deserve a more minute examination, to which we will return. In the mean time, our attention shall be directed to the composition of the finer earth in No. 4., which is mixed with water in a semi-fluid state. This is well shaken, and suddenly poured into a deep glass vessel, and allowed to settle for a few minutes, when the heavier earth, which is sand, will be deposited, and the lighter may be poured off suspended in the water. It requires some little practice to effect this at once, but a few trials will soon enable any one to do it. This operation may be repeated until all sand, of which the particles are visible to the naked eye, is separated. The earth and water decanted out of this last vessel are now poured into a glass tube, 18 inches long, No. 1., the bore of which is less than an inch; one end is stopped with a cork fitted into it, and the other has a small lip for the convenience of pouring out the contents. In a short time, there will be a further deposition of earth, which will be principally alumina. What remains suspended in the water over it is gently poured off into another similar tube (No. 2.); this will contain nearly the whole of the humus, which will take some hours to be deposited in the form of a fine brown mud. The contents of the tube No. 1. may now have a little more water added to them: after being well shaken, the tube may be set upright, and left for half an hour to settle: what remains suspended in the water after this, must be added to the humus in the tube No. 2. After some time, this will also be deposited, and the clear water may be decanted off. The mud which remains is put on filtering paper in a glass funnel; and when all the water has drained from it, it is dried over the fire, and weighed.



This is the most important portion of the soil. The fine earths deposited in the tube No. 1. will consist of very fine particles of sand, clay, and perhaps carbonate of lime. The sand will appear deposited in the bottom of the tube. The clay may be easily diffused in the water above it, by stirring it carefully with a small rod, without reaching the sand. It may then be decanted with the water into another tube (No. 3.), and allowed to settle. This part of the operation may be carried to much perfection by great care, and by examining the results occasionally with a small microscope; but for all common practical purposes it is sufficient to separate the vegetable earth from the mineral, and the particles of sand from the finer. The contents of No. 1. having been collected, as well as those of No. 3., are dried over the fire, and accurately weighed. The same is done with the earth which remains on the sieves. All the water in which the earths have been diffused and washed is collected and passed through filtering paper, and then set over the fire in a common saucepan. It is boiled away gently, until it is reduced to a small portion, which begins to look turbid. The complete evaporation is finished in an evaporating dish as slowly as possible; and the residue is the soluble matter contained in the soil. It will be sufficient to dry and weigh this, as its further analysis would require more skill and chemical knowledge than we suppose in the operation. Salts may be detected by the taste, or by the crystals formed in the evaporation; but unless there is a decided saline taste, the whole may be considered as soluble humus, and the immediate fertility of the soil depends greatly on the quantity of it.

To recapitulate what has been obtained, we shall have the coarse grit in sieve No. 1.; the sand in Nos. 2. and 3.; the fine earth separated in the tubes, Nos. 1. and 3.; the humus in tube No. 2. and on the filtering paper, and on the soluble parts in the evaporating dish. All these substances must be well dried over the fire, as was done with the soil at first, and each separated part accurately weighed: the sum of them ought to be equal to the original portion of soil subjected to analysis after the water was drawn off; but there always is a loss even with the most experienced analyser: this loss will be principally in the finer parts which are dissipated in the operation. But the analysis is not yet completed: we have separated the sand, clay, and humus, but there may be a portion of carbonate of lime in the form of sand, or of finely divided earth mixed with the other earths. To ascertain this, each portion, excepting the humus, is put into a separate cup, and a little muriatic acid, diluted with four times its weight of water, is poured on it: if there is any effervescence it shows the presence of carbonate of lime; diluted acid is then added gradually, as long as the effervescence is renewed by the addition. When this ceases, and the water continues to have an acid taste, more pure water is added, and each portion separately filtered, dried, and weighed. The loss of weight in each gives the quantities of carbonate of lime dissolved by the muriatic acid, and which has passed with the water in the form of muriate of lime. The different weights being now collected, the result of the operations may be set down. There may be many mineral substances in the soil, which this mode of analysing will not detect; and some of these may materially affect the fertility. In most cases there will be something to indicate the presence of metals. Iron abounds in most soils: when the quantity is considerable, it will be detected by pouring a decoction of gall-nuts into the water which has washed the earth; it will immediately become of a bluish dark colour. The other metals are not of frequent occurrence. Sulphate of lime or gypsum, and also magnesia, are found in some soils; but the separation of them can only be effected by those who are well acquainted with chemistry: they fortunately occur very seldom, and the places where they are found are generally well known. For all practical purposes it is sufficient to ascertain the proportion of sand, clays, carbonate of lime, and humus, which any soil contains. Many soils which have been highly manured contain portions of undecomposed vegetable substances, and fibres of roots: these will be found mixed with the coarser earths separated by the sifting: not being a part of the natural soil, they need not be taken into the account; but they may be separated by washing the earths, as they are much lighter, and will come over in the first decantations. They may be dried and weighed, and the quantity set down in the result, if it is desirable. Some very barren sands, containing very little argillaceous earth or humus may readily be known by the copious sandy deposit which they rapidly make when diffused through water. Good natural loams are not so easily judged of; but the preceding mode of analysis will in general detect their intrinsic value. When a soil contains peaty matter, it is easily discovered by the irregular black particles which are visible in it. Peat differs from humus only in being in a different state of decomposition and containing a considerable portion of tannin: when acted upon by lime or alkalies, and brought into a state of greater decomposition, it is not to be distinguished from humus in its qualities. The only instruments absolutely required for the foregoing analysis, are, in the first place, two good balances, one capable of weighing a pound and turning with a grain, and one weighing two ounces and *turning with the* tenth part of a grain.

Next, the combination of sieves which we have described, and which may easily be made by any tinsmith. But any sieves of the required fineness, whether of metal, horse-hair, or silk, provided they be of the proper texture, will answer the purpose for a trial. Some earthen or glass jugs, and two or three glass tubes, 18 inches long, open at both ends, which may be obtained at any glass-blower's or chemist's, a glass funnel and some filtering paper, will complete the apparatus. The only chemical substance indispensable to the analysis is some muriatic acid, commonly called spirit of salt. A little test-paper to detect acids in the water with which the soil has been washed, and an infusion of gall-nuts to ascertain the presence of iron, may be useful. A small glass phial will serve for the specific gravities. The whole of these instruments and materials may be procured for a very small sum. If the foregoing process is carefully followed, any person, however unaccustomed to chemical operations, will soon be enabled to satisfy himself as to the composition of any soil of which he desires to know the comparative value. He must not be disheartened by a few failures at first. However simple every operation may appear, it requires a little practice and much patience, if we would come to a very accurate result. Every portion must be dried to the same degree before it is weighed: minute portions which adhere to the vessels when dried must be carefully collected by scraping, and brushing off with a feather: pieces of filtering-paper and of linen must be weighed before they are used, that small portions of matter adhering to them may be ascertained by the increase of weight. By attending to these particulars it is surprising how nearly the whole original weight is accounted for in the summing up of the separate parts. If this mechanical analysis should be thought lightly of by experienced chemists, let them only carefully analyse a portion of soil by this process, and then another by any more perfect mode, and compare the importance of the results as regards practical agriculture. The object is to ascertain the productive powers of the soils; and for this purpose the separation of the different earths is sufficient, in the present imperfect state of our knowledge of the mysteries of vegetation. The process which we have described, simple as it is, may yet be too tedious for the farmer who is desirous of speedily comparing different soils; and we will indicate a still simpler method of ascertaining, nearly, the composition of a soil, and a simple instrument by which it may be done. Take a glass tube, ¾ths of an inch in diameter, and three feet long; fit a cork into one end and set it upright; fill it half full of pure water; take nearly as much water as has been poured into the tube, and mix with it the portion of soil which is to be examined, in quantity not more than will occupy 6 inches of the tube; pour the mixture rapidly into the tube and let it stand in a corner of a room, or supported upright in any way; in half an hour it may be examined. The earths will have been deposited according to the size and specific gravity of their particles. The portion still suspended in the water may be allowed to settle; and there will appear in the tube layers of sand, clay, and humus, which may be measured by a scale, and thus the proportion nearly ascertained. When a farmer is about to hire a farm of which the quality is not well known to him, he may be much assisted in his judgment by this simple experiment, if he has no time or opportunity for a more accurate analysis. For the glass tube may be substituted one of tin or zinc two feet in length, with a piece of glass tube a foot long, joined to it by means of a brass collar or ferule with a screw cut in it, which is cemented to the glass, and screws on the metal tube; and thus the instrument may be made more portable. When the water has been poured off, and the earths only remain, the cork may be taken out and the contents pushed out on a plate, by means of a rod and a plug which exactly fits the internal diameter of the tube. They may thus be more particularly examined. The result of various accurate analyses of soils shows that the most fertile are composed of nearly equal quantities of silicious and argillaceous earths in various states of division, and a certain proportion of calcareous earth, and of humus in that state in which it attracts oxygen and becomes soluble, giving out at the same time some carbonic acid. No chemist has yet been able to imitate the process of nature in the formation of this substance; and the circumstances which are most favourable to it are not yet fully ascertained. Here is the proper field for the application of science and accurate chemical analysis. As an example of an analysis will be useful to those who may desire to try the proposed method, we will add one actually made under very unfavourable circumstances, and without any apparatus; the only instrument at hand were scales and weights of tolerable accuracy, three glasses a foot long, and 1¼ inch in diameter, belonging to French lamps, a tin coffee-strainer, a piece of fine gauze, and a very fine cambric pocket-handkerchief. A little muriatic acid was obtained at the apothecary's. The soil to be analysed was taken from a piece of good arable land on the south side of the slope of the Jura mountains in Switzerland. Its specific gravity was taken as described before, and found to be 2·358 nearly. 500 grains of the dry soil were stirred in a pint of water, and set by in a basin. To save time, 500 grains more of the same soil were weighed, after having been dried over the fire. It was well pulverised with the fingers, and sifted through the coffee-strainer, then through gauze, and, lastly, through the cambric handkerchief. Some portion was left behind at each sifting. The two first portions were washed in the strainer and the gauze. The residue was sand of two different degrees of fineness, which, when dried, weighed, the coarser, 24 grains, the next, 20 grains. The earth and water which had passed through the strainer and the gauze were now strained through the cambric, and left some very fine sand behind, which, dried, weighed, and added to what had remained on the cambric, when sifted in a dry state, weighed 180 grains. All that which had gone through the cambric was mixed with water in a jug and stirred about. The heavier earth subsided, and the lighter was poured in one of the lamp-glasses, which had a cork fitted into it, and was placed upright. In about two minutes there was a deposit, and the lighter portion was poured into a similar glass, where it was left some time to settle. In this a slower deposition took place, and in about a quarter of an hour the muddy water was poured off into the third glass. The three glasses were placed upright, and left so till the next day. In the first glass was some very fine earth, apparently clay; in the second the same, but more muddy; and in the third nothing but thin mud. The contents of No. 2. were divided between No. 1. and No. 3. by pouring off the muddy part into No. 3., after some of the pure water had been poured off, and the remaining earth into No. 1.; they were then left to settle. As much water as appeared quite clear over the sediment was decanted off. The sediment was poured on a plate by taking the cork out of the tube, which was cleaned with a piece of fine linen which had been carefully dried, and accurately weighed. The plates were examined, and some of the lighter part, which floated on the least agitation, was poured from one plate to another, until it was thought that all the humus had been separated. Most of the water could now be poured off the earths, by inclining the plates gently, without any muddiness. It was, however, passed through a piece of filtering-paper, which had been previously dried and weighed. The earth was slowly dried, by placing the plates on the hearth before a good fire, until they were quite dry, and so hot that they could not be easily held in the hand. The deposit left in the jug was poured on a plate, and a little muddy part, which was observed, was poured off with the water on another. This was again transferred, and the finer added to that which was in the second plate. Collecting now all the separate portions, there were found

	Grains.
Of coarse sand - - -	24
Finer sand - - -	20
Very fine sand - - -	180
Clay deposited in the jug, and first plate dried - - -	240
Deposit in the second plate -	24
— on the filtering-paper -	1½
— on the linen rag - -	0½
	490

Leaving 10 grains to be accounted for.

Each portion, except the three last, was now put into a cup, and diluted muriatic acid poured over them: an effervescence appeared in all of them, which continued on the addition of diluted acid, and when the contents of the cups were stirred with a piece of tobacco-pipe. They were left till the next day, when all effervescence ceased, and the calcareous part seemed entirely dissolved: pure water was added to dissolve all the muriate of lime which had been formed. After some time, the clear liquor was poured off, and the remainder was strained through filtering-paper, and dried on plates before the fire. The earths were now found to weigh, respectively, 20, 17, 162, and 182·5 grains, having lost 4, 3, 18, and 57·5 grains of calcareous earth dissolved by the acid. The soil and water which had been put by in a basin were now repeatedly stirred, and poured into a filter, and more water was passed through the earth to wash out all the soluble matter: all the water was boiled down and evaporated, and left two grains of a substance which had the appearance of a gum with a little lime in it. Thus the loss was reduced to eight grains, a very small quantity, considering the means used in analysing the soil. The corrected account, therefore, is as follows:—

Specific gravity, 2·358.

		Grains.	
Silicious sand.	Coarse -	20	199
	Finer -	17	
	Very fine -	162	
Calcareous sand.	Coarse -	4	25
	Finer -	3	
	Very fine -	18	
Impalpable earth.	Clay - -		182·5
	Carb. of lime -		57·5
	Humus - -		26
	Soluble matter -		2
	Loss - -		8
			500

Or, in round numbers, —

40 per cent. Sand.
36 — Clay.
17 — Calcareous earth.
5·5 — Vegetable earth, or humus.
0·5 — Soluble matter.

From the composition of this soil, it is evident that it is a most excellent loam, capable of producing with good tillage and regular manuring every kind of grain, artificial grasses, and roots commonly cultivated. The field from which the soil was taken was always considered to be of superior quality. This simple rule will suffice to enable any one to analyse any soil of which he desires to know the component parts, so far as they affect the general fertility. To ascertain minute portions of salts or metals, or any peculiar impregnation of the waters, must be left to practical chemists. To those who may be inclined to try the analysis of soils, it may be interesting to compare the results of their own experiments with some which have been obtained with great care. Thaër in his very excellent work on *Rational Husbandry*, written in German and translated into French, has given a table in which different soils analysed by him are classed according to their comparative fertility, which is expressed in numbers, 100 being the most fertile. This table is the result of very patient investigation, the natural fertility of each soil being ascertained by its average produce with common tillage and manuring. It is as follows: —

No.	Clay.	Sand.	Carb. of Lime.	Finely divided Organic Matter or Humus.	Comparative Value.	
1	74	10	4	11½	100	Rich alluvial soils.
2	81	6	4	8½	98	
3	79	10	4	6½	96	
4	40	22	36	4	90	
5	14	49	10	27	- -	The value of this could not be fixed, as it was grass land; perhaps bog-earth.
6	20	67	3	10	78	Good wheat and barley-lands.
7	58	36	2	4	77	
8	56	30	12	2	75	
9	60	38	Very little carbonate of lime.	2	70	
10	48	50		2	65	
11	68	30		2	60	Barley-land not fit for wheat.
12	38	60		2	60	
13	33	65		2	50	
14	28	70		2	40	Poor sand, fit only for oats or buck-wheat.
15	23½	75		1½	30	
16	18¾	80		1¼	20	

ANALYSIS OF VEGETABLES. The process or means by which such bodies are resolved into their constituent or elementary principles. (See CHEMISTRY, or VEGETABLE CHEMISTRY.)

ANANA. See PINE.

ANBURY. In Farriery a kind of wen, or spongy soft tumour or wart, commonly full of blood, growing on any part of an animal's body. Substances of this kind may be removed either by means of ligatures being passed round their bases, or by the knife, and the subsequent application of some caustic material, in order to effectually destroy the parts from which they arise.

ANBURY, THE, AMBURY, HANBURY, or CLUB-ROOT. The anbury, the correct name, is evidently derived from the Saxon word *ambre*, a wart, suffused with blood, to which horses are subject. In Holderness, a district of Yorkshire, this disease is known as "fingers and toes," from its causing the top root of the turnip to be divided into swollen fibres, resembling those members of the human body. On this, Mr. Spence, the entomologist, wrote a very sensible pamphlet, entitled "Observations on the Diseases in Turnips, termed in Holderness Fingers and Toes, Hull, 1812." The deficiency of knowledge relative to the diseases of plants is well illustrated by the imperfect and inaccurate observations that have been adventured upon this disease. Where there is much difference of opinion there is little real knowledge, and both these are certainly the case in the instance before us. Some cultivators assert that the disease arises from a variableness and unfavourable state of the seasons; a second party of theorists advance, that it is caused by insects; and a third, that it is owing to a too frequent growth of the same crop upon the same site. Every man having formed an opinion, usually clings to it pertinaciously, and sets its estimate far above its real value or correctness. "It is with our opinions as our watches, none go just alike, yet each believes his own." The chief error appears to be in considering any of the above enumerated causes as the exclusive one; for beyond doubt they each contribute, either immediately or remotely, to induce or exasperate the attacks of the anbury. I am about, in the first place, to consider the disease exclusively as affecting the cabbage, and, secondly, as it operates upon the turnip. Though other species of brassica, the hollyhock, &c. are subject to its attacks, its progress has invariably ap-

heals, and the growth is little re-
On the other hand, if the gall is left
rbed, the maggot continues to feed
e alburnum, or young woody part
em, until, the period arrives for its
nto the other insect form, previously
it gnaws its way out through the
bark. The disease is now almost
the power of remedies, the gall, in-
in size, encircles the whole stem:
rnum being so extensively destroyed,
the sap ascending, consequently,
weather, sufficient moisture is not
from the roots, to counterbalance
spiration of the leaves, and the dis-
lant is very discernible among its
companions, by its pallid hue and
foliage. The disease now makes
rogress: the swelling continues to
e; for the vessels of the alburnum
bark continue to afford their juices
than they can be conveyed away.
e and air are admitted to the interior
xcrescence through the perforation
y the maggot; the wounded vessels
putrefaction supervenes, and death
es the stinted existence of the mi-
plant. The tumour usually attains
of a large hen's egg, has a rugged,
s, and even mouldy surface, smelling
and offensively. The fibrous roots,
being generally thickened, are dis-
nd monstrous, from swellings which
throughout their length, which ap-
y arise from an effort of nature to
ceptacles for the sap, deprived as it
ts natural spissation in the leaves.
swellings do not seem to arise imme-
from the attacks of the weevil, for I
ever observed them containing its

much affected turn yellow, and flag with the heat of the sun, so that in the daytime they are obviously distinguishable from those which are healthy. These distortions manifest themselves very early in the turnip's growth, even before the rough leaf is much developed. Observation seems to have ascertained, that if the bulbs have attained the size of a walnut unaffected, they do not subsequently become diseased. Mr. Spence has clearly shown, from established facts, that the anbury does not arise from any imperfection of the seed sown: for experience demonstrates that, in the same field and crop, the attacks are very partial; and crops in two adjoining fields, sown with seed from the same growth, will one be diseased, and the other healthy. Secondly, it does not arise from an unfavourable time of sowing, or from dry, unpropitious seasons, during their after-growth; for on this supposition we might expect that in all turnip districts the disease would occasionally make its appearance, in consequence of variations in the period and mode of sowing, or from following droughts; yet we know that, in many parts of the country, it has never been heard of. Thirdly, it does not arise from the quality of the soil, for Sir Joseph Banks suffered from its infecting thin stapled, sandy fields; whilst all Holderness, which is generally a strong loamy soil, was found equally liable to the disease. But a still more decisive evidence on this point is, that it makes its appearance at uncertain intervals upon the same soil; the turnips upon it being in some years more injured by them than in other years. Fourthly, although it is certain from the observations of Sir Joseph Banks, and general experience, that the disease oc-the disease is occasioned by the poisonous wound inflicted by some unascertained insect upon the turnip in an early stage of vegetation, or by its insinuating its egg into it, infusing, at the same time, a liquid, causing a morbid action in the sap-vessels, and the consequent forming of excrescences. This correct opinion was afterwards confirmed by the actual discovery of the insect, and that there actually is a maggot generated from the egg, of which fact he was at the time ignorant. The maggot found in the turnip anbury, is the larva of a weevil called *Curculio pleurostigma* by Marsham, and *Rhynchænus sulcicollis* by Gyllenhal. "I have bred this species of weevil," says Mr. Kirby, "from the knob-like galls on turnips, called the anbury, and I have little doubt that the same insects, or a species allied to them, cause the clubbing of the roots of cabbages." (*Kirby and Spence's Introduction to Entomology.*) Marsham describes the parent as a coleopterous insect, of a dusky, black colour with the breast spotted with white, and the length of the body one line and two thirds.

A very full description of this insect is in the *Insecta Svecica descripta*, of Gyllenhal, vol. iii. p. 229. under the name of *Rhynchænus sulcicollis*. It is the *Curculio affinis* of Panzer's *Faunæ Insectorum Germanicæ initia*, the *Curculio sulcicollis* of Paykull's *Fauna Suecica*, the *Falciger sulcicollis* of Dejean's *Catalogue des Coleoptères*, and the *Cryptorhynchus alauda* of Germar's *Insectorum species novæ*, &c.

The general experience of all the farmers and gardeners with whom I have conversed upon the subject, testifies that the anbury of the turnip and cabbage usually attacks these crops when grown for successive years on the same soil. This is precisely what might be expected; for the parent insect always deposits her eggs in those situations where her progeny will find their appropriate food; and in the fragments of the roots, &c. of preceding crops, some of these embryo ravagers are to be expected. That they never attack the plants upon a fresh site is not asserted: Mr. Marshall's statement is evidence to the contrary; but it is advanced that the obnoxious weevil is most frequently to be observed in soils where the turnip or cabbage has recently and repeatedly been cultivated. Another general result of experience is, that the anbury is most frequently observed in dry seasons. This is also what might be anticipated, for insects that inhabit the earth just beneath its surface are always restricted and checked in their movements by its abounding in moisture. Moreover, the plants actually affected by the anbury, are more able to contend against the injury inflicted
larva of the weevil by the same c
supply. The developement of their
their growth is more rapid; conseq
the maggot has not to extend his r
so extensively in search of food as in
seasons, when the stem is less juicy
a smaller growth. In wet periods, al
affected plants show less the extent
injury they have sustained, for their
does not flag; because their transpirat
watery particles is less, and their sup
nutriment from the soil is more free.

In wet seasons I have in very few ins
known an infected cabbage plant pr
fresh healthy roots above the swelli
the anbury. These facts being pre
better qualify us for the considerat
the best modes of preventing the occu
of the disease, and of palliating its at
It is apparent that any addition to t
that renders it disagreeable to the
will prevent the visits of this insect.
gardener has this in his power wit
little difficulty; for he can keep the vi
of his cabbage, cauliflower, and
plants soaked with water. Mr.
gardener to Mr. Bell, of Woolsing
Northumberland, expresses his conv
after several years' experience, that ch
dust spread about half an inch deep
the surface, and just mixed with it
point of a spade effectually preven
occurrence of this disease. (*Trans. o*
Hort. Soc. vol. i. art. 2.) That this
be the case we might have surmised
analogy; for charcoal dust is offensi
many insects, and is one of the most
erful preventives of putrefaction k
Soot, I have reason to believe, from a
experience, is as effectual as charcoal
Judging from theoretical reasons, we
conclude that it would be more specifi
in addition to its being like charcoal,
divided carbon, it contains ammonia, to
insects have an antipathy. Mr. Dru
practical farmer at Erpingham, in N
considered marl a certain preventive
disease. He, and several other jud
farmers also, thought that *teathing*, t
giving sheep and cattle their green
turnips, &c. upon the barley stubbl
tended for turnips as the succeeding
will cause the anbury. (*Marshall's*
Economy of Norfolk, ii. 33. 35.) It i
evident that it would mix fragment
the soil that would be liable to conta
eggs of the weevil. The marl, appro
Mr. Drurey, is probably the calc
marl which occurs at Thorp Market,
hundred of North Erpingham; but as
is a slight doubt, owing to the deficie
accuracy in the statement, it affords

opportunity to impress upon agriculturists in general the great importance of employing more certain terms than they usually do. What can be more indefinite than the statement, that marl is a certain preventive of the anbury? For the very first question suggested to the reader's mind is, What marl is intended? Is it a chalky marl, or a clay marl? Is it a mixture of chalk and clay, or of chalk and silicious sand? for all these varieties of marl are known to agriculture. The want of a correct nomenclature is one of the drawbacks and deficiencies checking the improving progress of agriculture. Few farmers ever thought upon this point, and still smaller is the number who duly appreciated its importance; yet it is an incontrovertible fact, that no art or science can advance rapidly until its technical terms are fixed, terse, expressive, and generally understood. Chemistry attained a greater aid to its advancement by the introduction of its new nomenclature by Lavoisier, than by any series of discoveries that have since been made on its rapid and brilliant progress. If a sulphate, an acid, or a metal is mentioned, a chemist immediately has a definite idea of the nature and properties of the substance alluded to; but if a loam or marl is spoken of, would any two farmers agree in their idea of what description of earthy compound was intended? To make it well understood, a long detail must be added; and nothing checks the imparting of knowledge more, than the person capable of imparting it being conscious that he must define every term as he goes on, and that even then it is doubtful, if he shall succeed in making himself intelligible. The very name, anbury, usually applied to the disease, which is the subject of this paper, is another proof of the necessity of a reformed agricultural nomenclature; for in Suffolk the same title is given to another disease which merely affects the leaves of the turnip. Sir Joseph Banks, Mr. Baker of Norfolk, and others, agree that marl is the best preventive of anbury. And another evidence of the efficacy of applications to the soil is afforded by a gentleman in Holderness, a Mr. Brigham, who had a highly manured clayey ridge, which he had levelled the year before, and this grew turnips entirely free of the disease, whilst in the natural rich loam of the field they were much infected. Francis Constable, Esq. of Burton Constable, had a field that had been in grass twenty years: this he pared, burned, and sowed with turnips, obtaining a crop perfectly free from the disease. Two white crops were then taken, after which turnips were again sown; a considerable portion of the crop was then infected with the disease. (*Spence's Observations on the Disease of Turnips, termed in Holderness fingers and toes.*) I have myself tried the efficacy of common salt in preventing the occurrence of this disease: its tendency to keep the soil moist, and to irritate the animal frame, certainly checks the inroads of the weevil; and its generally beneficial effects as a manure, enables the plants better to sustain themselves under the weakening influence of the disease; but it is not a decisive preventive.

The following result of one of my experiments was read to the "Horticultural Society of London," October 16. 1821. Some cauliflowers were planted upon a light silicious soil, which had previously been manured with well putrefied stable manure, and over one third of the allotted space was sown salt, at the rate of twenty bushels per acre. Immediately before the planting, in the beginning of July, 1821; the previous crop had been broccoli: fifty-four plants were set on the two thirds unsalted, and twenty-six on the one third salted; the result has been, that of the fifty-four unsalted fifteen have been diseased and unproductive; but of the twenty-six salted only two. Some more cauliflowers were planted on a plot of ground which had previously borne a crop of savoys, and half of which ground had been sown with salt four months previous to planting: in this the unsalted and salted were alike nearly destroyed, evincing that the salt was not present in a sufficient proportion to produce the desired effect.

With regard to the use of salt as a cure for the disease, I am inclined to think, from the results of experiments which I have instituted, that unless the salt be applied very early, it would be useless; for the root soon becomes so diseased as to be entirely past recovery. (*C. W. Johnson's Essay on Salt*, p. 136.)

I have a strong opinion that a slight dressing of the surface soil, with a little of the dry hydro-sulphate of lime, that may now be obtained so readily from the gas-works introduced throughout England, would prevent the occurrence of the disease, by driving the weevils from the soil. It would probably as effectually banish the turnip-fly or flea, if sprinkled over the surface immediately after the seed is sown. I entertain this opinion of its efficacy in preventing the occurrence of the anbury, from an instance when it was applied to some broccoli, ignorantly grown upon a bed where cabbages had as ignorantly been endeavoured to be produced in successive crops; these had invariably failed from the occurrence of the anbury, but the broccoli was uninfected. The only cause for this escape that I could trace was, that just previously to planting, a little of the hydro-sulphuret of lime had been dug in. This is a very fetid, powerful compound.

Where dry lime purifiers are employed at gas works it may be obtained in the state of a dry powder; but where a liquid mixture of lime and water is employed, the hydro-sulphuret can only be had in the form of a thick cream. Of the dry hydro-sulphuret, I would recommend 8 bushels per acre to be spread regularly by hand upon the surface, after the turnip seed is sown, and before harrowing. If the liquid is employed, I would recommend 30 gallons of it to be mixed with a sufficient quantity of earth or ashes, to enable it to be spread over an acre in a similar manner. For cabbages 12 bushels, or 45 gallons per acre, would not, probably, be too much spread upon the surface, and turned in with the spade or last ploughing. To effect the banishment of the turnip-flea, I should like a trial to be made of 6 or 8 bushels of the dry, or from 22 to 28 gallons of the liquid hydro-sulphuret, being spread over the surface immediately after the sowing, harrowing, and rolling are finished. Although I specify the quantities as those I calculate most correct, yet in all experiments it is best to try various proportions: 3 or 4 bushels may be found sufficient; perhaps 12, or even 20, may not be too much. Frequent hoeing has been recommended as a preventive of this disease; but I believe this to be unsustained by either reason or practice. Hoeing, like any other stirring of the surface soil, assists the ready admission of the atmosphere to the roots of the incumbent plants, and so far promotes their general health: but I have never yet found, or even heard any one advance, that a frequently-hoed part of a crop was free from the anbury, which affected the more rarely hoed portion. It would be fortunate if our white turnip crops could be sown as early as our Swedes; for they would then probably be as little liable to the anbury as these are. The reason of this seems to be, that the weevil does not emerge into that state in which it is capable of injuring the young plants until the summer is far advanced, and by that time the Swedish turnips have attained a size which secures their safety. I conclude this to be the case from my own slight, very slight observations upon the habits of the insect; for, unfortunately, we are very deficient in knowledge upon this point. It is to be regretted, that entomologists are not more attentive to what may be termed the private and particular history of the subjects of their study: to define and describe their specific characters is very useful; but it is chiefly so, because it is like a good index to an intricate volume. It is of far more utility to ascertain their habits, and their periods of gestation and transformation, because this knowledge is that which often affords us one of the best means of avoiding their ravages. In cabbages, the anbury may usually be avoided by frequent transplantings; for this enables the workman to remove the excrescences upon their first appearance, and renders the plants altogether more robust, and ligneous, the plant in its tender, sappy stage of growth being most open to the insect's attacks. The sap of the turnip and cabbage, thus diseased, undergoes a considerable change: its specific gravity is much increased, arising from an excess of the mucilage, vegetable extract, and other saline constituents, which it naturally contains, caused probably by its being in a concentrated state; for it is very considerably reduced in quantity compared with what the same plant contains when healthy. The increase of the saline components unquestionably exasperates the disease. They consist chiefly of chloride and carbonate of potass, which, by the corroding power of the last named, and the irritating qualities of both, must increase the sanious discharge by stimulating the already lacerated and morbidly sensitive vessels. Probably the occasional application of diluted acids, such as the dregs of beer, would mitigate the symptoms, and check the progress of the ulcerations; but the application could not be expected to effect a cure, nor is it available, even if proved to be a specific. The warts or galls that so frequently may be noticed on the bulbs of turnips must not be mistaken for the anbury in a mitigated form: if these are opened, they will usually be found to contain a yellowish maggot, the larva, probably, of some species of cynips. This insect deposits its eggs in the turnip when of larger growth than when it is attached by the weevil, and the vegetable, consequently, suffers less from the injury; but from some slight observations I am inclined to conclude, that the turnips thus infested suffer most from the frosts of winter, and are the earliest in decay. This is what might be anticipated; for when the maggot has escaped from its cell, the hollow of this admits the exterior air to the wounded vessels, and forms a reservoir for moisture, agents which promote the progress of putrefaction, and assists the penetrating influence of the freezing temperature. (*G. W. Johnson*, *Quar. Journ. Agric.*, vol. viii. p. 308. et seq.)

ANCHYLOSIS. In farriery, a disease of the joints of animals.

ANDERSON, JAMES, was born at

ston, and took an uncultivated farm
acres, in Aberdeenshire, which he
most beneficially for twenty years,
let, enjoying an annuity from
the remainder of his life. He wrote
on *Planting*, first in the Edinburgh
Magazine, afterwards in a separate
777, 8vo. This acquired him much
n, and the University of Aberdeen
on him the degree of Doctor of
1780. In 1783 he gave up his
removed to Edinburgh, where he
the North British fisheries, and
loyed by government to survey the
Scotland. He then commenced a
termed *The Bee*, which was ably
d, but the doctor suffered from
litical papers appearing in it, of
he was entirely ignorant. About
removed to the neighbourhood of
fixing his abode at Isleworth,
e wrote *Recreations in Agriculture*,
continued to lead a very domestic,
ife, being excessively fond of the
on of his garden, until 1808, in
ar he died. He wrote many works,
essays, &c.: we shall only mention
that already noticed,

iption of a Patent Hot-house, which operates
the Heat of the Sun, and other subjects, with-
d of Flues, Tan-bark, or Steam, for the pur-
eating it, &c. London. 1804. 12mo. (*G. W.*
Hist. of Eng. Gard.)

ROMEDA, THE MARSH. (Lat.
eda polifolia.) This is a pretty
growing a foot high, and blowing
oured flowers in May. It loves
nd a well-dug light soil. It is pro-
by suckers, or by dividing the roots
nary. If raised from seed, the seeds

the mould over the seeds, to the thickness of a shilling. It is better to sow the seed in drills, than broadcast, as the young tubers are much more easily found. Water the seed very gently with a watering-pot, and keep out the frost and the mid-day sun, for both are destructive to the young plants. In March, when the leaves of the young plants have died away, take up the tubers or roots, and put them by in a dry place till October, when they may be planted in the flower-beds to flower the following spring. Anemones are plentifully multiplied by dividing their roots with a sharp knife. Plant them in raised beds, that the wet may not lie upon them too long, and rot their roots. Let each root be placed five inches apart. Take them up when their leaves die away, which will be in June, and replace them in October.

All the anemone tribe are detersive and acrimonious in their quality. Taken in infusion they are good in removing female obstructions, and increase milk in the maternal breast. The root chewed strengthens the gums and teeth. The root in decoction is excellent for inflammation in the eyes; the juice cleanses corrosive ulcers. The flowers of the anemone boiled in oil causes the hair to thicken. Anemone ointment is very valuable in inflammations and ulcers applied externally; and is also an eye-salve of great virtue. (*L. Johnson.*)

ANETHUM. See Dill and Fennel.

ANEURISM. In farriery, a throbbing tumour, produced by the dilatation of the coats of an artery in some part of the body of an animal. Aneurisms in the limbs may be cured by making an incision, exposing of a globular form. Two seeds follow each flower.

It may be grown in any soil and exposure, but flourishes best in moist situations, consequently the banks of ponds, ditches, &c. are usually allotted to it. It is propagated by seed, which is to be sown soon after it is ripe, about September, being almost useless if preserved until the spring, as at that season not one in forty will be found to have preserved its vegetative powers; if, however, it be neglected until that season, the earlier it is inserted the better. It may be sown either broadcast moderately thin, or in drills a foot asunder, and half an inch deep. When arrived at a height of five or six inches they must be thinned, and those removed transplanted, to a distance of at least two feet and a half from each other, either in a bed, or on the sides of ditches, &c. as the leaves extend very wide. Water in abundance must be given at the time of removal, as well as until they are established; but it is better to discontinue it during their further growth, unless the application is regular and frequent. In the May, or early June of the second year, they flower, when they must be cut down, which causes them to sprout again; and if this is carefully attended to they will continue for three or four years, but if permitted to run to seed they perish soon after. A little seed should be saved annually, as a resource in case of any accidental destruction of the crop. (*G. W. Johnson's Kitchen Garden.*)

Angelica is fragrant when bruised, and every part of it is medicinal. The bruised seeds are the most powerful. They are cordial and sudorific. The leaves distilled are healing in diseases of the womb. Three table-spoonfuls of the distilled water is a remedy for flatulence, and pains in the stomach. A dram of the powdered dried root in treacle water, or in distilled water of tormentil, is an excellent drink in pestilential fevers, and in diseases of the liver. A paste of the fresh root of angelica beaten up in vinegar used to be carried by physicians in times of great contagion, to apply to the nose. Some preferred holding a dry piece in their mouths, to resist infection. It has always been celebrated against pestilential and contagious diseases. The stalks of the angelica candied are much esteemed in winter desserts as a sweetmeat in England. The Laplanders boil or bake the stalks till extremely tender, and eat them as a delicacy. The seeds bruised are cordial, stomachic, and sudorific. (*L. Johnson.*)

ANGINA. In farriery, a name sometimes applied to the quinsy, or what in animals is termed anticor.

ANGLE-BERRY. In farriery, a sort of fleshy excrescence, to which catt
some other animals are subject und
ferent circumstances; and are suppo
proceed from a rupture of the cut
vessels, which give vent to a matter c
of forming a *sarcoma*, or fleshy excre
They frequently appear upon the bel
adjacent parts, hanging down in a pen
manner.

ANGLERS. Persons who follo
business of taking fish by the hook.
Fisheries; and Animals, Stealing

ANGORA GOAT. A particular
of goat.

ANIMAL. A creature that is en
with life, and commonly with spont
motion, though in some cases with
They are distinguished in general from
tables, by having motion, though this
us no perfect definition; as there are
classes of animals which are fixed to a
as the *lithophytes* and *zoophytes*, whi
produced and die upon the same spot
on the other hand, certain vegetable
as much motion in their leaves and
as certain animals. However, by att
to the most general characters, they
defined to be bodies endued with se
and motion necessary to preserve the
They are all capable of reproducing
like: some, by the union of the two
produce small living creatures; othe
eggs, which require a due temperat
produce young: some multiply withou
junction of sexes; and others are repr
when cut in pieces like the roots of
(See Botany; also a series of articles
"History of British Animals," *Quart.*
Agric. vol. i. pp. 219—537. and
p. 637.)

ANIMALS, DANGEROUS. Se
sance.

ANIMALS, WILD, STEALIN
No larceny at common law (says Mr.
bold in his *Crim. Law*, p. 165.) can be
mitted of such animals, in which ther
property either absolute or qualified;
beasts that are *feræ naturæ*, and unrecl
such as deer, hares, and conies, in a
chase, or warren; fish in an open ri
pond; or wild fowls, rooks, for in
(*Hanman* v. *Mockett*, 2 B. & C. 934.;
R. 518.) at their natural liberty. (1
511.; *Fost.* 366.) But if they are rec
or confined, and may serve for food
otherwise; for of deer so enclosed in
that they may be taken at pleasure,
a trunk or net, and pheasants or part
in a mew, larceny may be committe
Hale, 511.; 1 *Hawk.* c. 33. s. 39.) Sw
is said, if lawfully marked, are the
of larceny at common law, although a
in a public river (*Dalt. Just.* c. 156

whether marked or not, if they be in a private river or pond. (*Ib.*) So, all valuable domestic animals, as horses, and all animals *domitæ naturæ*, which serve for food, as swine, sheep, poultry, and the like, and the product of any of them, as eggs, milk from the cow while at pasture (*Foster*, 99.), wool pulled from the sheep's back feloniously (*R.* v. *Martin*, 1 *Leach*, 171.), and the flesh of such as are *feræ naturæ*, may be the subject of larceny. (1 *Hale*, 511.) But as to all other animals which do not serve for food, such as dogs, ferrets though tame and saleable (*R.* v. *Spearing*, R. & R. 250.), and other creatures kept for whim and pleasure, stealing these does not amount to larceny at common law. (1 *Hale*, 512.) But now, to course, hunt, snare, or carry away, or kill or wound, or attempt to kill or wound, any deer kept or being in the enclosed part of any forest, chase, or purlieu, or in any enclosed land wherein deer are usually kept, is felony, punishable as simple larceny; and if committed in the unenclosed part of any forest, chase, or purlieu, the first offence is punishable upon summary conviction by fine not exceeding 50*l.*, and the second after a previous conviction is felony, and punishable as simple larceny. (7 & 8 G. 4. c. 29. s. 27.) Summary punishment may also be imposed by fine, not exceeding 20*l.*, upon any person who shall have in his possession, or upon his premises, with his knowledge, any deer, or the head, skin, or other part thereof, or any snare or engine for the taking of deer, without satisfactorily accounting for such possession (7 & 8 G. 4. c. 29. s. 27.); or who shall set or use any snare or engine whatsoever for the purpose of taking or killing deer in any part of any forest, chase, or purlieu, whether enclosed or not, or in any fence or bank dividing the same from any land adjoining, or in any enclosed land where deer are usually kept, or shall destroy any part of the fence of any land where deer are then kept. (7 & 8 G. 4. c. 29. s. 28.) To take or kill hares or conies in the night-time, in any warren or ground lawfully used for the breeding or keeping of the same, is a misdemeanor; and to take and kill them in any warren or ground in the day-time, or at any time to set any snare or engine for the taking of them, is punishable upon summary conviction by fine. (7 & 8 G. 4. c. 29. s. 30.) Stealing dogs, or any beast or bird ordinarily kept in a state of confinement, not being the subject of larceny at common law (7 & 8 G. 4. c. 29. s. 31.); knowingly being in possession thereof, or of the skin or plumage thereof (7 & 8 G. 4. c. 29. s. 32.); killing, wounding, or taking any dove-house pigeon, under such circumstances as shall not amount to larceny at common law (see *R.* v. *Brooke*, 4 C. & P. 131.; 7 & 8 G. 4. c. 29. s. 33.), is punishable upon summary conviction by fine, imprisonment, and whipping, according to the nature of the offence. So, to take or destroy any fish in any water which shall run through, or be in any land adjoining or belonging to the dwelling-house of any person, being the owner of such water, and having a right of fishery therein, is a misdemeanor; and to take and destroy fish in any other water, being private property, or in which there shall be any private right of fishery; and to destroy fish by angling, in the day-time, in either description of water, is punishable upon summary conviction by fine, varying according to the nature of the offence. (7 & 8 G. 4. c. 29. s. 34.) And, lastly, to steal any oyster or oyster brood from any oyster bed, laying, or fishery, being the property of another, and sufficiently marked out or known as such, is larceny; and to use any dredge or any net, instrument, or engine whatsoever within the limits of such oyster fishery, for the purpose of taking oysters or oyster brood, although none be taken, or to drag upon the soil of any such fishery with any net, instrument, or engine, is a misdemeanor. (7 & 8 G. 4. c. 29. s. 36.)

ANIMAL CHEMISTRY. See CHEMISTRY.

ANIMAL MANURES. For the information I have to furnish with regard to animal manures, I must refer the farmer to other heads of this work, such as FARM-YARD MANURE, NIGHT-SOIL, BONES, LIQUID MANURE, FISH, &c. A very elaborate paper by Dr. C. Sprengel, translated by Mr. Hudson, will be found in the *Journal of the Roy. Ag. Soc. of Eng.*, vol. i. p. 455., and to that I am indebted for most of the general observations on animal manures in this article. The excrements of animals vary with the age of the animal, its food, &c. That of young animals is poorer than that of the aged, for the young and growing animal requires, for its nourishment and increase in size, a greater proportion of the phosphate of lime, and other solid ingredients of its food, than the more aged animal, because the excrements or refuse matters of the vegetables consumed are proportionately diminished in quantity and in richness. The richer the food, too, the better is the quality of the manure. That from animals fed upon oil-cake is the richest; then that from corn-fed animals; then that from green crops, hay; and, lastly, that from straw-yard cattle is decidedly the poorest. Then again, the water consumed by animals to some extent influences the quantity of their manure. In the water usually drank by an ox, amounting daily to about 80 lbs., is often found from half an ounce to an ounce of saline matter. These consist of gypsum, common salt, carbonate of lime, and carbonate of magnesia. "It may be always regarded," as is observed by M. Sprengel, "as an indication that the excrements of animals contain many powerfully manuring substances when they pass quickly into the putrefactive state, and develope a large quantity of the offensive gases, and ammonia; for in such cases they contain not only much sulphur, phosphorus, and nitrogen, but an abundance also of chlorine, soda, potash, lime, and magnesia, the whole of which are so much the more important in vegetation, as the soil manured with the excrements is deficient in these particular substances."

The mode in which animal fertilisers operate varies, however, according to their chemical composition. Some are enriching from possessing peculiar saline substances, which are direct food for plants. Thus bones abound with phosphate of lime. Night-soil and urine do the same. Farm-yard compost contains all the essential ingredients of the farmer's crops, and they all copiously yield, by their decomposition, the gases of putrefaction, such as the carburetted hydrogen, and carbonic acid gas, as well as various easily decomposable salts of ammonia; all of which are found to be highly nourishing when applied to the roots of the plants, or even to their leaves. And, in fact, some of the most powerful of the animal fertilisers, such as train-oil, whale-blubber, &c. can yield the plant nothing else: they do not contain either saline or earthy matters. It is their gaseous elements only, therefore, which, when applied to the roots of vegetables, produces such a rankness of growth, such a dark green, as the farmer invariably finds to follow in moist seasons from their use.

The quantity of animal manures employed in this country besides that produced by the farmer's live stock, is annually increasing, and it is a happy circumstance that it is so. Not only are sprats and other cheap fish bought up in every direction, but all northern Europe, and even the South Sea, is searched for bones; refuse train oil, and greaves are, to a considerable extent, also used, and there are several manufactories in the metropolis for the preparation of manure powders of an animal description, such as the urate of the London Manure Company, and the disinfected night-soil of M. Poittevin. These are both, especially the first, powerful enrichers, and are admirably adapted for application by the drill.

ANIMAL POISONS. Several animals are furnished with liquid juices of a poisonous nature, which, when injected into fresh wounds, occasion the disease or death of the wounded animal. Well known examples are furnished by the sting of serpents, bees, scorpions, spiders, &c. The poison of the viper is a yellow liquid, which lodges in two small vesicles in the animal's mouth. These communicate by a tube with the crooked fangs, which are hollow, and terminate in a small cavity. When the animal bites, the vesicles are squeezed, and the poison forced through the fangs into the wound. This poisonous juice occasions the fatal effects of the viper's bite. If the vesicles be extracted, or the liquid prevented from flowing into the wound, the bite is harmless. It has a yellow colour resembling gum, but no taste; and when applied to the tongue occasions numbness. The poison of the viper, and of serpents in general, is most hurtful when mixed with the blood. Taken into the stomach, it kills if the quantity be considerable. Fortana has ascertained that its fatal effects are proportional to its quantity compared with the quantity of the blood. Hence the danger diminishes as the size of the animal increases. Small birds and quadrupeds die immediately when they are bitten by a viper; but to an adult the bite seldom proves fatal. "Sweet oil," says Mr. Beckford, "has long been esteemed as a certain antidote to the bite of a viper; some should be applied to the part, and some taken inwardly; but the common cheese-rennet, externally applied, is asserted to be a more efficacious remedy than oil. Ammonia, or spirits of hartshorn, has also been proposed as an antidote. It was introduced in consequence of the theory of Dr. Mead, that the poison was of an acid nature. The numerous trials of that medicine by Fontana robbed it of all its celebrity; but it has been lately revived and recommended by Dr. Ramsay as a certain cure for the bite of the rattlesnake." (*Phil. Mag.*, vol. xvii. p. 125.)

The venom of the bee and the wasp is also a liquid contained in a small vesicle, forced through the hollow tube of the sting into the wound inflicted by that instrument. From the experiments of Fontana we learn that it bears a striking resemblance to the poison of the viper. That of the bee is much longer in drying when exposed to the air than the venom of the wasp. The sting of the bee should be immediately extracted; and the best application is opium, and olive oil; one drachm of the former finely powdered, rubbed down with an ounce of the latter, and applied to the part effected by means of lint, which should be frequently renewed. (See Bee.) The poison of the scorpion resembles that of the viper. But its taste is hot and acid, which is the case also with the venom of the bee and the wasp.

No experiments upon which we can rely have been made upon the poison of the spider tribe. From the rapidity with which these animals destroy their prey, and even one another, we cannot doubt that their poison is sufficiently virulent. (*Mead and Fontana on Poisons; Thomson's Chem.* vol. iv. pp. 531—533.)

ANJOU CABBAGE. An excellent vegetable both for the kitchen and the food of cattle.

The great Anjou cabbage, said the Marquis de Turbilly, is one of the most useful leguminous plants for country use. It will grow in almost any soil, not excepting even the most indifferent, provided it be sufficiently dunged. The seeds of this cabbage are commonly sown in June, in a quarter of good mould, in the kitchen-garden, and watered from time to time in case of drought. The plants will rise pretty speedily, and should be thinned soon after, wherever they stand too thick. The next care is to keep them free from weeds whilst they continue, by hoeing the ground between them. About the first of November (probably September or October would be better in this climate), they should be transplanted into the field where they are to remain. They should be planted there in trenches dug with a spade, pretty deep; that is, they should be buried almost up to the leaves. The distance between them should be two feet or two feet and a half every way, according to the soil. Particular care should be taken never to plant them with a dibble, as gardeners plant other sorts of cabbages. A layer of dung should be spread along the bottom of the trench, and the roots of the transplanted cabbages covered therewith. The mould taken out should then be returned back upon the dung; and, as the trench will then no longer hold it all, there will remain a ridge between each row of cabbages. Towards the middle of the ensuing May, the ground should be well stirred between the plants with a spade, or some other proper instrument, and its whole surface laid quite level. After this, nothing more remains to be done, except pulling up the weeds, from time to time, as they appear.

In the month of June, such of these cabbages as are already large, and do not turn in their leaves for cabbaging, but still continue green, begin to be fit for use, and soon arrive at their full perfection, which they retain till the next spring, when they begin to run up, and afterwards blossom. Their seeds ripen towards the end of July, and what is intended for sowing should then be gathered. In Anjou, when these cabbages are entirely run up, they generally grow to the height of seven or *eight feet;* sometimes they reach to eight feet and a half, or nine feet; nay, some have even been seen of a greater height. From the month of June, when these cabbages begin to be fit for use, their leaves are gathered from time to time, and they shoot out again. They are large, excellent food, and so tender that they are dressed with a moment's boiling. They never occasion any flatulencies or uneasiness in the stomach; and are also very good for cattle, which eat them greedily. They likewise greatly increase the milk of cows. Such are the properties of this kind of cabbage, which is greatly esteemed in the districts formerly denominated Anjou, Poitou, Brittany, Le Maine, and some other neighbouring provinces. In the first, farmers were formerly bound by their leases to plant early a certain number of these cabbages, and to leave a certain number of them standing when they quitted their farms.

ANNONA (*Triloba*). The *North American Papaw.* This is the only sort which will grow in the open air in England. Miller says, it will thrive in a warm sheltered situation, if the plant be trained up in a pot and sheltered for the two or three first winters under cover. It may then be placed out in the open ground. It rises in its native country to ten feet high, having several stems, and bears a fruit shaped like a pear inverted. It loves a well dug light soil, and casts its leaves in autumn. (*L. Johnson.*)

ANNOTTA, or ARNOTTA (Fr. *rocou;* Ger. *orlean;* It. *oriana*). In rural economy, anatto or arnatto, for it is written in various ways, is a colouring substance, or dye, obtained from the skin or pulp of the kernel of the *Bixa orellana* of South America and the West Indies.

Of the preparation of this matter from the red pulp which covers the seeds, Mr. Miller gives the following account: — The contents of the fruit are taken out and thrown into a wooden vessel, where as much hot water is poured upon them as is necessary to suspend the red powder or pulp, and this is gradually washed off with the assistance of the hand, or of a spatula, or spoon. When the seeds appear quite naked, they are taken out, and the wash is left to settle; after which the water is gently poured away, and the sediment put into shallow vessels to be dried by degrees in the shade. After acquiring a due consistence, it is made into balls or cakes, (which are known in commerce as the *flag*, or *cake*, and *roll* Arnotto, and comes chiefly from Cayenne,) and set to dry in an airy place until it be perfectly firm. Some persons first pound the contents of the fruit with wooden pestles; *then, covering* them with water, leave them to steep six days. This liquor being passed through a coarse sieve, and afterwards through three finer ones, it is again put into the vat or wooden vessel, and left to ferment a week; it is then boiled until it be pretty thick, and when cool spread out to dry, and afterwards made up into balls, which are usually wrapped up in Banana leaves.

Arnotta, when of good quality, is of the colour of fire, bright within, soft to the touch, and capable of being dissolved in water. But the substance commonly met with under this name is a preparation made by the druggists, in which madder is probably a principal ingredient; it is of a brick colour, and a hard compact texture. Arnotto is much used in Gloucestershire, and other cheese counties, and in the butter dairies. The method of using the soft, or genuine sort, is simply by dissolving such a quantity as is necessary in a small portion of milk; allowing such particles as will not dissolve to settle to the bottom. The milk thus coloured is then poured off, and mixed with that which is to be made into cheese. But when the hard preparation is used, pieces of it are frequently under the necessity of being rubbed against a hard, smooth, even-faced pebble, or other stone, being previously wetted with milk to forward the levigation, and to collect the particles as they are loosened. For this purpose, a dish of milk is generally placed upon the cheese-ladder; and, as the stone becomes loaded with levigated matter, the pieces are dipped in the milk from time to time, until the milk in the dish appear to be sufficiently coloured. The stone and the "colouring" being washed clean in the milk, it is stirred briskly about in the dish; and, having stood a few minutes for the suspended particles of colouring-matter to settle, is returned into the cheese-cowl; pouring it off gently, so as to leave any sediment which may have fallen down in the bottom of the dish. The grounds are then rubbed with the finger on the bottom of the dish, and fresh milk added, until all the finer particles be *suspended:* and in this the skill in colouring principally consists. If any fragments have been broken off in the operation, they remain at the bottom of the dish: hence the superiority of a hard closely-textured material, which will not break off or crumble in rubbing. The decoction of Arnotto has a peculiar smell and a disagreeable flavour. An ounce of Arnotto will colour about twenty cheeses of 10 or 12 lbs. each. The rolls usually weigh 2 or 3 oz. each. In Gloucestershire, it is usual to allow 1 oz. to a cwt. of cheese; in Cheshire, 8 pennyweights to a cheese of 60 lbs. By the Spanish Americans, it is mixed with their chocolate. The average annual import of Arnotto in the three years ending in 1831 was 128,528 lbs. (*Comp. Farm.; M'Culloch's Com. Dict.; Gray's Supplement; Loudon's Encyc.; Thomson's Chem.*)

ANNUAL HOLDING. See Landlord and Tenant.

ANNUAL MEADOW-GRASS. See Poa Annua.

ANNUAL PLANTS. Such as are only of one year's duration, or which come up in the spring and die in the autumn. They are frequently denominated simply *annuals*. Wheat, oats, barley, beans, peas, &c. are of this kind.

ANNULAR. Having the form or resemblance of a ring. This appearance is observed in the wood of some kinds of trees after they have been cut down; and in the horns of cattle and sheep, by which their ages may in some measure be ascertained.

ANODYNE. In farriery, a term applied to such medicines as ease pain and procure sleep.

ANOREXY. In farriery, a term applied to a want of appetite.

ANT. A sort of insect, extremely injurious to pasture lands and gardens; in the former by throwing up hills, and in the latter by feeding on the fruit, &c. The best methods of keeping them from trees, are those of having the earth round them constantly dug up, and the application of saw-dust, coal-ashes, or other matters of the same kind, about their roots. The same purpose may be effected by covering the bottom part of the trees with tar; but, as it is prejudicial to the trees, night-soil may, perhaps, answer better; as it is found to destroy them when spread upon or put into their hills. A liquor, prepared by boiling rain-water, with black-soap and sulphur, has been made use of for destroying those animals, it is said, with considerable success. Where this liquor is employed, care should be taken that the ground where they inhabit be perfectly saturated with it.

ANT-HILLS. The habitations of ants, consisting of little eminences, composed of small particles of sand or earth, lightly and artfully laid together. These hills are very detrimental to the farmer, depriving him of as much land as the hills cover, which may often be computed at a tenth part, or more, of his grass-lands. And in some places, where negligence has suffered them to multiply, almost half of it has been rendered useless, the hills standing as thick together as grass-cocks in a hay-field: and what is very surprising is, that, by some, this indolence is defended, by affirming, that the area or superficies of their land is thereby increased; whereas it is well known that very little or no grass ever grows thereon;

and, therefore, if the surface be increased, the produce is proportionably decreased.

In order to remove the hills, and destroy the insects, it has been a custom in some places, at the beginning of winter, and often when the weather was not very cold, to dig up the ant-hills three or four inches below the surface of the ground, and then to cut them in pieces, and scatter the fragments about. But this practice only disseminates the ants, instead of destroying them, as they hide themselves among the roots of the grass for a little time, and then collect themselves together again upon any little eminence, of which there are great numbers ready for their purpose, such as the circular ridges round the hollows where the hills stood before. It is, therefore, a much better method to cut the hills entirely off, rather lower than the surface of the land, and to let them lie whole at a little distance, with their bottom upwards: by this means the ants, who continue in their habitations until the rains, running into their holes of communication, and stagnating in the hollows formed by the removal of the hills and the frosts, which now readily penetrate, will be destroyed. If a little soot is sown on the places, it will contribute to the intended effect. The hills, when rendered mellow by the frosts, may be broken and dispersed about the land. By this method of cutting off the hills, one other advantage is gained; the land soon becomes even and fit for mowing, and the little eminences being removed, the insects are exposed to the rain, which is destructive to them. In wet weather these insects are apt to accumulate heaps of sandy particles among the grass, called by labourers sprout-hills, which quickly take off the edge of the scythe. These hills, which are very light and compressible, may be removed by frequent heavy rolling.

ANTHELMINTIC. In farriery, a term applied to such remedies as are supposed to destroy or carry off the worms which lodge in the intestines of an animal.

ANTHEMIS. See CHAMOMILE.

ANTHOXANTHUM ODORATUM. The sweet-scented vernal grass. This grass constitutes a part of the herbage of pastures on almost every kind of soil, though it only attains to perfection on those that are deep and moist. The chief property that gives merit to this grass is its early growth, though, in this respect, it is inferior to several other species, which are alter in flowering. It thrives best when combined with many different species, and is therefore a true permanent pasture grass. It does not appear to be particularly liked by cattle, though eaten in pastures in common with others. Mr. Grant, of Leighton, laid down a field of considerable extent, one half of which was sown with this grass and white clover, the other half with meadow fox-tail and red clover. The sheep would not touch the sweet-scented vernal and white clover, but kept constantly on the fox-tail grass, though the dwarfish nature of the sweet-scented vernal had occasioned an unusual degree of luxuriance of the white clover with which it was combined. This would indicate that it is not, when single, or when combined with but two or three different species, very grateful to cattle. The chemical examination of its nutritive qualities shows, that it does not abound in saccharine matter, but chiefly in mucilage; and the insoluble extract is in a greater proportion than in many other grasses. Its merits, however, in respect to early growth, continuing to vegetate and throw up flowering stalks till the end of autumn, and its hardy and permanent nature, sufficiently uphold its claim to a place in the composition of all permanent pastures. The superior nutritive qualities of its latter-math, are a great recommendation for the purpose of grazing, the stalks being of but little utility, as they are generally left untouched by the cattle, provided there is a sufficiency of herbage. It is said to give to new-mown hay that delightful smell which is peculiar to it; if it is not the sole cause of that pleasant smell, it is certainly more powerful when combined with the grasses which compose hay. About the middle of April it comes into flower, and the seed is ripe generally about the first or second week of June. The fragrance of this, and some other of the grasses, so abundant in our English pastures, arises, it is said, from the presence of benzoic acid. An essential oil of an agreeable flavour may be extracted from this grass, which is valued as a mild aromatic, and stimulant.

Sir H. Davy has shown that the nutritive matter of the grass, at the time the seed is ripe, consists of mucilage, or starch, 43, saccharine matter, 4, and bitter extract and salt 3=50. The leaves, or first growth of the spring, afforded me of mucilage, 40, saccharine matter, 1, bitter extractive, 9=50. The bitter extractive is here much greater in the leaves than in the culms and leaves combined, which is the case with all the grasses I have made trial of, though in different proportions.

The proportional value which the grass, at the time the seed is ripe, bears to that at the time of flowering, is as 13 to 4. The proportional value which the grass of the latter-math bears to that of the seed crop, is nearly as 13 to 9; and the proportional value or nourishment contained in the autumn grass, exceeds that of the first grass of the spring as 9 to 7. The comparative produce of the herbage, at different periods, may be seen by reference to the following table: — (*Sinclair's Hort. Gram. Wob.*)

Description of Grass.	Soil.	Green Produce per Acre.	Dry Produce per Acre.	Produce per Acre of Nutritive Matter.
		lbs.	lbs.	lbs.
Anthoxanthum odoratum, on 1st April -	Brown sandy loam	3,488 0 0	- -	95 6 0
———, in flower - -	—	7,827 3 0	2,103 8 14	122 4 12
———, seed ripe - -	—	6,125 10 0	1,837 11 0	311 1 1
———, latter-math -	—	6,806 4 0	- -	239 4 8

ANTICOR. In farriery, a disease among horses, arising from an inflammation in the gullet and throat, or a kind of quinsey. The swelling sometimes extends as far as the sheath; and is attended with fever, great depression, weakness, and a total loss of appetite.

ANTIDOTE. See POISON, and ANIMAL and VEGETABLE POISONS.

ANTIMONY, SULPHURET OF. In farriery, a mineral substance, of a shining striated appearance, hard, brittle, and very heavy. It is employed as a remedy in many diseases of horses and other animals, and is said to have been given to fattening cattle and hogs with advantage. An ounce is the common quantity for a full-grown animal, which may be repeated according to circumstances. It is composed, according to Dr. J. Davy (*Phil. Trans.* 1812, p. 231.), of

Antimony - -	100
Sulphur - -	34·960

ANTISEPTIC SUBSTANCES. In agriculture, are such substances as have a tendency to resist the putrefaction and decay of animal and vegetable matters.

ANTISPASMODICS. In farriery, are such medicines as are suited to cure spasmodic affections. Opium, assafœtida, and the essential oils of many vegetables, are the most powerful remedies of this kind.

ANTLER. (Fr. *andouiller.*) Properly the first branches of a stag's horns; but, popularly and generally, any of his branches, and so used, by poetic license, in all our modern authors.

AORTAL ARTERIES, of vegetables. The large vessels destined to convey the elaborated juice or blood of plants to the leaves and extremities, are so denominated by Dr. Darwin.

APERIENTS. In farriery, are such remedies as are calculated to keep the bowels of animals in a gentle open state.

APHERNOUSLI, or ARKENOUSLI. A species of fir, pine or pinaster, which grows wild on the Alps.

The timber of this tree is frequently large, and has many uses for internal work. The branches resemble those of the spruce-fir: but the cones are more round in the middle, being of a purplish colour, shaded with black. The bark of the trunk, or bole of the tree, is not reddish like the bark of the pine, but of a whitish cast like that of the fir. The husk, or sort of shell, which incloses the kernels, is easily cracked, and the kernels are covered with a brown skin, which peels off; they are about as large as a common pea, triangular like buck-wheat, and white and soft as a blanched almond; of an oily agreeable taste, but leaving in the mouth that small degree of asperity which is peculiar to wild fruits, and is not unpleasant. These kernels sometimes make a part in a Swiss dessert; they supply the place of mushroom-buttons in ragouts, and are also recommended in consumptive cases.

Wainscoting, flooring, and other joiner's work, may be made with the planks of aphernousli, which is a wood of a finer grain, and more beautifully variegated than deal, and the smell is more agreeable. The aphernousli is a tree of a healthy, vigorous growth, and will bear removing when it is young, even in dry warm weather. From this tree is extracted a white odoriferous resin. The wood also makes excellent firing in stoves, ovens, and kilns.

APHIS. See AMERICAN BLIGHT.

APIUM. See CELERY and PARSLEY.

APOPLEXY. In farriery, is a disease which is often called the *staggers*, to which horses and other animals are subject, and by which they drop down suddenly, without sense or motion, except a working of the flanks. (See SHEEP, DISEASES OF.)

APPETITE. In farriery, a certain painful or uneasy sensation, accompanied with a desire to eat or drink. Horses, more than most other creatures, are subject to diseases of the stomach, particularly to a want of appetite, and a vitiated or voracious appetite.

Want of appetite is when a horse feeds poorly, and is apt to mangle his hay, or leave it in the rack, and at the same time gathers little flesh, his dung being habitually soft, and of a pale colour. This state of the stomach evidently arises either from some error in respect of diet and management, want of grass, or from a relaxed constitution, in which the stomach and bowels are more particularly affected with debility. This weakness of the digestive organs may be either accidental or constitutional; and it may proceed from the use of food administered in an improper state, such as too much scalded bran, or hot meat of any kind, which relaxes the tone of the stomach and bowels, and ultimately produces a weak digestion, and consequently a loss of appetite. The best method to strengthen and recover horses in this state is to give them gentle exercise in the open air, especially in dry weather; never to load their stomachs with large feeds; and to keep them as much as possible to a dry diet, indulging them now and then with a handful of beans among their oats. But where the disorder has been caused by over-feeding with dry food, and the neglect of proper evacuation and exercise, mashes, with gentle saline purges, would seem to be the most suitable remedies; and where horses do not gain strength under the above management, a run at grass will most probably be the readiest method of removing their complaints.

APPLE. SEE MALUS.

APPLES OF LOVE. (*Poma amoris; tomato.*) These apples are juicy, and large fruit, growing upon a low plant in gardens. The flowers are yellow and small; when the fruit ripens, it becomes red, containing soft juicy pulp and seeds. Its juice is cooling to the system, and is applied externally to remove eruptions upon the skin. The juice is also excellent in diseases of the eyes. (*L. Johnson.*) See TOMATO.

APPRAISEMENT. By the 55 G. 3. c. 184., every person who shall exercise the calling or occupation of an appraiser (except he is a licensed auctioneer), or make any appraisement or valuation hereinbefore charged with a duty for or in expectation of any gain, fee, or reward, shall take out a license and pay ten shillings. The word appraiser does not mean a person who, in one single instance only, shall happen to make a valuation for another, but is intended to designate persons who exercise the calling or occupation of an appraiser, and who bear a known character as such. (*Atkinson* v. *Fell*, 5 M. & S. 240.) In this case, two resident parishioners, by the appointment of the parish officers, had valued the parish lands for the purpose of equalising a poor rate. Upon which, Lord Ellenborough said, in giving judgment, "The statute 46 G. 3. c. 3. s. 4. enacts, 'that every person who shall appraise any estate, real or personal, in expectation of any hire or reward, shall be deemed to be an appraiser within that Act.' Now, if these words are to be construed literally, the consequences will be that every person who, in one single instance only, shall make a valuation, must, without regard to circumstances, be subject to the appraiser's duty. Now, the plaintiffs were not appraisers in any sense of the word; but the one a farmer, the other a tradesman, resident on their own property, and being, from their situation in life, no doubt acquainted with agricultural matters, were applied to by the parish officers to contribute their aid in valuing the parish lands, with a view of equalising the parish rates. There is hardly a farmer in the kingdom who will not be obliged to take out a license, if these plaintiffs must." And if an appraisement is made for the information of parties, and not made binding upon them, it is not liable to an appraisement stamp, by 55 G. 3. (*Jackson* v. *Shepherd*, 2 C. & M. 361.)

And by the same act, the appraisement or valuation of any estate or effects, real or personal, heritable or movable, or of any interest therein, or of the annual value thereof, or of any dilapidations, or of any repairs wanted, or of the materials used or to be used in any building, or of any artificer's work whatsoever, are subject to the following stamp duties:—

Where the amount of such appraisement or valuation shall not exceed	50*l.*,	£0	2	6
over 50*l.* and not exceeding	100*l.*	0	5	0
100*l.* - -	200*l.*	0	10	0
200*l.* - -	500*l.*	0	15	0
500*l.* - -	1000*l.*	1	0	0

Examples.—Appraisements or valuations made in pursuance of the order of any court of admiralty. Appraisements or valuations of any property made for the purpose of ascertaining the legacy duty, payable in respect thereof.

It is not only customary, but essential to the maintenance of the good condition of a farm, that the outgoing tenant should be induced to carry on the proper course of husbandry up to the period of his quitting the farm; notwithstanding that much of the labour and manure he bestows is for the benefit of crops which a succeeding tenant will reap. Hence the good practice has arisen, that the outgoing tenant shall be allowed for these matters, according to agreement, or, in its absence, by the custom of the district, which varies considerably. (See CUSTOM OF THE COUNTIES.)

The following real appraisement of a farm in Surrey by Mr. Hewitt Davis, an eminent appraiser of the Haymarket, London, will afford the young farmer a complete view of the matters usually included in such appraisements. It is usual for these valuations to be made by appraisers, one being appointed by the outgoing, and the other by the incoming tenants, who choose an umpire to decide in case of difference.

APPRAISEMENT.

Appraisement of the Tenant's Property on the *Farm, Coun* *of Surrey, made this 29th September*, 1841,

From , outgoing tenant.
To , incoming tenant.
By , outgoing tenant's appraiser.
And , incoming tenant's appraiser.

Made according to the terms of the Lease, which says, "at leaving the Landlord or Incoming Tenant shall pay for the Turnips, Leys, Seeds sown, and Crops in or on the Ground, Ploughings, Dressings, Half Dressings, Fallows, Half Fallows, and preparations of the Land for the Manure and Underwoods, according to their growth, and all other Matters and Things according to the Custom of the Country."

The farm is principally a light turnip soil, and consists of—

Arable - - -	227½ acres
Grass - - -	48 —
Wood - - -	24 —
Hedges - - -	10 —
	309½ —

And has been very highly cultivated on the Scotch Drill system.

DRESSINGS AND TILLAGES, viz.,

		£	s.	d.	£	s.	d.
Lodge Field, 17 Acres. — *Swedes.*							
Ploughed, 2 horses, three times - -	at 10*s*.	25	10	0			
Ridging and splitting - - - -	14*s*.	11	18	0			
Ox harrowed, four times - - - -	1*s*. 6*d*.	5	2	0			
Small harrowed, eight times - -	9*d*.	5	2	0			
Rolled twice - - - -	1*s*.	1	14	0			
Handpicking - - - - - - -		0	17	0			
Dung, 295 loads - - - - -	6*s*.	88	10	0			
Seed, 2 lb. per acre, per lb. - -	1*s*.	1	14	0			
Drilling - - - - - -	1*s*.	0	17	0			
Scuffling twice - - - - -	2*s*. 6*d*.	4	5	0			
Hand-hoeing - - - - -	8*s*.	6	16	0			
Handpicking, rent, rates, and taxes, -	30*s*.	25	10	0			
					177	15	0
Lower Loam Pit, 12 Acres. — *Preparing for Wheat.*							
Half dressing, 230 loads dung - -	at 3*s*.	34	10	0			
Ploughed twice, 2 horses - - -	10*s*.	12	0	0			
Harrowed, Finlayson - - - -	3*s*.	1	16	0			
Ox harrowed twice - - - -	1*s*. 6*d*.	1	16	0			
					50	2	0
Middle Loam Pit, 7½ Acres. — *Seeds.*							
One year's ley - - - - -	at 60*s*.				22	10	0
Upper Loam Pit, 10 Acres. — *Seeds.*							
Two years' ley - - - - -	at 40*s*.				20	0	0
Lower Blighs, 7 Acres. — *Pea Stubble.*							
Half dressing, 110 loads dung - -	at 3*s*.				16	10	0
North Blighs, 8 Acres. — *Wheat after Clover.*							
Clover ley - - - - -	at 60*s*.	24	0	0			
Ploughed, 3 horses - - - -	12*s*.	4	16	0			
Harrowed small, four times - -	9*d*.	1	4	0			
Seed, 16 bushels - - - - -	10*s*.	8	0	0			
Drilling - - - - - -	3*s*.	1	4	0			
					39	4	0
	Carry forward -				326	1	0

		£	s.	d.	£	s.	d.
Brought forward - -					326	1	0
South Blighs, 7½ Acres. — *Wheat.*							
sition earth and lime, 164 loads -	at 3*s.*	24	12	0			
ed, 3 horses - - -	12*s.*	4	10	0			
ved small, four times - -	9*d.*	1	2	6			
5 bushels - - - - -	10*s.*	7	10	0			
g - - - - - -	3*s.*	1	2	6			
					38	17	0
Upper Blighs, 13 Acres. — *Tares.*							
ed, 2 horses - - -	at 10*s.*	6	10	0			
ved small, four times - -	9*d.*	1	19	0			
, 2 horses - - - -	1*s.* 6*d.*	0	19	6			
26 bushels - - - - -	12*s.*	15	12	0			
g - - - - - -	3*s.*	1	19	0			
					26	19	6
t Blighs, 5 Acres. — *Turnips, after Tares fed off.*							
s for the tares - - - - -		5	0	0			
ed twice, 3 horses - - -	at 12*s.*	6	0	0			
ved, ox, twice - - -	1*s.* 6*d.*	0	15	0			
ved small, four times - -	9*d.*	0	15	0			
g and splitting - - -	14*s.*	3	10	0			
, 2 horses, twice - - -	1*s.* 6*d.*	0	15	0			
85 loads - - - - -	6*s.*	25	10	0			
lbs. per acre - - -	1*s.*	0	10	0			
g - - - - - -	1*s.*	0	5	0			
ng three times - - -	2*s.* 6*d.*	1	17	6			
twice - - - - -	8*s.*	2	0	0			
rates, and taxes - - -	30*s.*	7	10	0			
					54	7	6
Ten Acres, 10 Acres. — *Clover.*							
ear's ley - - - - -	at 60*s.*				30	0	0
Ox House, 14 Acres. — *Turnips.*							
hed three times, 2 horses - -	at 10*s.*	21	0	0			
wed, ox, twice - - -	1*s.* 6*d.*	2	2	0			
wed small, four times - -	9*d.*	2	2	0			
small, twice - - -	9*d.*	1	1	0			
g and splitting - - -	14*s.*	9	16	0			
220 loads - - - - -	6*s.*	66	0	0			
28 lb. - - - - -	1*s.*	1	8	0			
g - - - - - -	1*s.*	0	14	0			
ng twice - - - - -	2*s.* 6*d.*	3	10	0			
twice - - - - -	8*s.*	5	12	0			
rates, and taxes - - -	30*s.*	21	0	0			
					134	5	0
Stack Yard, 12 Acres. — *Winter Beans.*							
hed, 3 horses - - -	12*s.*	7	4	0			
wed small, four times - -	9*d.*	1	16	0			
, 24 bushels - - - -	5*s.*	6	0	0			
ng - - - - - -	3*s.*	1	16	0			
					16	16	0
West Field, 7 Acres. — *Clover Seeds.*							
ressing, 145 loads dung - -	at 3*s.*	21	15	0			
allow - - - - -	50*s.*	17	10	0			
nd sowing - - - - -	16*s.*	5	12	0			
					44	17	0
West Starve Acre, 7½ Acres. — *Clover.*							
ressing, 125 loads dung - -	3*s.*	18	15	0			
ressing fallow - - -	50*s.*	18	15	0			
- - - - -	16*s.*	6	0	0			
					43	10	0
Carry forward -					715	13	0

		£	s.	d.	£	s.
Brought forward -					715	13
East Starve Acre, 8 Acres. — *Swedes after Rye, Sheep fed.*						
Tillages for the rye - - - - - -		8	0	0		
Ploughed twice, 2 horses - - -	at 10*s*.	8	0	0		
Ridging and splitting - - -	14*s*.	5	12	0		
Harrowing small, four times - -	9*d*.	1	4	0		
Dung, 139 loads - - - -	6*s*.	41	14	0		
Seed, 16 lbs. - - - - -	1*s*.	0	16	0		
Drilling - - - - - -	1*s*.	0	8	0		
Scuffling three times - - -	2*s*. 6*d*.	3	0	0		
Hoeing twice - - - - -	8*s*.	3	4	0		
About 1½ acre reploughed and resown - - -		1	10	0		
Rent and taxes - - - - -	30*s*.	12	0	0		
					85	8
Sand Pit, 15 Acres. — *Rye.*						
Ploughed, 2 horses - - -	at 10*s*.	7	10	0		
Harrowed small, four times - -	9*d*.	2	5	0		
Seed, 30 bushels - - - -	5*s*.	7	10	0		
Drilling - - - - - -	3*s*.	2	5	0		
					19	10
Upper Kennel Field, 10 Acres. — *Seeds.*						
Half dressings, 165 loads dung - -	at 3*s*.	24	15	0		
Half dressing fallow - - -	50*s*.	25	0	0		
Seeds mixed, and sowing - - -	16*s*.	8	0	0		
					57	15
Lower Kennel Field, 14 Acres. — *Seeds.*						
Half dressings, 240 loads dung - -	at 3*s*.	36	0	0		
Half dressing fallow - - -	50*s*.	35	0	0		
Seeds mixed, and sowing - - -	16*s*.	11	4	0		
					82	4
Upper Pond Field, 14 Acres. — *Seeds.*						
Ley one year old - - - -	at 60*s*.	42	0	0		
Ashes, 1000 bushels - - -	1¼*d*.	5	4	2		
Carting, &c., 50 loads - - -	1*s*. 6*d*.	3	15	0		
					50	19
Lower Pond Field, 11 Acres. — *Bean Stubble.*						
Nothing.					0	0
Middle Common, 7 Acres. — *Potatoes.*						
Crop laid at 49 tons - - -	at 50*s*.				122	10
Manure.						
In West Blighs, dung 162 loads - -	5*s*.	40	10	0		
In yards, dung 100 loads - -	4*s*.	20	0	0		
Ashes, 7 lumps - - - - -		3	10	0		
					64	0
Straw.						
Wheat, 32 loads - - -	at 28*s*.	44	16	0		
Oat, 58 loads - - - -	24*s*.	69	12	0		
Bean, 14 loads - - - -	20*s*.	14	0	0		
Pea, 41 loads - - - -	24*s*.	49	4	0		
					177	12
Hay.						
Meadow, 18 loads - - -	80*s*.	72	0	0		
Rye grass, 14 loads - - -	85*s*.	59	10	0		
Clover, 27 loads - - -	90*s*.	121	10	0		
					253	0
N.B. By the term of the lease, the tenant has the right to sell off the hay and straw, which is therefore put at a market price.						
Carry forward -					1628	11

		£	s.	d.	£	s.	d.
Brought forward	-				1628	11	2
ods.							
rove, 7 acres, 9 years growth -	at 10s.	31	10	0			
ower Wood, 5 acres, 7 years growth	10s.	10	0	0			
haw, 2 acres, 6 years growth -	10s.	6	0	0			
ennel Wood, 10 acres, 2 years growth,	10s.	10	0	0			
					57	10	0
ding stuff in hedge-rows, after al- ; for re-making, all at - -	- -				16	0	0
					1702	1	2

(Signed)
By for the outgoing tenant.
By for the incoming tenant.

NTICES, PARISH, are regu-
the acts of the 43 Eliz. c. 2.,
80., 56 G. 3. c. 139., 1 & 2 G. 4.
3 & 4 W. 4. c. 63. Any person
r holding lands in a parish, is
e to receive a parish apprentice
lapp, 3 T. R. 107.); even a tithe-
ot exempt. (*Rex* v. *Saltern*, Calde-
The magistrates may apprentice
e except that of nurture, *ibid.*
yman's consent is not necessary,
nature of the apprentice: he may
for an indefinite time. His ap-
ip cannot be dissolved during his
without the consent of the parish
Rex v. *Austery*, Burroughs, S.C.
after he is of age the consent of the
unnecessary (*Rex* v. *Hacburton*,
L. 615.), even though he is bound
24. (*Bierlow* v. *Warslow*, 1 W.
.) But an indenture of appren-
not avoided by its having been
ly contrived between the parent
minal master, for the purpose of
a premium, and keeping the infant
(*Rex* v. *Sheepy*, 2 M. & R. 286.)

OT. (*Armeniaca vulgaris.*) The
he apricot has been thought to be
om *apricus*, open and exposed to
or from *præcox*, early ripe; but
be no doubt that the word is a
of the Arabic name of the fruit.
f our earliest wall-fruits, and held
hest estimation. The fruit, when
young to thin the crop, makes an
tart; and when ripe, it is second
for preserves or jam: it gives an
flavour to ice, and makes a delicious
f all the fruits used in pastry, none
eautiful or agreeable than the ripe
To prolong the enjoyment of this
s natural state, we should be care-
ant the earliest variety in the
ituation, as the frost often injures
ms unless it is protected by a glass
The apricot, as well as the plum, may be kept for our dessert two or three weeks later, by gathering it when half ripe, and placing it in an ice-house, a dairy, or any cool place, where it slowly ripens.

Apricots, if not too ripe, agreeably astringe and strengthen the stomach; but like all other perfumed watery fruit, it loses its aromatic and tempting flavour, becomes clammy, and is less easy of digestion, when over-ripe: they should therefore be gathered at least twenty-four hours before they acquire the last degree of maturity.

Of this excellent fruit, thirty-nine varieties have been described in the *Horticultural Society's Catalogue.* For a small garden, Mr. Lindley recommends the following selection.

Breda.
Brussels.
Hemskirke.
Large early.
Moorpark.
Peach apricot.
Red masculine.
Roman.
Royal.
Turkey.

The Moorpark and Turkey have been recommended where variety is not wanted, the former being fine, and a good bearer; the latter not a good bearer, but very fine. The apricot requires a rich soil, rather lighter than the apple and pear.

The apricot tree was first brought to England from Italy in the year 1524, by Woolf, gardener of Henry VIII., who it appears introduced several valuable fruits about the same period. (*Gough's British Topography*, vol. i. p. 133.) Turner, whose work was written in 1564, and published in 1568, says, "I have sene many trees of thys kynde in Almany and som in England." Gerarde in 1597 notices two varieties, that he tells us "do grow in my garden, and now-adaies in many other gentlemen's gardens throughout all England." Parkinson notices but two varieties of this fruit; and Coles says also, in 1657, "I am not assured that there are more than two sorts of apricot trees."

Budding is generally performed from the middle of June to the end of July, on muscle or plum stocks two or three years old. The breda, peach apricot, royal, and a few others, are those generally budded upon the muscle, "and although," says Mr. Lindley, "the Moorpark is for the most part budded upon the common plum, on which it takes freely, yet I am persuaded that if it were budded on the muscle, the trees would be better, last longer in a state of vigour, and produce their fruit superior both in size and quality."

In planting out trees for training, young plants, or those called maiden plants, should be made choice of, being far preferable to those which have been headed down, and stood two years in the quarters of the nursery; observing in all cases, without exception, that the bud should stand outwards, and the wounded part where the stock has been headed down, inwards, or next the wall. The apricot in general bears chiefly upon the young shoots of the preceding year, and also upon small spurs rising on the two or three year old fruit branches. The pruning of wall-apricots comprehends both a summer and a winter course of regulation. In May, the summer pruning commences by the disbudding and removal of the superfluous shoots, and shortening the smaller shoots to half an inch, which will occasion many of them to form natural spurs for blossoms at the base. This should be carefully done with a sharp thin-bladed knife. Care must also be taken to select and train as many of the best placed young shoots as may be wanted to form the figure of the tree, proceeding thus from year to year, till it is completely furnished, both in its sides and middle, for there ought not then to be a blank space in any part within its extent.

For the winter pruning of apricots, every shoot should be shortened according to its strength, none being permitted to exceed 18 inches, while a few will require to be even less than 6. By pruning thus short, and training the branches thus, the trees will be kept in vigour, the fruit will always attain its full size under favourable circumstances, and its quality will be good.

When the fruit is found to be too numerous, and growing in clusters, thinning must be resorted to in May and June, leaving the most promising fruit singly, at three or four inches distance; or from about two to six on the respective shoots, according to their strength. The retained fruit should in all instances be situated at the *sides* of their respective shoots, and no *fore-right* fruit be suffered to remain; for these being exposed to the full power of the sun, will perish before they can arrive at maturity. The apricot is very liable to be attacked by wasps
and large flies, which should be kept off
a net. The other insects and diseases
this tree are the same as in the peach tr
but it is not nearly so obnoxious to th
attacks, probably owing to the comparativ
hard nature of its bark and wood, a
coriaceous leaves. (*Phillip's Pom. Br*
Lindley's Guide to the Orchard and Kitch
Garden.)

APRIL. The fourth month in t
year.

Farmer's Calendar. — Spring corn so
ing should be now finished; let all remaini
turnips be cleared from the land. T
practice of keeping back turnips for la
feed being at the expence of the succeedi
corn crop, should be avoided; all plan
which are suffered to run towards seed, ar
in that stage, great exhausters of the so
The substitutes are rye, winter barley, a
the mixed grasses. Lucern is well sow
this month; it delights in a rich deep soi
contains sulphate of lime; gypsum, ther
fore, on most soils, makes it grow luxuriantl
Live stock prefer gypsumed lucern to a
other. It is best sown in drills. By th
means it may be easily kept clean by t
hoe, and if the farmer takes the precauti
to previously trench or subsoil the groun
it may be made to produce four or five go
crops per annum on inferior dry land. T
value of this grass in many parts of t
country is unknown. If the farmer h
procured any sprats or five-fingers, or a
other oily fish, or animal manures, in t
previous months, and mixed them wi
earth, he may now be getting out the co
post for his Swede turnips. In *moist seaso*
all such oily manures produce very lar
crops. Cut and lay hedges, and roll a
bush-harrow grass land. All this wo
should be finished early in the month,
avoid the bleeding of the wood. Stone-pi
and clean meadows. Cubic petre, and sa
petre, may be advantageously employed t
and the succeeding month, as a top-dressi
for wheat, oats, barley (from say the 10
of April to the middle of May), and gra
It does best when sown in fine powder (
cwt. per acre), on a moist morning. It i
creases both the produce of grain and
straw. It restores the colour of sickly loo
ing corn. Some comparative experime
with nitrate of soda upon turnips are co
tained in vol. i. of the *Journal of*
Royal Agricultural Society, p. 428., by M
Barclay, of which the following are the r
sults: —

cw

20 rods of Swedish turnips, manured with bones, 15 bushels, and ashes 15 bushels per acre, produced - - - 30

	cwt.
20 rods, with 1 cwt. of cubic petre per acre, drilled in, produced -	31
20 rods, with seed and cubic, produced - - - -	55
20 rods, seed, drilled, cubic, broadcast, produced - - -	38

There have been many recent experiments with the nitrates of potash and soda, as fertilisers. Sir Howard Elphinstone, Bart., of Ore Place, Sussex, in a letter to Mr. M. Fothergill, 40. Upper Thames Street, London, thus describes an experiment with nitrate of potash (saltpetre), in 1840:—"Description of land, a clay loam and sandy loam; crop wheat; quantity used, 1 cwt. per acre; dressed, 7 acres; applied by hand beginning of April. Result, most satisfactory. It was discernible by change of colour from a fortnight after its growth, by the superior length of the straw. By actual measurement, 45 square yards produced 33½ lbs. of wheat, 26 lbs. of straw, and 3½ lbs. of chaff. The adjacent land upon the same extent of surface, slightly dressed with dung and mould, produced 23½ lbs. of wheat, 19 lbs. of straw, and 2½ lbs. of chaff. Thus showing a difference of 10 lbs. of wheat, 7 lbs. of straw, and 1 lb. of chaff, in favour of land dressed with nitrate of potash."

In an experiment by W. Marsh, Esq., of Park Hall, Epping, with nitrate of soda, in 1840.—"The land, rather light; crop, wheat; quantity used, 1 cwt. per acre; of land dressed, 22 acres. Sown broadcast across the lands beginning of April, and immediately after rain, it produced a much darker green distinguishable to this time (August 2.), at a greater distance, and the plant appears thicker and taller, and I have no doubt whatever of its proving in every respect satisfactory."

Plant the main crop of potatoes, and do not place the sets too deep; the potato roots require air, as well as the grasses. Use the largest potatoes for seed. The produce is much superior from these. This plant delights in rich soil, and in waste vegetable manure, such as sea-weed, chopped fern, &c. Lime is injurious to it. But potatoes, we have found, may be grown successfully, even in partially reclaimed bogs, free from stagnant water, unfit for corn. It is admirable, as the first crop for newly reclaimed land. Paring and burning is usually in full operation this month. It is a practice, which, on peat soils superabounding with vegetable matters, may be attended with advantage, but even there it is not essential. The Lancashire peat-bog, Chat Moss, has been brought into cultivation, without applying fire. When clay soils need ashes, they are much better dressed with burnt clay from banks or headlands, and on light soils the ill effects of paring and burning, especially after the first crop, are very apparent. It is a system which is gradually becoming less and less employed by the skilful farmer. The cultivator must not suppose that burning *adds* any thing to the soil, or alters its chemical earthy composition; it does neither; it merely dissipates almost all the organic matters of the ground, and dresses the land with the ashes from its own vegetable and animal remains. Live stock now require the farmer's vigilance; it is now that the water meadows are so valuable to the cultivator, to afford a supply of food between the difficult periods when turnips are finished, and the natural grasses are ready. Consider the best modes of providing these. If you have not a stream or reservoir of water, then even the pump which drains half Lincolnshire, fills canals and empties lakes, may, by wind-mills or the steam engine, in many situations, be profitably and extensively brought into operation for the purposes of irrigation. Prepare also tanks for the preparation of liquid manure. (*Farm. Alm.*)

GARDENER'S CALENDAR.—*Kitchen Garden.*—*Alexanders*, sow. *Angelica*, sow. *Artichokes*, dress, plant *b.* *Asparagus* sow, plant, force in hot-bed, dress established beds. *Beans*, plant, hoe, and attend to advancing. *Beet* (red, green, white), sow *b.* *Borecole*, sow, prick out seedling, leave for seed. *Broccoli*, sow, prick out seedlings, leave for seed. *Basil*, sow. *Borage*, sow. *Burnets*, sow and plant. *Balm*, plant. *Cabbages*, plant, prick out seedlings, sow, earth up, &c., advancing crops. *Carrots*, sow, weed advancing crops. *Cardoons*, sow. *Capsicum*, sow. *Cauliflowers*, plant out from glasses, prick out seedlings, sow *b.* *Celery*, sow, earth up, and dress old plantations, leave for seed. *Colewort*, plant. *Cucumber*, sow, prick out seedlings, ridge out, attend to advancing and productive crops. *Chervil*, sow, leave for seed. *Clary*, sow. *Coriander*, sow. *Chamomile*, plant. *Chives*, plant. *Caraway*, sow. *Cress* (American), sow. *Dill*, sow. *Dung*, prepare for hotbeds. *Endive*, sow, *e.*, leave for seed. *Earthing up*, attend to. *Fennel*, sow or plant. *Finochio*, sow. *Garlic*, plant *b.* *Horse-radish*, plant, *b.* *Hyssop*, sow and plant. *Hot-beds*, make and attend to. *Jerusalem artichokes*, plant *b.* *Kale, sea*, sow and plant *b.* *Kidney beans*, attend to in hot-beds. *Leeks*, sow *b. e.*, leave for seed. *Lettuces*, sow, plant out from frames, prick out seedlings, tie up, &c. those of advanced growth. *Lavender*, plant. *Mint*, plant. *Melons*, sow, prick out, ridge out, attend to advancing crops. *Mustard* and *cress*, sow, leave for seed. *Mushroom-bed*, make, attend to. *Marjorams*, sow and plant. *Marigolds*, sow. *Nasturtiums*, sow. *Onions*, sow *b.e.*, leave for seed, weed advancing crops. *Potato*, plant *b*. *Trees*, plant. *Orach*, sow. *Potatoes*, plant *b*., attend to, in forcing. *Parsnips*, sow *b*., hand-weed advancing crops. *Parsley*, sow, leave for seed. *Hamburgh do*., sow. *Peas*, sow, hoe, stick, &c. advancing. *Pompions*, sow *b*. *Purslane*, sow. *Penny-royal*, plant. *Rape*, sow. *Radishes*, sow, thin, &c. advancing. *Rhubarb*, plant *b*. *Rochambole*, plant *b*. *Rue*, plant. *Spinach*, sow, thin, &c. advancing, leave some winter standing for seed. *Savoys*, sow *b*., prick out seedlings. *Shallots*, plant *b*. *Savory*, sow. *Sorrels*, sow and plant. *Sage*, plant. *Small salading*, sow. *Salsafy*, sow *e*. *Scorzonera*, sow *e*. *Skirrets*, sow *e*. Slugs, caterpillars, &c. search for, amongst lettuces, &c. *Tomato*, sow. *Thyme*, sow and plant. *Tansey*, plant. *Tarragon*, plant, thin advancing crops, and weed generally. *Turnip cabbage*, sow, watering attend to in dry weather. *Wormwoods*, sow.

Flower Garden.—Now place sticks to every plant or stalk requiring support; fix the sticks, or light iron rods, firmly in the ground; and tie the stems to each stick neatly, in two or three places.

Some evergreens may yet be removed, as laurels, laurustinus, Portugal laurel, cistuses, arbutus, magnolias, pyracanthas, &c.; propagate auriculas, by slipping off their suckers and off-sets, this month. Sow carnation and polyanthus seed still; sow, also, perennial and biennial seeds.

Where any perennial or biennial fibrous-rooted flowers are wanted, transplant them only in the first week of this month, and they must have each a good ball of earth attached to them, but this work should be completed in February, or March at farthest.

Every sort of annual may now be sown. Take care of your hyacinths, tulips, ranunculuses, and anemones now, for they will be hastening into bloom. Place your auriculas, hyacinths, &c., which may be in pot, in a sheltered place, during the heavy rains or winds; and shelter those flowers which are in the borders as well as you can. Trim them from dead leaves; keep your lawn and grass nicely mown and rolled, and your borders free from weeds and rubbish. (*Farm. Almanac.*)

General Monthly Notices. — This month has ever been hailed as that in which Nature is re-animated. *Zif* was its name among the Hebrews, signifying brightness and liveliness; and *Ijah*, to come forth, because now the atmosphere is clear, and animals as well as plants are arising from the torpor of their winter existence. The Greek name seems to have reference to the same phenomena; and the Latin, *Aprilis*, from which its designation in our language is derived, according to Horace, Plutarch, Macrobius, and Ovid, was applied from the verb *aperire*, to open, because vegetation is expanding during its days. Our Saxon forefathers termed it *Eostre-monath*, in honour of their goddess Eostre; a name perpetuated by its being still retained, from usually occurring in this month, to the season in which we commemorate our Saviour's suffering and triumph. Nero altered the name of this month to *Neroneus*, but succeeding ages have refused to the tyrant such a perennial memento. Romulus assigned to this month thirty days; but Numa added one more, which it has ever since retained.

Every organic body appears now overflowing with life, activity, and happiness; and that man must indeed be gloomy, who does not feel an expansion of heart, a very elevation of his nature, amidst the universal joy. Who has not walked forth and heard the distant notes of the blackbird's evening song; the hum of the passing bee; bathed himself in the fresh air that passes softly over him; looked over the distant landscape sprinkled with the cottage-homes of England, and not felt his heart swell with a general benevolence?

Now we have those integrants of our idea of spring, the swallow, the nightingale, and the cuckoo; and those other-passage birds of this milder season, the beautiful little wryneck, the yellow and willow wrens, the ring-ousel, the white-throat, the redstart, and the grasshopper lark, the smallest of its genus.

One of the most interesting subjects for observation in ornithology is the architecture of the nests of each species of birds. A volume might be occupied with the discussion of the theme. The art and cunning displayed in selecting a secret place for the erection, and in rendering the exterior of the nest similar in appearance to the objects by which it is surrounded; the neatness of the structure; the firmness and regularity with which the parts are woven together, are all points which might be curiously illustrated, and are subjects of admiration.

It would be a long vocabulary even merely to insert the names of plants which, during this month, usually expand their flowers — it is the very month of blossoms. A more rich and gorgeous sight is not exhibited in our country to the traveller, than by the orchards of Hereford, Somerset, and Devon, on bright sunny days during this month. A view from the hills over their brilliantly green pastures, relieved by their hedge-rows, clustered with the pink and white bloom of the universally cultivated apple, is equal to any imaginary landscape in fairy-land. The white blossoms of the cherry, and the roses of Kent, at this month's close, are scarcely less attractive. (*Farmer's Almanac.*)

AQUATIC PLANTS are such plants and trees as grow in water, or watery situations. Thus, the willow, osier, alder, poplar, &c. are aquatic plants. They are proper for being planted where the soil is inclined to moisture, though they succeed best when they are not over-wet.

ARABLE SOILS. See SOILS.

ARBOR VITÆ. (*Thuja.*) The generic name of this tree is a corruption from θυα of Theophrastus, or thya of Pliny, which were derived from the verb *thyô*, I perfume; as the thya of the ancients gave out an aromatic smoke when it was burnt. It is called *arbor vitæ*, or tree of life, because it keeps in full leaf winter and summer; and not in allusion to the tree of life mentioned in the book of Genesis. The first mention we have of it in England is by Gerard, in his *History of Plants*, which was published in 1597. He tells us that it was then growing plentifully in his garden at Holborn, where it flowered about May, but it had not then ripened seed.

> "The Thuja from China's fruitful lands,"

being of a brighter green and thicker verdure, has nearly superseded the arbor vitæ of Canada in our plantations. It is well adapted to screen private walks or low buildings, as it gives out flat spreading branches near the ground; but it has a sombre appearance, unless associated with more cheerful foliage, or ornamented by some gay climbing plant, as the everlasting pea, the flaming nasturtium, or our native bindweed.

The arbor vitæ, which we have borrowed from the extremity of the east and of the west, as a mere ornament to our pleasure-grounds, forms an article of utility and profit to the inhabitants of its native soil. It is reckoned the most durable wood in Canada, where it is known by the name of the white cedar. All the posts which are driven into the ground, and the palisades round the forts, are made of this wood. The planks in the houses are made of it; and the thin narrow pieces of wood which form both the ribs and the bottom of the bark boats, commonly made use of there, are taken from this wood, because it is pliant enough for the purpose, when fresh, and also because it is very light. The thuja wood is reckoned one of the best for the use of lime-kilns. Its branches are used all over Canada for brooms, which leave their peculiar scent in all the houses where they are used. The arbor vitæ affords the Indian a remedy for the cough and the intermitting fever, and a medicine for rheumatic pains, in the fresh leaves, which are simply pounded in a mortar, and mixed with lard or other grease. This is boiled together till it becomes a salve, which is spread on linen, and applied to the part where the pain is, to which it is said to give certain relief in a short time. The oil is recommended against the gout, being rubbed on the part; for it acts like fire, by stimulating and opening. The leaves, bruised with honey, dissolve tumours. The balsam and oil of arbor vitæ were very much used during the time of the plague in Dresden.

The finest trees are always raised by seed, but they are more easily propagated by layers or cuttings. (*Phil. Syl. Flor.*)

ARBUTUS. A genus of evergreen shrubs which is characterised by its fruit being a berry, containing many seeds. The only variety necessary to be enumerated in these pages is the *Arbutus Unedo*, or strawberry tree.

The Greeks called this tree κομαρος, and the fruit μιμαικυλον; the Latins named the tree *arbutus*; but in Pliny's time, when Rome abounded in wine and oil, they called the tree *unedo*, which was an abridgment of *unum edo*, meaning, "You will eat but one." It has the name of strawberry-tree with us, because its berries so nearly resemble in appearance that delicious fruit. It is not known at what precise period the arbutus was first cultivated in England. Dr. Turner says, that he had not seen it in this country in 1568. Gerard also describes the tree in 1597, but he does not say that it was then planted in our gardens. Parkinson notices in 1640, that "it came to us from Ireland." Evelyn observes, as late as the time of Charles II., that "the arbutus is too much neglected by us, making that a rarity which grows so common and naturally in Ireland." It is found growing spontaneously on rocky limestone situations in the west of Ireland, particularly in the county of Kerry, near the lake of Killarney, where the peasants eat the fruit. The arbutus is a native of the south of Europe, Greece, Palestine, and many other parts of Asia.

Horace celebrates the shade of this tree:—

> "Nunc viridi membra sub arbuto
> Stratus."

But Virgil describes its foliage as rather thin (*Ecl.* vii.), and recommends the twig as a winter food for goats.

The arbutus tree succeeds best in a moist soil, for when planted in dry ground it seldom produces much fruit. It is therefore recommended to place it in warm situations; and if the earth is not naturally moist, there should be plenty of loam and rotten neat's dung laid about its roots, and in dry springs it should be plentifully watered.

Miller says, "These plants are tolerably hardy, and are seldom hurt, except in extreme hard winters, which many times kill the young and tender branches, but rarely destroy the roots; therefore, however dead they may appear after a hard winter, yet I would advise the letting them remain till the succeeding summer has sufficiently demonstrated what are living and what are dead." The arbutus trees may be propagated by layers, but they are principally raised from seed; and they require to be kept in pots for several years before they are ready for the plantation. We meet with a variety of this tree in our shrubberies with double blossoms, and another with red flowers. Aiton enumerates five different species of the arbutus, and there are several varieties of them in the Parisian gardens not to be seen in our shrubberies. The leaves of the arbutus are said to be usefully employed by tanners in preparing their leather. (*Phillips's Sylva Florifera.*)

This beautiful evergreen grows to the height of ten and fifteen feet. Its flowers, which are of a yellowish white or red colour bloom in September, October, and November, and are succeeded by the fruit, which remain till the flowers of the following year are full blown, thus giving the tree a beautiful appearance.

Propagate by layers made in the early spring, or by seed, which is still better, as soon as it has well ripened. Sow in pots of light earth exposed to the south-east till the seeds come up. Keep the pots in the house during the first winter, then plant out. The *Andrachne arbutus*, which comes from the Levant, is not so hardy as the above, but is very handsome in appearance, bearing large deep red flowers. Propagated by layers, or from seed, and the young plants preserved in pots for three or four years to gain strength. It likes a dry soil, and must be secured always from frost. (*L. Johnson.*)

ARCHANGEL. (*Lamium album.*) This is a very common plant growing by hedges, walls, highways, and in fields. It flowers all through the summer, and its leaves are very like the nettle leaf, only stingless. The flowers are large and white, and are placed at the joints of the leaves. This plant is of a hotter and drier nature than nettles. It is an admirable poultice, bruised with vinegar, to apply to wens, hard swellings, inflamed kernels under the ear, &c. The flowers dried, or made into conserve in May, is excellent for the whites, in all weakness, and in strangury. The red archangel, or red dead-nettle, is also common as the above. It grows about six or seven inches high only, and the flowers are like the white archangel, but small and reddish. This herb is used fresh, but it dries very well. The decoction is good in floodings, bleedings at the nose, and spitting of blood. A poultice of the red archangel draws out splinters and thorns, applied to wounds. (*L. Johnson.*) See Nettle, Dead.

ARCHDEACONS, are ecclesiastical officers, appointed first by Arshbishop Lanfranc, in 1075. The archdeacon ought to visit his jurisdiction, which extends through either the whole or a portion of the bishop's diocese, annually; and he has a court, where he may impose penances, suspend, excommunicate, prove wills, &c. It is the lowest of the ecclesiastical courts, and an appeal lies from it by the 24 H. 7. c. 12. to the Bishop. He has a ministerial duty to perform in swearing in churchwardens, which he must do gratis, except by custom (*Salk.* 330.), and he cannot reject a churchwarden legally elected by the parish. (*Rex* v. *Rice*, 1 Lord Ray. 138.; *Prideaux's Office of Churchwardens*; *Blackstone*, vol. i. 383. iii. 64.)

ARCHED. A term employed among horsemen. A horse is said to have arched legs when his knees are bent archwise. This only relates to the fore-quarters, and the infirmity sometimes happens to such horses as have their legs spoiled in travelling.

ARCHERY. (From *arcus*, Lat. a bow.) The archers of England were, in early days, celebrated amongst all the nations of the earth. The ancient British bows were made after the Saxon model, of elm, hazel, or yew; the arrows of fir tipped with bone, flint, iron, or steel. An English archer, says Blaine (*Enc. of Rur. Sports*), has been known to shoot twelve arrows in a minute into a circle not larger than a hat; and the cloth-yard arrows of the Cornish archers at 480 yards would pierce any ordinary armour. The invention of gunpowder has long since reduced archery to a mere pastime. The Toxopholite Society of London was founded by Sir Ashton Lever, in 1781. The Royal Artillery Company of London owe their origin to a body of noble and gallant archers, who formed the body-guard of Queen Elizabeth in the days of the armada. The Royal Company of Archers of Scotland, founded by the royal commissioners appointed to regulate the practice of archery, still exist; and in most counties of England toxopholite societies are now to be found. Modern bows are usually made from 5 feet to 5 feet 10 inches in length; the bow-strings of Italian hemp well twisted; the arrows of

r lime, and from 20 to 24 or 28
ngth.

MEDES'S PUMP. A kind of
w pump for raising water, so
Archimedes, who is supposed to
he inventor of it. This, though
nethod for raising water, is cer-
despicable one for the purposes
y drainage.

S. A provincial term employed
llowings, or frequent ploughings

ACEOUS. Any thing contain-

H. An Irish county, for an ac-
hose agriculture by Mr. Lind-
art. *Journ. of Agr.* vol. vii. p. 54.

F A HORSE. A term applied
r part of the fore-leg.

TO. See Annotta.

TIC. An epithet applied to
, and other bodies, as yield a
our, and have a warm spicy taste.

TIC REED. (*Acorus calamus.*)
n sweet-flag. A marshy peren-
f the easiest culture, flowering
till August, which grows among
oist ditches and watery places,
banks of rivers, but not very
ot, thick, rather spongy; leaves,
r three feet high, bright green,
h broad. It rarely flowers unless
water, but when it does bloom, it
a mass of very numerous, thick-
sh green flowers, which have no
t when bruised. Every part of
e is stimulant, and very aromatic,
ts are especially so. The dried
red is used by the country people
for curing the ague. It is af-
ossess carminative and stomachic
ving a warm, pungent, bitterish
is frequently used in preparing
ugh it is said to impart a nauseous
t is the *Calamus aromaticus* of the
Linnæus says, the roots powdered
ply the place of foreign spices.
r. vol. ii. p. 157.; *Paxton's Bot.*
lich's Dom. Encyc.)

See Arum.

T The French name for an

H, STINKING. See Orach.

V-GRASS. (*Triglochin.*) Peren-
herbs, of which there are two
marsh arrow-grass and the sea
s, both perennials, flowering from
ugust. They grow in wet boggy
nd salt marshes, &c. abundantly,
ry grateful to domestic cattle, the
ontaining a large proportion of
g. *Flor.* vol. ii. p. 200.)

V-HEAD. (*Sagittaria sagittifolia,* from *sagitta*, an arrow; because of the resemblance of the leaves to the head of that weapon.) An indigenous, aquatic, perennial herb, flowering in July or August. Root, tuberous, nearly globular, with many long fibres. It is industriously cultivated in China for its esculent properties: its mealy nature rendering it easily convertible into starch or flour. It is much relished by most cattle. Nothing is more variable than the breadth and size of the floating leaves, which are diminished almost to nothing when deeply immersed in the water, or exposed to a rapid current. Hence has arisen the several varieties mentioned by authors, but which the slightest observation will discover to be evanescent. This plant, especially the seed, was formerly supposed to possess medicinal properties, which time and improved knowledge have demonstrated to be imaginary. The leaves, however, feel cooling when applied to the skin; hence they have been used and may be serviceable as a a dressing to inflamed sores. (*Eng. Flor.* vol. iv. p. 144.; *Willich's Dom. Encyc.*)

ARSENIC. See Poison.

ARSMART, or WATER PEPPER. See Persicaria.

ARSON. Burning houses, &c. The 7 W. 4. & 1 Vict. c. 89. s. 3. enacts, says Mr. Archbold, "that whosoever shall unlawfully and maliciously set fire to any church or chapel, or to any chapel for the religious worship of persons dissenting from the United Church of England and Ireland, or shall unlawfully or maliciously set fire to any house, stable, coach-house, outhouse, warehouse, office, shop, mill, malthouse, hop-oast, barn, or granary, or to any building or erection used in carrying on any trade or manufacture, or any branch thereof, whether the same, or any of them respectively, shall then be in the possession of the offender, or in the possession of any other person, with intent thereby to injure or defraud any person, shall be guilty of felony, and, being convicted thereof, shall be liable, at the discretion of the court, to be transported beyond the seas for the term of the natural life of such offender, or for any term not less than fifteen years, or to be imprisoned for any term not exceeding three years."

ARTEMISIA. See Wormwoods.

ARTESIAN WELLS have been so named from the opinion that they were first used in Artois, in France. These wells have been found extremely beneficial in the low lands of Essex and Lincolnshire, and in some other districts where good water is scarce, and that of the surface of indifferent quality. Some practical knowledge of geology is necessary in order to fix with judgment upon the most eligible spot for sinking these wells, or else much labour and expense may be uselessly applied. They are formed by boring with a long auger and rod to such a depth into the earth, that a spring is found of sufficient power to rise to and run over the surface.

ARTICHOKE. (*Cynara.*) From *cinere*, according to Columella, because the land for artichokes should be manured with ashes. Parkinson derives it from the ash colour of its leaves. There are two varieties, — the oval green, or French, which is considered by Miller as *Cynara scolymus;* and the globe, or red, which he names *Cynara hortensis*. The latter is not only the largest and most fleshy, but the first has a taste so peculiarly perfumed as to be disagreeable to most persons not accustomed to it. Those plants produce the finest heads which are planted in a soil abounding in moisture, but in such they will not survive the winter. Nevertheless, some persons grow them here, and make a fresh plantation annually. To enable them to survive the winter, those for the supply of suckers, as well as those for a lasting production, must have a rich mouldy soil allotted to them. Manure must be applied every spring, and the best compost for them is a mixture of three parts of well-putrefied dung, and one part of fine coal-ashes. They should always have an open exposure, and, above all, be free from the influence of trees; for, if beneath their shade or drip, the plants spindle, and produce worthless heads. The artichoke is propagated by suckers, which are annually afforded by the parent plants in the spring. For planting, these must be slipped off in March or early in April, when eight or ten inches in height, with as much of their fibrous roots pertaining as possible. Such of them should be selected as are sound and not woody. The brown, hard part, by which they are attached to the parent stem, must be removed; and if that cuts crisp and tender, it is evidence of the goodness of the plant; if it is tough and stringy, the plant is worthless. Further, to prepare them for planting, the large outside leaves are taken off so low, that the heart appears above them. If they have been sometime separated from the stock, or if the weather is dry, they are greatly invigorated by being set in water for three or four hours before they are planted.

The plants should be set in rows four and a half feet by three feet apart, and about half their length beneath the surface. Water must be given them abundantly every evening until they are established, as well as during the droughts of summer, which will increase the vigour of the heads considerably. The only other attention they require during the summer is the frequent use of the hoe. They produce heads the same year, from July to October, and will continue to do so annually, if preserved in succeeding years, from May until June or July; consequently, it is the practice, in order to obtain a supply during the remainder of the summer and autumn, to make an annual plantation in some moist soil, as the plants are not required to continue.

As often as a head is cut from the permanent bed, the stem must be broken down close to the root, to encourage the production of suckers before the arrival of winter. In November or December they should receive their winter's dressing. The old leaves being cut away without injuring the centre or side shoots, the ground must be dug over, and part of the mould thrown into a moderate ridge over each row, close about the plants, but leaving the hearts clear. If this dressing is neglected until severe frosts arrive, or even if it is performed, each plant must be closed round with long litter or pea haulm: it is, however, a very erroneous practice to apply stable-dung immediately over the plants, previous to earthing them up, as it in general induces decay. Early in February all covering of this description must be removed. In March, or as soon as the shoots appear four or five inches above the surface, the ridges thrown up in the winter must be levelled, and all the earth removed from about the stock to below the part from whence the young shoots spring. All of these but two, or at most three of the straightest and most vigorous, must be removed, care being taken to select from those which proceed from the under part of the stock; the strong thick ones proceeding from its crown having hard woody stems, are productive of indifferent heads. Those allowed to remain should be carefully preserved from injury. Every other sucker must be removed and every bud rubbed off, otherwise more will be produced, to the detriment of those purposely left. These must be separated as far apart as possible without injury, the tops of the pendulous leaves removed, and the mould then returned, so as to cover the crowns of the stocks about two inches. Some gardeners recommend, as soon as the ground is levelled, a crop of spinach to be sown, which will be cleared off the ground before the artichokes cover it; but this mode of raising or stealing a crop is always in some degree injurious.

Although the artichoke, in a suitable soil, is a perennial, yet after the fourth or fifth year the heads become smaller and drier. The beds, in consequence, are usually broken

lapse of this period, and fresh
on another side.
f the spring-planted suckers
produce heads the same year,
ay be tied together and covered
so as just to leave their tops
on the arrival of frost, being
litter, so as to preserve them,
ford heads either during the
ry early in spring.
table, the artichoke is whole-
ot very nourishing; and as a
s of little use. Sir John Hill,
having known patients cured of
perseverance in this medicine
ut combining its virtues with
lant; but the statement of Sir
no value in the present day.
of the artichoke have the pro-
nnet in curdling milk. The
second crop of artichokes, when
cellent baked in meat pies, with
as they dress them in France.
son's *Kitchen Garden.*)
OKE, JERUSALEM. (*He-
rosus*, from Ἥλιος, *the sun*, and
wer.) It flourishes most in a
oil, with an open enclosure.
rticularly inimical to its growth.
ipens its seeds here, though it
metimes in October, the only
opagation is by planting the
tubers or cuttings of the large
two eyes being preserved in
se are best planted towards
March, though it may be per-
arly as February, or even in
l continued as late as the begin-
l.
planted by the dibble, in rows,
r two feet apart, and four inches
y make their appearance above
t the middle of May. The only
ecessary is to keep them free
, and an occasional hoeing, to
urface, a little of the earth being
out the stems. Some gardeners,
of July, or early in August, cut
f about their middle, to admit
the air and light; in other re-
y be beneficial to the tubers.
rs may be taken up as wanted
tember; and in October, or as
stems have withered, entire for
in sand, for winter's use. They
raised as unbroken as possible,
lest piece of a tuber will vege-
ppear in the spring; for which
are often allotted some remote
he garden; but their culinary
inly demand a more favourable
(*G. W. Johnson's Kitch. Gard.*)
CIAL GRASSES. See GRASSES.

ARUM. (*Arum maculatum.* Formerly written *aron.*) Common Cuckow-pint or Wake Robin. A native and hardy perennial, growing in shady places, ditch banks, and rough grounds; flowering in May and June. Root, tuberous; herb, of a shining green; leaves, stalked, broadly arrow-shaped, erect, spotted variously with black; flower, solitary, on a simple radical stalk, erect, pale green, with a red tint and some occasional spots; the naked summit of the stalk within dark purple, reported to give out, at the time of its perfection, a considerable degree of heat; berries scarlet, internally viscid, remaining long after the leaves and all parts of the flower have disappeared. Arum is known by the name of "lords and ladies," in many places. This genus contains some very handsome species, while others are only useful on account of their medicinal qualities: the flowers are generally very disagreeable, hence they are not favourites; they all succeed in any common soil, and increase with little trouble from offsets. Both the tuberous root and the leaves of this plant are extremely acrid in a fresh state. When dried and pulverised, the roots lose all their acrimony, and afford an almost tasteless farinaceous powder; from which, according to Withering, good bread may be prepared, as well as an excellent starch. Sir J. Smith also states, that the root "affords plenty of white, wholesome, nutritious flour, fit for making bread." In the island of Portland, on the Weymouth coast, where this plant is very common, a species of British arrow-root is manufactured from the grated root, in the same manner as potato starch is made. The French make a harmless cosmetic, called "Cyprus powder," from the dried and prepared root. (*Eng. Flor.* vol. iv. p. 146.; *Paxton's Bot. Dict.*; *Willich's Dom. Encyc.*)

ARUNDO. A genus of grasses in which a number of useful species was once comprehended; but in consequence of the altered views of botanists, regarding the limits of genera, it is now confined to the *Arundo donax*, and the species most nearly agreeing with it. These are grasses of considerable size, sometimes acquiring a woody stem, and found only in the warm parts of the world. (*Penny Cyclop.*)

Arundo arenaria. Sea-reed, marram, starr, or bent. The nutritive matter of this grass affords a large portion of saccharine matter when compared with the produce in this respect of other grasses. The *Elymus arenarius*, however, affords about one-third more sugar than the present plant. The quantity of nutritive matter afforded by the *Elymus arenarius* is superior to that afforded by the *Arundo arenaria*, in the proportion of 4 to 5. From experiments as to the produce, it would appear that the *A. arenaria* is unworthy of cultivation as food for cattle, out of the influence of the salt spray But from the habit of the plant in its natural place of growth, it is of great utility, particularly when combined with the *Elymus arenarius*, in binding the loose sands of the sea-shore, and thereby raising a natural barrier, the most lasting against the encroachments of the ocean upon the land. So far back as the reign of William III., the important value of the *Elymus arenarius* and *Arundo arenaria* was so well appreciated, as to induce the Scottish parliament of that period to pass an act for their preservation on the sea-coasts of Scotland. And these provisions were, by the British parliament in the reign of George II., followed up by further enactments, extending the operation of the Scottish law to the coasts of England, and in passing further penalties for its inviolability, so that it was rendered penal, not only for any individual, without even excepting the lord of the manor, to cut the bent, but for any one to be in possession of any within eight miles of the coast. This plant is likewise applied to many economical purposes, hats, ropes, mats, &c. being manufactured from it. (*Sinclair's Hort. Gram. Wob.*)

ASARABACCA. (*Asarum Europæum.*) An indigenous, but rather scarce, dwarf, perennial plant, growing in the northern wooded parts of this island. It produces curious bell-shaped flowers, of a dusky purple colour, which are frequently overlooked among the leaves, and blossoms in the beginning of May; root, creeping, entangled with numerous stout fibres, having a pungent odour when bruised; stems, very short and simple, each bearing two dark green, kidney-shaped leaves, and one drooping flower. The herb increases plentifully by seed without any care, as well as by division of the root. Any common soil suits them, but they prefer dry, shady situations. The leaves and roots are emetic, cathartic, and diuretic, but they are now out of use, except in farriery. The powdered leaves, however, are still in repute as a sternutatory, and form the basis of most cephalic snuffs. (*Eng. Flor.* vol. ii. p. 342.; *Paxton's Bot. Dict.*; *Willich's Dom. Encyc.*)

ASCARIDES. See WORMS, INTESTINAL.

ASH. (*Fráxinus excélsior.*) This tree was called by the Greeks *μελία*, and by some *μελία*. The Latins, it is thought, named it *Fraxinus, quia facilè frangitur*, to express the fragile nature of the wood, as the boughs of it are easily broken. We are thought to have given the name of ash to this tree, because the bark of the trunk and branches is of the colour of wood-ashes, whilst some learned etymologists affirm that the word is derived from the Saxon æsc. Virgil tells us that the spears of the Amazons were of this wood, and Homer celebrates the mighty ashen spear of Achilles. Many of the ancient writers highly extolled the ash. It has been asserted that serpents have such an antipathy to the ash that they will not approach even within its morning or evening shadows; and Pliny tells us (he says upon experience), that if a fire and serpent be surrounded by ash boughs, the serpent will sooner run into the fire than into the boughs. There are many other superstitious notions attached to the ash, which it would be foreign to our purpose to notice.

There are several varieties of the ash, among which are, 1. the weeping, which forms a beautiful arbour when grafted upon a lofty stem; it is said to have originated incidentally in a field at Garntingay, Cambridgeshire: 2. the entire leaved: 3. the curl-leafed, which has a dark aspect: and 4. the wasted.

Ash plantations have lately been formed in many parts of the kingdom to a very considerable extent. The Romans used the ash-leaves for fodder, which were esteemed better for cattle than those of any other tree, the elm excepted; and they were also used for the same purpose in this country, before agriculture was so well understood, and our fields clothed with artificial grasses. In Queen Elizabeth's time, the inhabitants of Colton and Hawkshead fells remonstrated against the number of forges in the country, because they consumed all the loppings and croppings which were the sole winter food for their cattle. In the north of Lancashire the farmers still lop the tops of the ash to feed their cattle in autumn, when the grass is on the decline; the cattle peeling off the bark as food. The Rev. Mr. Gilpin tells us, that in forests, the keepers make the deer browse on summer evenings on the sprays of ash, that they may not stray too far from the walk. The branches are frequently given to deer in time of frost. The ash-tree, in early days, served both the soldier and the scholar. It was also a principal material for forming the peaceable implements of husbandry, as it continues to be with us to this day, in the shape of carts, waggons, teeth and spokes of wheels, ploughs, harrows, rollers, &c. The gardener recognises it in his rake-stem, spade-tree, and other tool handles. The hop-planter knows its value for poles, the thatcher for spars, the builder for ladders, the cooper for hoops, the turner for his lathe, the shipwright for pulleys, the mariner for oars and ship-

the fisherman for tanning his nets and
his herrings; the wheelwright em-
t usefully, and the coach-maker pro-
whilst the cabinet-maker palms it
s as green ebony. The ashes of this
fford very good potash, and the bark
l in tanning calf-skins, and dyeing
black, and blue. The ash-keys were
ly gathered in the green state, and
with salt and vinegar, and served to
r sauce.

e we to transcribe all we have seen
on the medicinal virtues of this
t might naturally be asked how it hap-
at we do not meet our ancestors upon
who had in this tree a cure for every
? The Arabian as well as the
and Roman physicians, highly extol
dicinal properties of the seed which
ing named *lingua avis*, bird's tongue,
t resembles. Drs. Taner, Robinson,
wles, are amongst the later physicians
mmend the good qualities of this
eed. The common ash propagates
lentifully by the seed, so that abun-
f young plants may be found in the
urhood of ash-trees, provided cattle
t suffered to graze on the land.
duces its leaves and *keys* in spring,
e seeds ripen in September. The
changes its colour in October. (*Bax-
b. Ag. Kn.*; *Phillips's Syl. Flor.*)

HES. (Goth. *atzgo*, *azgo*, dust; Sax.
Dutch and Germ. *asche*; Su. Goth.
"*Ashes* contain a very fertile salt,
re the best manure for cold lands,
dry, that the rains doth not wash
their salt." (*Mort. Husb.*; *Todd's
n.*)

use of ashes may be traced to a very
age. The Romans were well ac-
ed with paring and burning. Cato
mends the burning of the twigs and
es of trees, and spreading them on
nd. Palladius says, that soils so
l would require no other manure for
ars. They also burnt their stubbles,
tice common among the Jews. The
t Britons, according to Pliny, used
rn their wheat-straw and stubble,
pread the ashes over the soil. And
dus Heresbachius, a German coun-
in his *Treatise on Husbandry*, pub-
in 1570, which was translated by
, tells us, p. 20., that "in Lombardie,
ike so well the use of ashes, as they
it farre aboue any doung, thinking
not meete to be used for the unhol-
se thereof."

the earthy and saline matters of the
soils, and combustibles employed,
constitute the substance of the ashes
yed in agriculture. Their use as a manure is very general in most parts of England, although many errors are usually committed in their application, and much erroneous reasoning wasted in accounting for their unsuccessful application in some districts, or their general success in others. Those usually employed for agricultural and horticultural purposes in this country are, 1. the ashes of coal; 2. ashes of wood; 3. peat ashes; 4. the ashes from turf, as in paring and burning; 5. the ashes of burnt clay; 6. the ashes from soap-boilers. I will remark upon these, in the order in which I have enumerated them.

1. *Coal ashes.*—The only analysis of coals that I am acquainted with is that of earth-coal, by M. Klaproth: he found it to be composed of—

Volatile matter	62·25	= 82·5
Charcoal	20·25	
Lime	02·00	= 17·5
Sulphate of lime	02·05	
Oxide of iron	01·00	
Alumina	00·05	
Sand	11·05	
		100

The combustion of the coals dissipates almost all the gaseous matters, and much of the charcoal; and the ashes, therefore, will consist almost entirely of the various earths, a small portion of charcoal, and the saline matters, of which the sulphate of lime (gypsum) and lime constitute about a fourth.

The presence of these last-named substances gives to the coal-ash almost all its value as a fertilizer, for these ashes are always most beneficially applied to those crops which contain sulphate of lime in sensible quantities, such as to lucern, sainfoin, red clover, &c. In the garden, they are more often employed for the purpose of forming walks, and to prevent the ravages of garden mice, than as a manure; or, when they are employed as an addition to the soil, it is generally in considerable quantities, on stiff clay soils, with the intention, by the mechanical operation of the cinders, of rendering the soil more friable and permeable by the gases of the atmosphere. As a top dressing for lucern, red clover, sainfoin, and other grasses, there is no application superior to coal ashes. This fact was clearly proved in some comparative experiments made by Lord Albemarle, with a variety of manures, as a top dressing for sainfoin. He found coal ashes far superior in value to any other fertilizer. As a manure for gardens, it is generally employed in quantities much too large; and thence an idea has been entertained by many gardeners, that coal ashes are inimical to plants and trees. Mr. Loudon has given several experiments of this description. In these, one gardener imbedded his potted chrysanthemums, by placing a "large handful" at the bottom of each of his pots, and then was surprised that other pots, not thus partly filled, produced better plants. Another "horticultural friend" states the case of a Scotch gardener, who "coated over," for two successive years, his garden with coal ashes; and then our experimentalist, who was, doubtless, a persevering character, finding that, with this over-dose of cinders, the "fruit trees did not thrive so well as he expected," actually took them up, and placed under them a "substratum of ashes, in order to lay them," as he said, "dry and comfortable." The trees of course grew worse, and were taken up. (*Gard. Mag.* vol. vi. p. 224.) It is to be lamented that such trials as these are ever brought forward; they are merely sources of erroneous conclusions, and strong proofs of the ignorance of those who have thus been wasting their master's time and property.

Mr. Loudon has, in another place (*Gard. Mag.* vol. ii. p. 406.), given some experiments of a very different character, which I shall give in his correspondent's own words: — "I sowed, on the 15th of May, 1826, three rows of Swedish turnips. No. 1. was manured with well-rotted dung from an old melon bed. No. 2. with the tops of cabbages just come into bloom. No. 3. with coal ashes. They vegetated about the same time, but the row manured with the cabbage-tops seemed to suffer most from the drought; the season being hot and dry, they made little progress until the end of August, and in November they were a middling, or rather a bad crop. The row manured with coal ashes had, all along, a more luxuriant appearance than the other two. The rows were 20 yards in length, 3 feet apart, and 15 inches from plant to plant in the row. I took them up in February, and they weighed as follows: — No. 1. 78 lbs.; No. 2. 88 lbs.; No. 3. 121 lbs.; which is very much in favour of the coal ashes." It may be remarked, that sulphate of lime, which abounds in coal ashes, is found in very sensible quantities in turnips. In the garden, coal ashes are very useful when spread over the surface, to prevent the depredations of garden mice; they cannot burrow through them; and, in the case of early sown peas, it will be found that the peas covered on the surface of the ground, with coal ashes, say a quarter, or half an inch in thickness, will be three or four days earlier than those to which the ashes have not been applied. This may be attributed to the greater heat absorbed from the sun by the black coal ashes.

Wood Ashes.—The wood of various trees, &c., has been analysed by M. Saussure, jun.; the following was the result (*Chem. Rec. Veg.*): —

	Parts of Ashes.
1000 parts of the dry wood of a young oak yielded - - -	2
1000 ditto of the bark of oak - -	60
1000 ditto of perfect oak wood -	2
1000 ditto of poplar wood - -	8
1000 ditto of poplar bark - -	72
1000 ditto of wood of hazel - -	5
1000 ditto bark of ditto - - -	62
1000 ditto wood of mulberry - -	7
1000 ditto bark of ditto - - -	89
1000 ditto wood of hornbeam - -	6
1000 ditto bark of ditto - -	134
1000 ditto wood of horse chestnut -	35
1000 ditto straw of wheat - -	43
1000 ditto branches of the pine -	15

100 parts of these ashes were found to consist of the following substances in varying proportions. I have arranged the results in a tabular form, by which my readers will readily ascertain the composition of the ashes procured by the combustion of various woods, barks, &c.: —

	Soluble Salts.	Earthy Phosphates.	Earthy Carbonates.	Silica.	Metallic Oxides.	Loss.
100 parts of ashes of young oak dry wood, contain - -	26·	28·5	12·25	0·12	1·	·38
Bark of ditto, ditto -	7·	4·5	63·25	0·25	1·75	22·75
Perfect oak wood, do.	38·6	4·5	32·	2·	2·25	20·65
Poplar wood, ditto -	—	16·75	27·	3·3	1·5	24·5
Poplar bark, ditto -	6·	5·8	60·	4·	1·5	23·2
Wood of the hazel, do.	24·5	35·	8·	0·25	0·12	32·2
Bark ditto, ditto - -	12·5	5·5	54·	0·25	1·75	26·
Mulberry wood, ditto (Cut in November.)	21·	2·25	56·	0·12	0·25	20·38
Bark of ditto, ditto -	7·	8·5	45·	15·25	1·12	23·13
Wood of hornbeam -	22·	23·	26·	0·12	2·25	26·63
Bark ditto - -	4·5	4·5	59·	1·5	0·12	30·38
Wood of chestnut -	9·5	—	—	—	—	—
Straw of wheat - -	22·5	6·2	1·	61·5	1·	7·8
Branches of the pine	15·	—	—	—	—	—

The soluble salts of these ashes are chiefly carbonate and muriate of potash. The earthy phosphates are the phosphates of lime and magnesia (or the principal salt of bones); the earthy carbonates are those of lime (chalk), and magnesia; silica is the pure earth of *flint;* and the oxides were those of iron and manganese.

The cultivator will readily see, by the results of these valuable investigations, the reason why wood ashes are so much superior to those from coal as a manure. The ashes from wood, he will notice, contain a very considerable proportion of the phosphates of lime and magnesia; those from the hazel, containing 35 per cent. and those from the wood of young oak 25 per cent. essential vegetable ingredients, of which the

n coal are entirely destitute. The
e of lime, it will be remembered, is
fertilizing constituent of bones, in
uable manure it is invariably pre-
proportions varying from 37½ per
e bones of the ox, to 35 per cent.
f the hare. Wood ashes also con-
siderable proportion of carbonate
, a salt which is more or less pre-
ll vegetable substances, and for
erefore, it must be highly service-
food. The carbonate of potash,
otes the dissolution of dead vege-
stances, and it also, from its attrac-
isture from the atmosphere, must
an increased supply to the soil.
es are often very judiciously added
n manure, the quality of which is
roved by the mixture. The leaves
when burnt, generally produce
s, or pot ashes as they are called,
ng formerly produced by burning
substances in large open pots,)
branches, and the stem of the tree
of all; herbs produce four or five
d shrubs three or four times, as
either. All vegetables produce
es if burnt when green than when
previously dried. Davy (*Lectures*,
as given a table of the quantity of
s furnished by the combustion of
ommon vegetable substances, which
ere insert, as the cultivator will see
t there is a very remarkable dif-
n the quantity produced by equal
f different trees and plants.

			Parts of Pot Ashes.
parts of the	poplar	produced -	7
—	beech	—	12
—	oak	—	15
—	elm	—	39
—	vine	—	55
—	thistle	—	53
—	fern	—	62
—	cow thistle	—	196
—	beans	—	200
—	vetches	—	275
—	wormwood	—	730*
—	fumitory	—	790

Ashes.—Peat ashes are made in
rts of England for the use of the
by burning peat in large heaps, after
een sufficiently dried by the heat of
; and for grass lands and turnips
ve been found a very valuable
They are usually applied as a top
. The composition of peat ashes
early resembles that of coal ashes,
se from wood or vegetables—which
lt hardly to be expected, when we
that the immense beds of peat, or turf, as it is sometimes called, which are dispersed over Britain, are evidently composed of the remains of vegetable substances; trunks of trees, leaves, fruits, stringy fibres, the remains of water mosses, &c., and this in some places to a depth of 15 yards. Peat ashes were analysed by Davy, with much care: he came to the conclusion that they owe most of their fertilizing properties to the presence of gypsum (or sulphate of lime). In the Berkshire and Wiltshire peat ashes, he discovered a considerable portion of it. The Newbury peat ashes he found to be composed of from one-fourth to one-third gypsum, and in the peat ashes of Stockbridge, in Hampshire, a still larger proportion of the same substance. The other constituents of peat ashes are calcareous, aluminous, and silicious earths, with varying quantities of sulphate of potash, a little common salt, and occasionally oxide of iron, especially in the red varieties of peat ashes.

"These peat ashes," said Davy, "are used as a top dressing for cultivated grasses, particularly sainfoin, clover, and rye grass. I found that they afforded considerable quantities of gypsum, and probably this substance is intimately combined as a necessary part of their woody fibre; if this be allowed, it is easy to explain the reason why it operates in such small quantities; for the whole of a clover or sainfoin crop on an acre, according to my estimation, would afford, by incineration, only three or four bushels of gypsum. In examining the soil in a field near Newbury, which was taken from below a footpath, near the gate, where gypsum could not have been artificially furnished, I could not detect any of this substance in it, and at the very time I collected the soil, the peat ashes were applied to the clover in the field. I have mentioned certain peats, the ashes of which afford gypsum; but it must not be inferred from this, that all peats agree with them. I have examined various peat ashes, from Scotland, Ireland, Wales, and the northern and western parts of England, which contained no quantity that could be useful; and these ashes abounded in silicious, aluminous earths, and in oxide of iron. Lord Charleville found in some Irish peat ashes, sulphate of potash. Vitriolic matter is usually found in peats; and if the soil or substratum is calcareous, the ultimate result is the production of gypsum. In general, when a recent potash emits a strong smell resembling that of rotten eggs (sulphuretted hydrogen), when acted upon by vinegar, it will furnish gypsum." (*Agric. Chem.* p. 336.)

In the valley of the Kennet, in Berkshire, where the peat ashes are made in very considerable quantities, and are used by the

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potash was formerly called " salt of worm-farmers as a manure for both grass and turnips, they are sold at three-pence per bushel, and are applied at the rate of 40 or 50 bushels an acre broadcast. On most grass lands there is no dressing equal to them; and on some soils, near to Hungerford, they produce the most luxuriant crops of grass, in cases where the effects of common farm-yard manure are hardly perceptible. As a manure for turnips, they answer best in wet seasons. In very dry weather, the crops growing on the ashed land are described by the farmers as putting on a "*burned*" appearance.

Peat ashes are extensively employed in Flanders as a manure; they are carefully preserved by the householders, who burn turf or peat, and are sold to the farmers by the bushel, in the same way that those of Newbury are in this country. Their use is chiefly confined to clover, for which purpose they are an excellent top dressing. Mr. Radcliffe, in his *Agriculture of Flanders*, has given an analysis of these ashes, from which the farmer will see they owe nearly all their fertilising properties to the presence of 12 per cent. of gypsum. 100 parts are composed of—

Silicious earth	32
Sulphate of lime	12
Sulphate and muriate of soda	6
Carbonate of lime	40
Oxide of iron	3
Loss	7
	100

Paring and burning Ashes.—This is hardly the place to enter into the often argued and yet undecided question, as to the advantages of paring and burning. It is pretty universally agreed, that the practice is highly injurious to sandy soils, beneficial to clay lands, and still more advantageous to those of a peaty description; that is, to soils where there is an excess of inert vegetable remains. The cultivator of the soil will see, by the results of the analysis by Davy, of the ashes produced by the paring and burning of three different descriptions of soil, the usual products of paring and burning. 200 grains of the ashes from paring and burning a chalk soil in Kent, yielded that great chemist

80	grains of	chalk,
11	—	gypsum,
9	—	charcoal,
15	—	oxide of iron,
3	—	saline matter, consisting of sulphate of potash, muriate of magnesia, and vegetable alkali,
82	—	alumina (clay), and silica (flint).
200		

According to the estimate of Mr. Boys, who has published a treatise upon paring and burning, it appears that, on the chalk soils of Kent, about 2660 bushels of ashes are usually produced by paring and burning an acre of ground, and that this quantity of ashes, which he calculates will weigh 172,900lbs., will contain

Chalk	69,160 lbs.
Gypsum	9,509
Oxide of iron	12,967
Saline matter	2,594
Charcoal	7,781

The second specimen of ashes was from a soil at Coleorton, in Leicestershire, composed of three-fourths sand, one-fourth clay, and about 4 per cent. of chalk.

100 grains of the ashes yielded

6	grains	charcoal,
3	—	common salt, sulphate of potash, and a trace of vegetable alkali,
9	—	oxide of iron,
82	—	sand, clay, and chalk.
100		

The third variety of ashes was produced by paring and burning a stiff clay soil at Mount's Bay, in Cornwall.

100 grains of these were found to contain

8	grains of	charcoal,
2	—	common salt, and other saline matters,
7	—	oxide of iron,
2	—	chalk,
81	—	clay and sand.
100		

Such are the ashes from paring and burning. The cultivator of the soil will judge whether any of these products are required by his land, and whether all the good results of paring and burning might not be generally obtained by other means, without destroying that large portion of the vegetable matters of the turf destroyed during combustion. In those cases, however, where it is practicable to transfer the ashes produced by paring and burning a chalk soil to a clay, or, *vice versa*, the ashes of a clay soil to a chalk, the result must, in general, be highly and permanently beneficial to both.

The Ashes of burnt Clay.—The composition of the ashes of burnt clay, although varying according to the earthy proportions of the soil, will be found pretty generally to accord with the analysis of the ashes from the clay soil, from Mount's Bay, given above under the head, *Paring and burning Ashes.* Clay burning is practised with decided success in many districts of England, and, in every point of view, is by far the most eligible mode of producing ashes for manure; for the soil of the field is not thereby impoverished of its vegetable remains, the clay which is burnt being generally procured from ditches, banks, hedgerows, &c. The account of clay burning, given several years since by General Vavasour, of Melbourne Hall, in Yorkshire, is so practical and satisfactory, that I cannot do better than quote his own words:—"I would recommend to a beginner, that the kiln should be made small, about three yards wide, and six yards long in the inside; as he becomes more skilful, they may be made larger. The walls of the kiln are to be made of sods, two feet thick at the bottom, and one foot thick at the top, leaving two flues on each side, and one at each end, about one foot square; these walls may be built at *first* four feet high. We then put in the wood, beginning with the larger pieces at the bottom, particularly near the flues, supported by sods to keep them open, adding tops of firs, or any brushwood, until the kiln is nearly filled. It might be burnt with coal or peat, if more convenient. Cover the wood with a layer of clay taken from some bank or ditch in the field, and which has been digged some time before to dry; it is not necessary that it should be very dry. The fire is then to be lighted at the flue, by means of straw previously placed there. The greatest care is required, that the fire shall not escape at the top; but fresh clay constantly thrown on, wherever it seems likely to burn out, at the same time not overloading the kiln, so as to put out the fire. As the quantity of clay is increased, the walls should be raised, keeping them a foot higher than the clay. About six feet will be as high as can be conveniently burned. The chief art seems to be, to procure a great mass of fire at first, and to let the fire rise through the clay as you go on, to let it smoke in every part at the top, but not to burn out. My men, who burn by contract, watch the kilns by night and day. I have applied the ashes almost exclusively for wheat, upon a clay soil, spreading them on a fallow after the last ploughing, and harrowing them in with the seed, at the rate of 30 tons per acre, on 90 acres. The longer the ashes remain upon the land, before harrowing, the better, that the lumps may fall, and mix with the soil. If the walls are well made, one end may be taken down, and, after the kiln is emptied, rebuilt for a second burning; if not likely to stand, they may be entirely burned in a succeeding kiln. If the weather should not be moist, the kilns will burn for some weeks, as the clay will continue hot long after the wood is consumed."

Clay ashes have been used to a very considerable extent by Mr. Hewitt Davis, of Spring Park, near Croydon, on several of his farms, and with the most decided success. This excellent farmer and land-agent has the clay dug out in spits, that it may be more readily dried. He burns in heaps; and employs as fuel, collections of hedge-clippings, furze, &c.; and these he thinks it best not to use in too dry a state, since one great object in clay-burning, he is of opinion, is, to produce a steady mouldering heat, not too fast. A fire, therefore, should not be suffered to flame. The fire in the heaps usually works against the wind, when those heaps are properly made. He applies about 150 bushels of the ashes per acre; pays 1*d.* to 1½*d.* per bushel, for burning; dressing with them with great advantage all kinds of soil, for turnips, &c.

Mr. Poppy, of Witnesham, in a pamphlet published in 1830, after giving various directions for burning clay, adds:—"Salt (the only inexhaustible universal manure, besides burnt earth,) does not increase the bulk of straw; and although it may be, and is, beneficial to corn, it will not be very extensively used, because its benefit is not apparent to the eye: burnt earth produces an abundance of straw. I have seen the corn so luxuriant on the sites of the heaps, where due caution was not used in laying a floor of earth under the fire, that it was rotted on the ground, and destroyed the clover plant. I have seen the beans on the site of a burnt-earth heap even too luxuriant; and potatoes and mangel wurzel a double produce to the rest of the crop. There is no limit to burning earth on stiff clay soils, because *the most sterile subsoil* brought up purposely by the plough will, by the action of fire, be converted into useful manure. If it is converted into *staple*, it increases the depth of titheable soil, and acts both physically and mechanically." The Suffolk plan of clay-burning is similar to that adopted in Yorkshire. "The common mode of burning earth is to dig old borders, surfaces of banks, &c.; turn it over, and, when dry, cart it to a heap, and burn; formerly much wood was used, but haulm, straw, dry weeds, and a few bushes, whins, or any thing of that kind, may be employed; then build a circular wall of turfs around it, cover the heap slightly with turfs and earth, and set fire to it in several places; feeding with the most inflammable materials at first, afterwards clay or any earth will burn; when all the earth is on the heap, the walls may be pulled down and thrown on, raising it by degrees as the fire ascends, in the shape of a cone, till all is consumed."

The expense of this kind of clay-burning is thus estimated by Mr. Poppy:—

	£	s.	d.
Labour, digging, and burning 100 loads, at 9*d.* per load	3	15	0
Filling 1*s.* 6*d.* per score—7*s.* 6*d.*; carting, three horses, and two carts, 16*s.*	1	3	6
Filling and spreading after burning, 3*d.* per acre	0	15	0
Carting, and laying out over two acres	0	16	0
Total per 100 loads	£ 6	9	6

Or 3*l.* 4*s.* 9*d.* per acre for 50 loads, or 1*s.* 4*d.* per load.

Clay-burning, according to Mr. Poppy, is certainly not a modern Suffolk improvement. "I have constantly seen it practised for half a century; and the oldest man I ever conversed with on the subject, spoke of it as common as long as he could remember. I have a workman on the farm, who is, I think, upwards of eighty years of age, and has always followed the vocation of burning earth."

The Ashes from Soap Boilers.—Soap boilers' ashes are a mixture of a peculiar description; they are principally the insoluble portion of the barilla, pot ashes, or kelp, employed in soap-making, mixed with cinders, lime, salt, and other occasional additions; and also with muriate of potash, common salt, and other saline matters.

The quantity of pearl and pot ashes imported into the United Kingdom is very considerable; in 1837, it amounted to 147,329 cwts.; in 1838, to 127,101 cwts.: of barilla, and alkali, in the same year, were imported 102,135 cwts. and 72,587 cwts. (*M'Culloch's Dictionary of Commerce.*)

The insoluble portion of barilla consists principally of lime, charcoal, sand, and oxide of iron. The insoluble portion of potash, or *ashes*, as they are denominated by the trade, will consist of a considerable portion of the same ingredients, added to a varying portion of phosphate of lime. Much difference of opinion has subsisted among farmers, with regard to the advantages of soap-makers' ashes. It has been recommended as very useful upon strong, cold soils, on peat moss, and on cold wet pastures. The quantity recommended to be applied per acre, by Arthur Young, was 60 bushels for turnips; to be harrowed in with the seed. For wet grass lands, six loads per acre. For wet arable soils, seven loads per acre. He describes the immediate effects as very great. For poor loamy land, ten loads per acre: the effect very satisfactory. Dr Cogan, who has written a paper on the uses of soap ashes, has given this letter of one of his correspondents, whom he describes as a plain, sensible farmer:—"My experience of soapers' ashes is confined to the application of it as a top dressing on pasture land. About 12 years ago, I agreed with a soap boiler for 1500 tons of soapers' ashes. I used to apply about 20 waggon loads per acre, and a single bushing would let the whole in. I was laughed at, and abused by every body, for my folly: these wiseacres alleging that my land would be burned up for years, and totally ruined; all which I disregarded, and applied my soapers' ashes every day in the year, reeking from the vat, without any mixture whatever.

"I tried a small quantity (say six acres), mixed up with earth; but I found it was only doing things by halves. My land never burned, but, from the time of the application, became of a dark green colour, bordering upon black, and has given me more, but never less than two tons per acre, ever since, upon being *hayned*, forty-two days, viz. from May 31. to July 11. The ground I so dressed was twenty-four acres; and I have had 120 sheep (hogs of the new Leicester breed) on the ground, from last August to this day (March 2.); but I allowed them plenty of hay: and although they were culled in August last, as the *worst* I had out of 700 lambs, and selected for this ground, on purpose to push them, they are now as good as the best I have."

As by far the most considerable portion of soap ashes is lime and chalk, wherever lime or calcareous matter is a fertiliser to the soil, soap-makers' ashes will generally, if not invariably, succeed; but they must be applied in quantities nearly as large as if lime was employed.

Such are the chief agricultural properties of the various ashes hitherto employed in agriculture. The research is, however, by no means nearly exhausted, for these fertilisers have showed the fate generally attendant upon all agricultural or horticultural investigations: they have been lauded as equally beneficial to every description of soil, and in all situations; or they have been condemned, with equal folly, by the results of blundering trials—begun in ignorance, continued without care, and perhaps nearly forgotten in the hurry of a conclusion.

They furnish ingredients, such as the carbonate of lime, carbonate of potash, charcoal, phosphate of lime, sulphate of lime, &c., which, in limited quantities, enter into the composition of all plants, as an absolute constituent part; and for these they must, according to the natural deficiency of the soil in these ingredients, be extremely useful. They absorb moisture from the nosphere, too, in quantities much superior what is generally believed, and in this perty the ashes of burnt clay and coal es considerably exceed both chalk, lime, sum, and even crushed rock salt, as will seen by the result of the experiments en under the head MANURES.

Some very valuable comparative expe- ents on the influence of ashes upon the wth of potatoes were made by the Rev. mund Cartwright, of Hollenden House, Kent. (*Com. Board of Agric.*, vol. iv. 370.) "The soil on which these experi- ents were made was previously analysed: 0 grains gave —

"Silicious sand, of different degrees of fineness - -	280 grs.
Finally divided matter - -	104
Loss in water - - -	16
	400

The finally divided matter contained —

"Carbonate of lime - - -	18 grs.
Oxide of iron - - -	7
Loss by incineration (probably vegetable decomposing matter)	17
Silex, alumina, &c. - - -	62
	104

"It will appear," says Mr. Cartwright, from the above analysis, that these expe- iments could not have been tried upon a il better adapted to give impartial results; r of its component parts there is no in- edient (the oxide of iron possibly ex- pted) of sufficient activity to restrain or gment the peculiar energies of the sub- nces employed." The beds were laid t and planted on the same day, the 14th April; they were manured as in the fol- wing table. These beds were each 40 rds in length, and one yard wide. Every d was planted with a single row of po- toes, "and, that the general experiment ght be conducted with all possible accu- cy, each bed received the same number of ts." The potatoes were taken up on the st of September, when the produce of the ds were as follows: —

	Potatoes in Bushels.
nd without any manure produced, per acre - - -	157
— with 60 bushels of wood ashes -	187
— — 60 bushels of wood ashes, salt 8 bushels - -	217
— — peat 363 bushels - -	159
— — peat ashes 368 bushels, salt 8 bushels - - -	185
— — peat 363 bushels, salt 8 bushels	171

Another series of experiments was made by Dr. Cartwright, upon a cold, wet, tenacious clay, with burnt clay, wood ashes, and soot; in all of which the clay ashes had a decided superiority of effect. The following table shows the quantity of manure applied per acre, and the produce of the land thus fertilised. (*Trans. Soc. Arts*, vol. xxxvi.)

Per Acre.	Produce per Acre.				
	Swedes.		Potatoes.	Barley.	
	tons.	cwts.	Bush.	qrs.	lbs.
Burnt clay, 400 bushels -	25	2	480	4	4
Wood ashes, 100 bushels -	23	12	456	4	2
Soot — 50 — -	16	12½	432	4	2
Soil simple - - -	10	4	340	3	0

The operation of burning clay produces but a slight chemical alteration in the composition of the clay; its tenacity is merely destroyed, and a portion of soot and of carbonised animal and vegetable remains are diffused through the ashes; added to which, the ashes of the wood employed for the burning, which usually contain a quantity of phosphate of lime and potash, are mixed up with the mass. (*Johnson on Fertilisers*, 296.; *Brit. Farm. Mag.*, vol. i. p. 58.)

ASPARAGUS. (From the Greek *ασπαραγος*, a young shoot before it expands.) There are only two varieties, the red-topped and the green-topped; the first is principally cultivated. There are a few sub-varieties which derive their names from the places of their growth, and are only to be distinguished for superior size or flavour, which they usually lose on removal from their native place. The soil best suited to this vegetable is a black, fresh, sandy loam, made rich by the abundant addition of manure; it should be neither tenacious from the too great preponderance of clay, nor too dry from a superabundance of silica, but should be retentive of moisture chiefly by reason of its richness. To raise fine roots for hot-beds, they may be raised in a much moister soil (*Miller's Dictionary*); but for natural production this will not answer, as such plants are much shorter lived. The site of the beds should be such as to enjoy the influence of the sun during the whole of the day, as free as possible from the influence of trees and shrubs, and, if choice is allowed, ranging north and south. The subsoil should be dry, or the bed kept so, by being founded on rubbish or other material to serve as a drain. The space of ground required to be planted with this vegetable for the supply of a small family is at least eight rods, if less, it will be incapable of affording one hundred heads at a time (Marshall says six rods will afford this quantity), so that part must be kept two or three days after it is cut, especially in ungenial seasons, to allow time for the growth of more to make a sufficient number for a dish. Sixteen rods will, in general, afford two or three hundred every day in the height of the season. To raise plants the seed may be sown from the middle of February to the beginning of April; the most usual time is about the middle of March. The best mode is to insert them by the dibble, five or six inches apart and an inch below the surface, two seeds to be put in each hole; or they may be sown in drills made the same distance asunder, or broadcast. If dry weather, the bed should be refreshed with moderate, but frequent waterings, and if sown as late as April, shade is required by means of a little haulm during the meridian of hot days, until the seeds germinate. Care must be taken to keep them free from weeds, though this operation should never commence until the plants are well above ground, which will be in the course of three or four weeks from the time of sowing. If two plants have arisen from the same hole, the weakest must be removed as soon as that point can be well determined. Towards the end of October, as soon as the stems are completely withered, they must be cut down, and well putrefied dung spread over the bed to the depth of about two inches: this serves not only to increase the vigour of the plants in the following year, but to preserve them during the winter from injury by the frost. About March in the next year, every other plant must be taken up, and transplanted into a bed, twelve inches apart, if it is intended that they should attain another, or two years' further growth, before being finally planted out; or they may be planted immediately into the beds for production. It may be here remarked, that the plants may remain one or two years in the seed-bed; they will even succeed after remaining three, but if they continue four they generally fail: it is, however, nearly certain that they are best removed when one year old, for the earlier a plant can possibly be removed, the more easily does it accommodate itself to the change, and less injury is it apt to receive in the removal. Some gardeners sow the seed in the beds where they are to remain for production. This mode, too, has the sanction of Miller. The time for the final removal is from the middle of February until the end of March, if the soil is dry and the season warm and forward; otherwise it is better to wait until the commencement of April. The plan which some persons have recommended, to plant in autumn, is so erroneous, that, as Miller emphatically says, the plants had better be thrown away. Mr. D. Judd has mentioned (*Trans. Hort. Soc. Lond.*, vol. ii. p. 236.) a very determinate signal of the appropriate time for planting, which is, when the plants are beginning to grow: if moved earlier, and they have to lie torpid for two or three months, many of them die, or in general shoot up very weak.

Immediately that the buds begin to swell they should be removed, and this may easily be ascertained by occasionally opening the ground down to the stool. A successful experiment, tried by Mr. J. Smith, gardener to the Earl of Kintore, would evince that one year old asparagus plants may be removed even as late as June. The stems of his plants, at the time of removal in that month, were twelve or fifteen inches high: they were removed and treated with the greatest care, the earth being gently pressed round the root, and water given plentifully; but although the experiment perfectly succeeded, for none of them died, and although they surpassed in growth those left in the seed-bed — so much so, that they might have been cut from — yet still, for many reasons, we are justified in considering that this must have been tried under accidental or very favourable circumstances of soil and season, and it requires repeated experiments from different counties before the practice is confirmed. (*Caled. Hort. Mem.*, vol. i. p. 71.) In forming the beds for regular production, it is customary to have them four or five feet wide. In the first instance, they have three rows of plants, in the latter four. The site of the bed being marked out, the usual practice is to trench the ground two spades deep, and then to cover it with well rotted manure from six to ten inches deep; the large stones being sorted out and care taken that the dung lies at least six inches below the surface. To mix the manure with the soil effectually, Mr. D. Judd, before mentioned, trenches his ground two feet deep, three times successively during the autumn or winter, at intervals of a fortnight, and then lays it in ridges until wanted, performing the work in the absence of rain or snow: he justly observes, that the preparation of the soil is of more consequence to be attended to than all the after management. (*Trans. Hort. Soc. Lond.*, vol. ii. p. 234.) In France, however, where the beds are celebrated for the number of years they continue in production, a pit is dug five feet in depth, and the mould that is raised from it sifted, care being taken to reject all stones, even as small as a filbert; the best part of the mould is laid aside for making up the bed. The bed is then formed as follows, beginning at the bottom; six inches deep of common manure — eight of turf, very free from stones — six of manure — six of sifted earth — eight of turf—six of very rotten dung — eight of best earth; finally, this last layer of mould is well incorporated with the adjoining

ing. The bed is then ready for the of the plants. (*Dr. M'Culloch, in . Hort. Mem.*) The plants being m the seed-bed carefully with a rolonged dung-fork, with as little the roots as possible, they must be ate and even together, for the sake nience whilst planting, the roots t to entangle, and cause much nd injury in parting them. They e exposed as short a time as posthe air; and to this end it is advis- eep them until planted in a basket, tle sand, and covered with a piece The mode of planting is to form narrow trenches five or six inches a foot apart, cut out with the spade, ide of each drill being made per- r, and against this the plants are ced, with their crowns one and a wo inches below the surface, and ches asunder: in France eighteen ed. The roots must be spread out he form of a fan, a little earth being er each to retain it in its position e row is proceeded with. If the ve begun to shoot, it is the practice to remove the sprouts, and with aution the planting is successfully d as late as July, and if any of those h were first planted they are re- that season. This is a practice to ed as much as possible, for it obvi- st weaken the plants, and be par- detrimental to such young plants. ake of convenience, one drill should at a time, and the plants inserted red completely, before another is ed; the two outside drills must be inches from the side of the bed. e planting is completed the bed is htly raked over, and its outline dis- arked out. Care must be had never on the beds — they are formed o render that unnecessary—for every ding to consolidate them is injuri- from the length of time they have to without a possibility of stirring any considerable depth, they have a tendency to have a closer texture eneficial to vegetation. Water must occasionally in dry weather until the re established. The paths between are to be two and a half feet wide. out the year care must be taken to beds clear of weeds. In the latter October or commencement of No- the beds are to have their winter : the stalks must be cut down and away, and the weeds hoed off into s, care being taken not to commence e stems are at all green, for if they down whilst in a vegetating state, the roots are very prone to shoot again, and consequently are proportionably weakened. This habit might perhaps be taken advantage of in assisting our forcing this esculent: cutting down the summer-produced stems of such stools as are intended for the hotbed, a considerable time before they lose their verdant colour, would give them a natural tendency to shoot again, and consequently assist the effect of the artificial heat employed. It is generally recommended not to add any manure until the bed has been two or three years in production, and then only to apply it every other year; but I consider it much more rational to manure regularly every year from the time of forming the bed, though in less quantity than if done every other year. I put on about two inches' depth of well decayed hotbed. By this means a continued and regular supply of decomposing matter is kept up, which is not so perfectly effected by the usual mode; and from the experiments purposely instituted by Miller we learn that, on the richness of the ground and warmth of the season, the sweetness of asparagus depends; in proportion to the poverty of the soil, it acquires a strong flavour. The dung needs merely to be laid regularly over the bed, and, the weeds, as well as some manure, to be slightly pointed into the paths, some of the mould from which must be spread to the depth of two inches over the dung just laid upon the beds. In France the asparagus beds at this season are covered with six inches depth of manure and four of sea-sand if procurable, otherwise, of river-sand or fine earth. No forking is required; but the boundaries of the bed must be marked out distinctly, as they should be kept, indeed, at all times. In the end of March or early in April, before the plants begin to sprout, the rows are to be stirred between to a moderate depth with the asparagus fork, running it slantingly two or three inches beneath the surface, as the object is merely to stir the surface and slightly mix it with the dung. Great care must be taken not in the least to disturb the plants. Some gardeners recommend that the beds should only be hoed again, so fearful are they of the injury which may be done to the stools; but if it be done carefully as above directed, the fork is the best implement to be employed, as by more effectually loosening the soil, it is by far the most beneficial in its effects upon the plants. This course of cultivation is to be continued annually, but with thsi judicious modification, that earth be never taken from the paths after the first year, but these merely be covered with dung, and which is only to be slightly dug in; for every gardener must have observed, that the roots of the outer row extend into the alleys, and are consequently destroyed if they are dug over; and rather than that should take place, the beds should have no winter covering, unless mould can be obtained from some other source, as asparagus does not generally suffer from frost, as is commonly supposed. In May the beds are in full production of young shoots, which when from two to five inches high are fit for cutting, and as long as the head continues compact and firm. Care must be taken, in cutting, not to injure those buds, which are generally rising from the same root, in various grades of successional growth within the ground. The knife ought to be narrow pointed, the blade about nine inches in length, and saw-edged: the earth being carefully opened round the shoot, to observe whether any others are arising, the blade is to be gently slipped along the stalk until it reaches its extremity, where the cut is to be made in a slanting direction. It almost always occurs, that the same stool produces a greater number of small heads than large ones, but the latter only should be cut; for the oftener the former are removed, the more numerously will they be reproduced, and the stools will sooner become exhausted. Great attention must be paid to the seed. For the obtaining it, some shoots should be marked and left in early spring, for those which are allowed to run up after the season of cutting is over are seldom forward enough to ripen their seeds perfectly. In choosing the shoots for this purpose, those only must be marked which are the finest, roundest, and have the closest heads; those having quick opening heads, or are small or flat, are never to be left. More are to be selected than would be necessary if each stem would assuredly be fruitful; but as some of them only bear male or unproductive blossoms, that contingency must be allowed for. Each chosen shoot must be fastened to a stake, which, by keeping it in its natural position, enables the seed to ripen more perfectly. The seed is usually ripe in September, when it must be collected, and left in a tub for four or six weeks, for the pulp and husk of the berry to decay, when it may be well cleansed in water. The seeds sink to the bottom, and the refuse floats and will pass away with the water as it is gently poured off. By two or three washings the seeds will be completely cleansed; and when perfectly dried by exposure to the sun and air, may be stored for use. Some gardeners keep them in the pulp until the time of sowing, unless required to be sent to a distance.

To force Asparagus.—Such plants must be inserted in hotbeds as are five or six
years old, and appear of sufficient st
to produce vigorous shoots: when, ho
any old natural ground plantations
tended to be broken up at the proper s
some of the best plants may be selec
be plunged in a hotbed or any spare
of the stove bark-beds. When mor
ten years old, they are scarcely wort
ploying. To plant old stools for the
forcing crop, is, however, decidedly
neous; for, as Mr. Sabine remarks, if
are past production, and unfit to rem
the garden, little can be expected from
when forced. The first plantation for f
should be made about the latter end o
tember: the bed, if it works favourabl
begin to produce in the course of f
five weeks, and will continue to do
about three; each light producing in
time 300 or 400 shoots, and affording
thering every two or three days. To
a regular succession, therefore, a fres
must be formed every three or four
the last crop to be planted in March
early part of April: this will contin
production until the arrival of the n
ground crops. The last-made beds w
in production a fortnight sooner than
made about Christmas.

The bed must be substantial, and pr
tioned to the size and number of the
and to the time of year—being constr
of stable dung, or other material.
common mode of making a hotbed is u
followed; but, as Mr. Sabine remark
general appearance of forced asparag
December and the two following m
gives a sufficient indication of def
management. The usual mode he con
erroneous, inasmuch as that the roots
plants come in contact with, or are o
mass of fermenting matter; and the
of raising potatoes practised by Mr.
which will be hereafter stated, first sug
the plan for obviating this defect, and
been confirmed as correct by the succ
practice of Mr. Ross, gardener to E.
Esq., of Brentford, who, by plantin
asparagus in the tan of his exhausted
pits, which consist of eighteen inches' l
and over that the same depth of tan
applying hot dung, successively ren
round the sides, and thus keeping up
heat, produced in five weeks asparag
fine, and by admitting as much air a
sible during the day, of such good
and so strong, as nearly to equal the n
ground crops. It is the best practi
plant the asparagus in mould laid upo
tan, which, or some other porous mat
indispensable for the easy admission
heat from the linings. The bed mu
topped with six or eight inches of ligh

th. If a small family is to be supplied, ee or four lights will be sufficient at a e; for a larger six or eight will not be many. Several hundred plants may be erted under each, as they may be crowded close as possible together; from 500 to are capable of being inserted under a ee-light frame, according to their size. planting, a furrow being drawn the le length of the frame, against one side it the first row or course is to be placed, crowns upright, and a little earth drawn to the lower ends of the roots; then re plants again in the same manner, and continued throughout, it being carefully erved to keep them all regularly about inch below the surface: all round on edge of the bed, some moist earth must anked close to the outside roots.

f the bed is extensive, it will probably uire a violent heat; the frames must efore be continued off until it has be- e regular, otherwise the roots are liable e destroyed by being, as it is technically ed, *scorched* or *steam-scalded*. When heat has become regular the frames may et on, and more earth be applied by de- es over the crowns of the plants, until it uires a total depth of five or six inches. e glasses must be kept open an inch or , as long and as often as possible, with- t too great a reduction of temperature urring, so as to admit air freely and give at to the vapours, for on this depends the periority in flavour and appearance of shoots. The heat must be kept up by ings of hot dung, and by covering the ses every night with mats, &c. The perature at night should never be below , and in the day its maximum at 62°. In thering, for which the shoots are fit when m two to five inches in height, the finger d thumb must be thrust down into the th, and the stem broken off at the bottom. is excellent vegetable possesses some diu- ic properties. Its juice contains a pecu- crystallisable substance, which was dis- vered by Vauquelin and Robiquet, and ed by them *Asparagine*. It is hard, ittle, colourless, and in the form of rhom- idal prisms: its taste is nauseous. The coction of the plant is sometimes used on Continent as a diuretic; but it is rarely never prescribed in England. M. Dubois Paris has submitted asparagus berries to mentation, and procured a spirit from m by distillation, with which he makes excellent liqueur. (*Dict. des Drogues*; *W. Johnson's Kitchen Garden*, 81.; *Mil- 's Dictionary*; *Trans. Hort. Soc. Lond.* . ii. pp. 234. 263. 361.; *Dr. Macculloch*, *led. Hort. Mem.* vol. i.)

ASPEN TREE (*Populus tremula.*) This is a branch of the poplar family, which derives its Latin name from the incessant trembling of its leaves. The Greeks named it *κερκις*, from *κερκω*, the same as *strepitum do*, to creak. The English name is from the German *espe*, which is the general name for all poplars. The heart-shaped leaves adhere to the twigs by a long and slender stalk, the plane of which is at right angles to that of the leaf, and consequently allows them a much freer motion than other leaves that have their planes parallel with their stalks. This, with their cottony lining below, and their hairy surface above, causes that perpetual motion and quivering, even when we cannot perceive by other means the least breath of air stirring in the atmosphere. This trepidation is attended of course with a rustling noise, on which account country people often call it *rattler*. The aspen tree may be planted so as to ornament large grounds, but its effect is lost when crowded. When it meets the eye as a fore-ground to plantations of firs, it has both a pleasing and singular appearance, as its foliage changes with the wind from a silver grey to a bright green; for when the sight goes with the wind, it catches only the under side of the leaves which are covered with a pale floss; but when it meets the current of air, the tree presents the upper surface of its foliage to the view: thus its tints are as changeable as its nature is tremulous. Like its relative, the poplar, this tree is of speedy growth, and will thrive in any situation or soil, but worst in clay. It is cultivated to the greatest advantage on such as are inclined to be moist, without having much stagnant surface water. In such situations they sometimes grow to a considerable size. It is accused of impoverishing the land, and its leaves are charged with destroying the grass, whilst its numerous roots, which spread near the surface, will not, it is said, permit any thing else to grow. The wood is extremely light, white, soft, and smooth, but it is of little value as timber, being chiefly used for making milk-pails, wooden shoes, clogs, and pattens, &c. From its lightness it might, however, probably be used to advantage for the construction of common field-gates The bark is the favourite food of beavers, whilst the leaves and the stalks form the nourishment and birthplace of the *tipula juniperina*, a species of long-legged fly. The aspen tree will not bear lopping, like other species of the poplar. (*Phillips' Sylva Florifera.*)

ASPHODEL. (Lat. *Asphodelus luteus.*) Yellow king's spear. This is a very handsome perennial, growing four feet high. It blooms its brilliant yellow flowers in May, June, and July; it is raised easily from seed, sown upon a hot-bed, and afterwards multiplied by separating its roots. It likes a good moist soil. The *Asphodelus fistulosus* is an annual, bearing white starry flowers with purple lines on the outside, and flowering in July and August. This elegant tall plant grows so freely in our gardens that we may class it among our own productions. The leaves are long and narrow. The root is composed of several knobs.

ASS. (Fr. *Ane*; Ger. *Esel;* It. *Asino;* Lat. *Asinus.*) A well-known and useful domestic animal, whose services might be rendered even still more useful for various purposes of husbandry, if it were properly trained and taken care of. Buffon has well observed, that the ass is despised and neglected, only because we possess a more noble and powerful animal in the horse; and that if the horse were unknown, the care and attention which are lavished upon him, being transferred to his now neglected and despised rival, would have increased the size, and developed the mental qualities of the ass, to an extent which it would be difficult to anticipate, but which Eastern travellers, who have observed both animals in their native climates, and among nations by whom they are equally valued, and the good qualities of each justly appreciated, assure us to be the fact.

Indeed, the character and habits of these two quadrupeds are directly opposed in almost every respect. The horse is proud, fiery, and impetuous, nice in his tastes, and delicate in constitution: like a pampered menial, he is subject to many diseases, and acquires artificial wants and habits which are unknown in a state of nature.

The ass, on the contrary, is humble, patient, and quiet, and bears correction with firmness. He is extremely hardy, both with regard to the quantity and quality of his food, contenting himself with the most harsh and disagreeable herbs, which other animals will scarcely touch. In the choice of water he is, however, very nice; drinking only of that which is perfectly clear, and at brooks with which he is acquainted.

This animal is very serviceable to poor cottagers, and those who are not able to buy or keep horses; especially where they live near heaths or commons, the barrenest of which will keep the ass, who is contented with any kind of coarse herbage, such as dry leaves, stalks, thistles, briars, chaff, and any sort of straw. Animals of this sort require very little looking after, and sustain labour, hunger, and thirst, beyond most others. They are seldom or never sick; and endure longer than most other kinds of animals. They may be made useful in husbandry to plough light lands, to carry burdens, to draw in mills, to fetch water, cut chaff, or any other similar purposes. Th are also very serviceable in many cases f their milk, which is excellent for those wh have suffered from acute diseases, and ar much weakened; and they might be of muc more advantage to the farmer, were the used, as they are in foreign countries, for th purpose of breeding mules.

The subjugation of the ass appears, fro the records of the Bible, to have precede that of the horse; and we infer from th same authority, that this subjugation too place prior to that of the dog.

The structural differences between the horse and the ass are trifling; perhaps that on which the very different tones emitted by the voice depends is one of the most striking. In all other essential points the organisation of the horse and ass is the same and, with the exception of the lengthened ear of the ass, their form, size, and proportions in a wild state, they differ but little; consequently, they possess conditions more favourable to the multiplication of specie than those afforded by any other nearly allied animals. The ass is, properly speaking, a mountain animal; his hoofs are long and furnished with extremely sharp rims leaving a hollow in the centre, by which means he is enabled to tread with more security on the slippery and precipitous sides o hills and precipices. The hoof of the hors on the contrary, is round and nearly fla underneath, and we accordingly find that h is most serviceable in level countries; and indeed experience has taught us that he i altogether unfitted for crossing rocky and steep mountains. As, however, the more diminutive size of the ass rendered him comparatively less important as a beast of burthen, the ingenuity of mankind early devised a means of remedying this defect, by crossing the horse and ass, and thus procurin an intermediate animal, uniting the size an strength of the one with the patience, intelligence, and sure-footedness of the othe

The varieties of the ass in countrie favourable to their developement are great In Guinea the asses are large, and in shap even excel the native horses. The asses o Arabia (says Chardin) are perhaps the handsomest animals in the world; their coat i smooth and clean; they carry the head elevated, and have fine and well formed leg which they throw out gracefully in walkin or galloping. In Persia, also, they ar finely formed, some being even stately, an much used in draught and carrying burden while others are more lightly proportione and used for the saddle by persons of quality frequently fetching the large sum of 40 livres; and being taught a kind of easy, ambling pace are richly caparisoned, and use

y the rich and luxurious nobles.
s, on the contrary, the ass unfortu-
exhibits a stunted growth, and ap-
rather to vegetate as a sickly exotic,
riot in the luxuriant enjoyment of
the horse.

diseases of the ass, as far as they are
bear a general resemblance to those
orse. As he is more exposed, how-
d left to live in a state more ap-
g to that which nature intended, he
diseases. Those few, however, are
nded to than they ought to be; and
the veterinary practitioner to ex-
this useful and patient animal the
of his art, in common with those of
imals. The ass is seldom or never
with vermin, probably from the
of its skin. (*Blaine's Encyc. Rural*

SSED TAXES. The assessed
e collected under the provisions of
.3. c. 99., 43 G.3. c. 150., and 43
161., and 3 Vic. c. 17. By these,
ioners are appointed for the col-
f these taxes, who must have a cer-
lification, and any two of whom can
y shall elect an assistant or clerk;
l issue their precepts for the election
h assessors; such assessors, previous
g, are to take an oath to bring in
ssments on oath, on or before
. in each year; and are liable to a
of not exceeding 20*l.* for refusing

vors or inspectors may be appointed
Lords of the Treasury, who may
ge, giving notice to the party sur-
, leaving such notice at his usual
f abode. Such surveyor, however,
all knowingly or wilfully through
under-rate, or omit to charge any
or persons, or shall be guilty of any
, vexatious, and illegal practices in
cution of his office, shall for every
ence forfeit 100*l.*, and be discharged
employment. Persons surcharged
peal, on giving ten days' notice to
r; but, in default of such notice,
essment must be confirmed. Sur-
may attend to support surcharge,
attorney or counsel can be heard for
arty, either *viva voce*, or by writing;
determination of the commissioners
no appeal. Persons giving false
before them, are guilty of perjury.
rs may distrain in default of pay-
ithout warrant, and sell the distress.
y action, brought against any col-
r other officer in pursuance of this
month's notice must previously be
tender of amends may be given; and,
of failure, the plaintiff will have to pay treble costs, and the collector must be defended at the expense of the parish.

By the 3 Vict. c. 17., an additional ten per cent. is to be added to the subjoined amount of the assessed taxes. But this Act "shall not extend to charge any person with duty with respect of any windows or lights which such person shall have made or opened since the 5th of April, 1835."

ARMORIAL BEARINGS.	£	s.
Persons using armorial bearings, and keeping a carriage	2	8
Not keeping carriage, but paying window duty	1	4
Persons not keeping carriage, or paying for windows	0	2

CARRIAGES WITH FOUR WHEELS.

PRIVATE CARRIAGES.

No.	Each Carriage. £	s.	d.
1	6	0	0
2	6	10	0
3	7	0	0

	£	s.
Carriages kept to be let for hire with post horses, each	5	5
If drawn by one horse, each	4	10
Carriages let by coachmakers without horses, each	6	0
Carriages with two wheels.		
Each carriage	3	5
Ditto drawn by two or more horses or mules	4	10
Reduced duties by 1 *W.*4. c. 35.		
Four-wheeled carriages with wheels of less diameter than thirty inches, drawn by ponies or mules above twelve hands and not above thirteen hands in height, each	3	5

Exempt. — Carriages with less than four wheels, not kept for hire or profit (except for the conveyance of prisoners or paupers), and drawn by one horse only, provided that the price of such carriage shall not exceed, or at any time have exceeded, the sum of 21*l.*; every such carriage must have the name, place of abode, and occupation of the owner, painted in straight lines.

Carriages not let for hire, with less than four wheels, of a diameter under 30 inches, drawn by ponies not exceeding twelve hands.

	£	s.
DOGS. — Every greyhound	1	0
Every hound, pointer, setting-dog, spaniel, lurcher, or terrier; and for every dog where two or more are kept, of whatever denomination the same may be, except greyhounds	0	14
Every other dog, where only one is kept	0	8
Persons compounding for their hounds	36	0

Exemptions. — Dogs only used in the care of sheep or cattle, if not of the descriptions chargeable with the duties of 1*l.* and 14*s.*; and dogs under six months old.

GAME CERTIFICATES.	£	s.	d.
If a servant to any person charged with duty in respect of such servant	1	5	0
If such person shall not be a servant as above	3	13	6
Every other person using a dog, or killing game	3	13	6
HAIRPOWDER	1	3	6

HORSES for riding, or drawing carriages:

No.	Each Horse. £	s.	d.	No.	Each Horse. £	s.	d.
1	1	8	9	8	2	19	9
2	2	7	3	9	3	0	9
3	2	12	3	10	3	3	6
4	2	15	0	11	3	3	6
5	2	15	9	12	3	3	6
6	2	18	0	13	3	3	9
7	2	19	9	14	3	3	9

	£	s.	d.
Race-horse, each	3	10	0
Horse let for hire not paying post-horse duty, each	1	8	9
Horse rode by butchers in trade, each	1	8	9
Where two only kept, the second	0	10	6
Horse for riding, not exceeding the height of 13 hands, each	1	1	0

Exempt. — Horses used in husbandry, or by market gardeners in business.

Horse used for the purpose of riding, or for drawing a carriage, not chargeable with duty.

Horse used for riding by bailiff, shepherd, or herdsman, where only one such horse is kept.

Horse used for riding, or drawing a carriage, not chargeable with duty, by a clergyman (including dissenters); person keeping only one such horse, and income arising from his ecclesiastical appointment or otherwise, under 120*l*. per annum.

Mares kept for breeding.

Horses kept by postmasters may be used in husbandry, and drawing fuel, manure, corn or fodder, free from duty.

	£	s.
HORSEDEALERS exercising the business within Bills of Mortality	25	0
Elsewhere	12	10

WINDOWS:

No. of Windows.	Duty Yearly. £ s. d.	No. of Windows.	Duty Yearly. £ s. d.
8	0 15 6	24	7 4 9
9	1 0 0	25	7 13 3
10	1 7 0	26	8 1 9
11	1 15 3	27	8 10 0
12	2 3 9	28	8 18 6
13	2 12 3	29	9 7 0
14	3 0 9	30	9 15 3
15	3 9 0	31	10 3 9
16	3 17 6	32	10 12 3
17	4 6 0	33	11 0 6
18	4 14 3	34	11 9 0
19	5 2 9	35	11 17 3
20	5 11 3	36	12 5 9
21	5 19 6	37	12 14 3
22	6 8 0	38	13 2 6
23	6 16 6	39	13 11 0

Exemptions. — Dairies and cheese-rooms, if not used to sleep in, and "dairy and cheese-room" is painted over door. Windows in a farm-house occupied by tenant at rack-rent less than 200*l*. per annum; a farm-house occupied by the owner or tenant of a farm, of yearly value under 100*l*. per annum, if the owner of such farm-house has not a yearly income exceeding 100*l*. from any other source.

Glass doors, or lights over doors, are windows, and windows of out-houses. A window lighting two rooms, in two frames, to pay as two windows.

SERVANTS, in the capacity of footman, coachman, groom, stable-boy, or helper in the stables, gardener, huntsman, whipper in, or other male servant.

No.	Each Servant. £ s. d.	No.	Each Servant. £ s. d.
1	1 4 0	5	2 9 0
2	1 11 0	6	2 11 6
3	1 18 0	7	2 12 6
4	2 3 6	8	2 16 0

Bachelors pay 1*l*. extra for each servant.

Exempt. — Any male servant, occasionally employed by person residing in parish in which servant shall have legal settlement; if such servant shall not have attained the age of 18 years.

ASTER. (Lat. *Aster chinensis*, starwort.) A beautiful annual plant, growing fr to two feet in height. It is a na China, from which cause it is known familiar term of China aster. Its har variegated flowers blow in August an tember; indeed, they are only banis the setting in of frost. They are rai seed sown in a hotbed in spring, and out into borders and beds, when the have acquired five or six leaves. like a good rich soil. Plant each ast inches distant from each other, as th branch out in every direction if the sufficiently light and rich. The Chin is a very important and gay flower garden.

ASTRINGENT. (*Astringo*, Lat farriery, a term applied to such reme have the property of constringing or b the parts.

ATMOSPHERE. The name gi the elastic invisible fluid, which, to siderable height, surrounds our globe. composed chiefly of two simple or composed gases, viz.

Azote, or nitrogen	79·
Oxygen	20·
	100·

It contains, also, about $\frac{1}{1000}$th weight of carbonic acid gas, or fixed considerable portion of aqueous (which is always the most consider amount in dry weather), and occas foreign substances. (See AEROLITES.) average proportion in which these e the atmosphere are —

Air	98
Watery vapour	1
Carbonic acid gas	
	10

(*Thomson's Chem.* vol. iii. 181.)

MONTHLY ATMOSPHERICAL OBSERVATIONS.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
Barometer, average mean height in degrees	29·921	30·067	29·843	29·881	29·888	30·036	29·874	29·891	29·931	29·774	29·776
Highest	30·770	30·820	30·770	30·540	30·380	30·460	30·300	30·260	30·410	30·610	30·270
Lowest	28·890	29·170	28·870	29·200	29·160	29·600	29·390	29·350	29·410	28·740	29·080
Thermometer, average mean temperature in degrees	31·1	38·	43·9	49·9	54·	58·7	61·	61·6	57·8	48·9	42·9
Highest	52·	53·	66·	74·	70·	90·	76·	82·	76·	68·	62·
Lowest	11·	21·	24·	29·	33·	37·	42·	41·	36·	17·	23·
Rain, mean quantity in inches	1·483	0·746	1·440	1·786	1·853	1·830	2·516	1·453	2·193	2·073	2·400
Evaporation of earth in inches (mean)	0·413	0·72	1·488	2·290	0·286	3·760	3·293	3·327	2·620	1·488	0·775
Winds in days:											
North	3½	1¼	2½	2¼	3	5	2½	1	2	3	3
North-east	4¼	4¾	4	3¼	4	6½	3	2¾	4	3¼	3
East	1½	2¼		3	4½	2	2	1½	1	2	3
South-east	2¾	2¾	2	3½	4	4	4	3	4	3½	2
South	1½	2¼	2¼	2¾	1	1	2½	2¼	1	2½	3
South-west	6½	5	9½	4	6½	3½	7	6	6	5¾	6
West	6¼	5½	6½	5½	5¾	3	5	1½	6	5	5
North-west	4½	3½	4½	5½	3	5	5½	2	6	6½	5

a very essential office with regard
rowth of plants. (See Gases, their
Vegetation.) The composition of
sphere is always the same, although
een analysed when obtained from
t elevated mountains, the lowest
from crowded cities, and the sur-
the ocean, in all winds, and in all
the barometer. It has been searched
by Liebig and other able chemists,
mmonia which it has been supposed
in, although, from some very incon-
experiments, it has been supposed
in snow. (*Organic Chem.*, 74—76.)

OPHY. In farriery, a morbid
and emaciation, attended with a
s of strength in animals.

AINT. Among farriers, signifies a
hurt in a horse's leg, proceeding
om a blow or from an over-reach.
ode of cure, where the skin is newly
by a blow or over-reach, is to re-
as soon as possible, and keep it close
from any extraneous matters, by
f a bandage, or some other conve-
but, in the case of wind-galls, the
thod is to have recourse to embro-
of the stimulant kind, and slight

ENUANTS. In farriery, are such
s as lessen the cohesion of the fluid,
parts of the bodies of animals.

ICKI. A term applied to a breed
ian horses.

IN. In horsemanship, a pace in a
etween an amble and a gallop.

TION, SALES BY. (*Auctio*, Lat.)
mmon mode of disposing of property
as the days of Rome. These con-
of the world in this way parted with
ls of their enemies. Sales of goods
ion are within the statute of frauds,
thy v. *Scolefield*, 4 D. & R. 566., and
o, *Walker* v. *Constable*, 1 B. & P. 306.
duties levied upon goods sold by
uction are not charged according to
form scale. Sheep's wool of British
sold for the benefit of the growers,
ct to an auction duty of 2*d*. for every
he purchase money. By the 45 G. 3.
duty of 7*d*. in the pound is payable
e amount of any sale by auction, of
erest in possession or reversion, in
ehold, copyhold, or leasehold estates,
in land or buildings; shares in the
ock of corporate or chartered com-
reversionary interest in any of the
funds; and of ships or vessels.
old furniture, pictures, books, and
kinds of personal property, are made
1*s*. in the pound. Many exceptions
een made by the legislature, when
g these duties. Thus piece goods, wove or fabricated in this kingdom, which shall be sold entire in the piece or quantity, as taken from the loom, and in lots of the price of 20*l*. and upwards, are exempted from the payment of duty. The same exemption extends to the produce of the whale and seal fisheries, elephants' teeth, palm oil, drugs, and other articles for the use of dyers; mahogany and other woods used by cabinet makers; and all goods imported by way of merchandise from any of the British American colonies, the same being the growth, produce, or manufacture of such colony, and sold by the original importer within 12 months from the time of importation. Neither is any duty chargeable upon property sold by order of the courts of chancery or exchequer; nor on any sale made by the East India or Hudson's Bay company; nor by order of the commissioners of custom, excise, or any other government board of commissioners.

In like manner, sales made by the sheriff for the benefit of creditors in execution of judgment, and bankrupt's effects sold by assignees, are not held liable to the payment of auction duty; which last species of exemption are made upon the principle of not aggravating their losses to innocent sufferers. For the same reason, goods damaged by fire, or wrecked and stranded, which are sold for the benefit of insurers, are not charged with duty. Wood, coppice, the produce of mines and quarries, cattle, corn, stock, or produce of land, may be sold by auction free of duty, while they continue on the lands producing the same. In case the sale of an estate be declared void, through defect of title, the duty that has been paid may be claimed again, within three months after the time when the defect has been discovered.

Putting in papers at a meeting, or tender, with an understanding that the highest sum marked on the paper shall be the purchaser, is a sale under the 17 G. 3. c. 50., and 19 G. 3. c. 56. (*Walker* v. *Advocate General*, 1 Dowling, 111. *Rex* v. *Taylor*, 13 Price, 636.)

Conditions of Sale.—The conditions of a sale by auction, printed and pasted up under the auctioneer's box, where he declares merely that the conditions are as usual, is sufficient notice to purchasers (*Mesnard* v. *Aldridge*, 3 Espinasse, 271.); but the verbal declarations of the auctioneer at the sale are not admissible in evidence to contradict the printed conditions (*Ghunnis* v. *Erhart*, 1 H. Blackstone, 289.); or as to the parcels or qualities of the lots (*Shelton* v. *Livius*, 2 C. & J. 411.); or to amend false statement or title. (*Bradshaw* v. *Bennet*, 5 C. & P. 48.)

A bidder, under the usual conditions that the highest bidder shall be the purchaser, may retract his bidding at any time before the fall of the hammer. (*Payne* v. *Case*, 3 T. R. 148.) And if the same person is declared the highest bidder for several lots, a distinct contract arises for each lot. (*Emmerson* v. *Heeles*, 2 Taunton, 28. *Roots* v. *Dormer*, 1 N. & M. 667.) If a person, by any statement or other means, prevents other persons from bidding against him at a sale, he cannot compel the delivery of the lot, even though he has paid a deposit. (*Fuller* v. *Abrahams*, 6 Moore, 316.) If a person employs puffers at a sale, he must announce it, or else the sale is void (*Wheeler* v. *Collier*, M. & M. 125. *Howard* v. *Castle*, 6 T. R. 642. *Crowder* v. *Austen*, 3 Bingham, 368. *Bramley* v. *All*, 3 Vesey jun., 624. *Rex* v. *Marsh*, 3 Y. & J., 331.); but there is no objection to one *bona fide* bid to prevent the lot going below a certain price. (*Smith* v. *Clarke*, 12 Vesey jun., 477.) But the agent for the vendor cannot bid for the purchaser. (*Twining* v. *Morrice*, 2 Bro. C. C. 326.) The owner's putting up certain lots at certain prices, does not render it, if there are no bidders, liable to the auction duty (*Cruso* v. *Crisp*, 3 East. 337.); this, however, was doubted in *Walker* v. *Advocate General*, 1 Dowling, 115.), but the auction duty becomes payable though the sale is imperfect. (*Jones* v. *Nanney*, 13 Price, 76.)

The average annual value of goods subject to duty which were sold by auction in the 10 years ending with 1833, was 7,556,732*l.*, yielding an average annual net revenue of 260,293*l.* An auctioneer must take out an annual license, renewable on the 5th July in every year, and for which he pays 5*l.* He must also enter into a bond, with sufficient sureties, to deliver to the officers of excise, within a certain period, a true and particular account of every sale held by him, and to pay the amount of auction duty accruing therefrom; 28 days being allowed for this purpose, within the limits of the chief office of excise in London, and six weeks beyond those limits. Two days' notice prior to a sale being held must be given within the limits of the chief office, and three days when beyond that jurisdiction. Though bound to take care of goods entrusted to him for sale, he is not liable for inevitable accidents. (*Maltby* v. *Christie*, 1 Esp. 340.) If he has notice that the goods he is about to sell do not belong to his principal, he is personally liable if he continues to sell, for the produce of the sale. (*Hardacre* v. *Stewart*, 3 Esp. 103.) He is also personally liable if, in selling goods, he deviates from the strict letter of the conditions. (*Jones* v. *Nanney*, 13 Price, 16.) If he is directed merely not to sell under a certain price, he may knock the lot down to the highest

bidder; but if he is directed to pu
up at a certain price, then he is p
liable if he neglects. (*Bexwell* v.
Cowper, 393.) He cannot purcha
tate he is employed to sell. The
Chancery set aside a sale under
cumstances, after a lapse of 13 years
v. *Court*, 1 Daniel, 301.) He ma
the price of the lot sold, though t
belong to another person. (*Wi*
Millington, 1 H. Blackstone, 81.)
purchaser may set off a debt owin
by the owner of the lots. (*Coppin* v
7 Taunt. 237. *Coppin* v. *Craig*,
243.) The auctioneer is bound to r
deposit on the sale of an estate till
chase is complete, and it is ascert
whom the money belongs. (*Gray*
teridge, 1 M. & R. 614.) The nu
auctioneers' licenses issued in En
1824, was 2939; in 1833, 3040.

AUGHTENPART LANDS.
cient kind of tenure, or condition
in which it lies in a sort of r
manner. Some remains of it are
with in the northern parts of Scotl

AUGRE, BORING. An imple
boring into the soil. An augre of t
kind, when made of a large size, a
different pieces to fix on to each ot
be very usefully applied to try the r
the under soil, the discovering spri
drawing off water from lands, &c.
to accomplish the first purpose, thre
will be necessary; the first of the
three feet long, the second six,
third ten. Their diameters should
an inch, and their bits large, and c
bringing up part of the soil they
An iron handle should be fixed cr
to wring it into the earth, from wh
instrument must be drawn up as of
has pierced a new depth of about si
in order to cleanse the bit, and exa
soil.

AUGRE, DRAINING. An ins
employed for the purposes of boring
bottoms of drains or other places,
to discover and let off water. It i
similar to that made use of in searc
coal or other subterraneous mineral
augre, shell, or wimble, as it is
called, for excavating the earth
through which it passes, is genera
two and a half to three and a half i
diameter; the hollow part of it
four inches in length, and constructe
in the shape of the wimble used by
ters, only the sides of the shell com
to one another. The rods are made
rate pieces of four feet long each, th
into one another to any assignable
one after another as the depth of

The size above the augre is about uare, unless at the joints, where, e of strength, they are a quarter more.

also a chisel and punch, adapted ng on, in going through hard other metallic substances, to ac- e passage of the augre, which otherwise perforate such hard he punch is often used, when the ot applied, to prick or open the vel, and give a more easy issue r. The chisel is an inch and a inches broad at the point, and sharp for cutting stone; and the ch square, like the other part of th the point sharpened also.

remarked by Johnstone, in his Elkington's mode of draining, to to make use of the borer is a rt of the business of draining. have not seen it made use of in ve been led into a mistaken no- s to the manner of using it, and for which it is applied. They if by boring indiscriminately ground to be drained, water is enough the surface to be reached h of the drain, the proper direc- along these holes where water und; and thus make it the first that is used. The contrary, practice, is the case, and the ver used till after the drain is en for the purpose of perforating re or impervious stratum, lying e bottom of the drain and the r strata containing the spring. atly lessens the trouble and ex- would otherwise be requisite in trench to that depth to which, stances, the level of the outlet mit. The manner of using it is :—in working it, two, or rather are necessary. Two stand above, e of the drain, who turn it round f the wooden handles, and when s full they draw it out; and the bottom of the trench clears out ssists in pulling it out, and di- nto the hole, and who can also rning with the iron handle or key lepth and length of rods require force to perform the operation. nen should be cautious in boring leeper at a time, without drawing, xact length of the shell, otherwise clay, or sand, through which it is er the shell is full, makes it very pull out. For this purpose the th of the shell should be regularly the rods, from the bottom up- wo flat boards, with a hole cut into the side of one of them, and laid alongside of one another over the drain, in the time of boring, are very useful for directing the rods in going down perpendicularly, for keeping them steady in boring, and for the men standing on when performing the operation.

AUGUST. The eighth month of the year.

Farmer's Calendar.—This is too completely the harvest month of the farmer in the south of England for him to have leisure to attend to more than the crowning labours of the season. Do not let the corn become too ripe before you begin to cut; it is a very common error — is attended with several disadvantages — the crops become ripe altogether, the labourers cannot cut it with sufficient rapidity, much seed is lost, and if wet comes on, the corn the sooner sprouts or becomes mouldy. The days get shorter, the night dews increase, seed sowing is retarded. Turnip hoeing, however, must now be going on, and on no account neglected, for on these depend more than one harvest of the farmer. Coleseed, or better, the "six weeks' turnips," may also be sown in the early part of the month in some of the ploughed stubbles. The practice of the Flemish farmers is admirable; they grow rye or early peas for the purpose of succeeding these by transplanted rape or cabbage, which they, immediately after planting, water with their liquid manure. In harvesting corn prefer stacking: wheat, "the farmer's chief hope," and barley, are safer from vermin when on frames; the sample is always of a better colour, and you may cart it earlier for stacking than for the barn. Beans, without they lay some days before they are tied, must be in small sheaves, and then hardly any weather will hurt them. Regulate the proceedings of the gleaners by public notice; do not stand too tightly upon your rights with these little harvesters, for their calling is older than your Bible: they have, however, no common law right to enter your fields to glean, and their being legally settled in the parish makes no difference; they are strictly in law trespassers. (*Steel* v. *Houghton*, 1 H. Black., 51.) Long good custom, however, has sanctioned the practice, a spirit which in some measure seems derived from the levitical law. Levit. xix. 9.; xxiii. 22, &c. Judge Gould, in *Steel* v. *Houghton*, delivered a learned judgment in favour of the right of the poor to glean, but the other three judges were against him. Turn the ram to the ewes for early fat lambs. If you have spare time, collect together the earth on which you intend to form your compost heaps; this can hardly be done with too much care. The practice of mixing earth with chalk or marl, and well mixing them by the plough or the spade for some months before the dung heap is formed on it, is excellent. These earth-beds should be formed deeper at the sides than in the centre, to allow of some of it being spared for covering over the heaps.

This is a good time, especially if the weather is moist, to improve poor worn out pastures, either by sowing grass seeds, or by using the sub-turf plough; or both rye and winter barley should be sown this month, and towards the end a small crop of tares for first feed. (*Farmer's Almanac.*)

Gardener's Calendar. — *Kitchen garden.* — *Alexanders*, sow. *Angelica*, sow. *Aromatic* herbs may still be planted, gather for drying and distilling. *Artichokes*, break down, &c. *Asparagus* beds, weed. *Balm*, plant, gather for drying. *Beans*, plant *b.* *Borage*, sow. *Borecole*, plant. *Broccoli*, plant *b.* *Cabbages*, plant out, sow *b.* *Celery*, prick out, plant. *Chervil*, sow. *Corn salad*, sow. *Cauliflowers*, plant, sow *e.* *Coleworts*, sow for *b.* plant. *Celeriac*, earth up. *Cardoons*, earth up. *Carrots*, sow *b.* *Cress, American*, sow. *Cucumbers*, plant or sow *b.* *Cucumbers*, attend to advancing. *Dill*, is fit for gathering, earthing up attend. *Endive*, plant, sow *b.*, blanch, &c., advancing crops. *Fennel*, sow and plant. *Finochio*, earth up. *Garlic*, take up. *Hoeing*, attend. *Kidney beans*, sow *b.* *Leeks*, plant *b.* *Lettuces*, sow, plant out. *Melons*, attend to. *Mint*, gather for drying. *Mushroom* beds, make, attend to. *Nasturtium* berries, gather. *Onions*, sow *b.* and *e.* *Parsley*, sow *b.* *Peas*, sow *b.* *Radishes*, sow pods, gather for pickling. *Rape*, edible rooted, sow. *Rochambole*, take up. *Shallots*, take up. *Savoys*, plant *b.* *Seed*, gather as ripe. *Small salading*, sow. *Spinach*, sow, stir between plants in rows, &c. *Turnips*, sow *b.*, thin, &c. *Turnip cabbage*, plant. Weeding and watering attend to. *Wormwood*, plant *b.*

Flower Garden.—You may now begin to propagate some double-flowered and approved fibrous rooted plants the end of the month if they have done flowering; such, for instance, as the double rose, campion, catchfly, double scarlet lychnis, double rocket, double ragged robin, bachelors' buttons, gentianella, polyanthuses, auriculas, &c. Sow auricula and polyanthus seed on a warm dry day, and remove carnation layers to some place where they may remain till October to gain strength. Sow seeds of bulbs. Sow anemone and ranunculus seed. Remove all bulbs which have done flowering. Cut and trim edgings of box, clip holly, yew, and privet hedges; gather flower seeds; plant autumnal bulbs if any are still above ground, such as colchicums, autumnal narcissus, amaryllis, and autumn crocus. Trim the flower plants; mow the lawn and grass walks, and keep every department in order.

General monthly Notices.—This month derived its name from Augustus, the Roman emperor: it was called *Sextilis*, or the sixth month in the Alban calendar, in which it had only twenty-eight days assigned to it. Romulus added two, and Augustus a third, which number it has since retained. The Anglo-Saxons called it either *Barn Monath*, alluding to this being the period when their barns were commonly filled, or *Weod Monath*, clothing month, alluding to their fields being then clothed with corn — just as the Romans dedicated this month to Ceres, the goddess of harvests. This is indeed a period of joy and gladness to all nations. We even allude to a person's success in life by saying he has made his harvest: the French do the same, only they say he has made his August. The earth is now rapidly ripening her fruits and seeds of all kinds, the leaves of the elm begin to change their colour, the young starlings now congregate in flocks, the golden sparwort and the sunflower are in bloom, the poisonous berries of the deadly nightshade ripen, meteors abound in the atmosphere. (*Farmer's Almanac.*)

AURICULA. (Lat. *Primula auricula*, bear's ears.) This superb flower is a native of Switzerland, and is hardy; but it blooms all the better for a little care, in frost, heats, and heavy rains. They are propagated by seed, and by rooted slips, and off-sets, and they should be parted every three years, otherwise they become weakly, and blow badly. Sow auricula seed in March, in boxes, cover them very lightly, and water very gently. Miller says, it is good to sow seed from August to December. Auriculas love a good, rich soil, and bloom finest if a little sea-sand is mixed in the compost. When the young plants have five or six leaves, transplant them till they become strong, and then remove them into pots, or the flower-beds. The auricula produces inexhaustible varieties of blooms. (*L. Johnson.*)

AVENA. A genus of grasses; the oat-grass. Some of the species may be cultivated to advantage in suitable situations, intermixed with a due proportion of other grasses.

Avena flavescens. Golden oat, or yellow oat-grass. This is one of those grasses which never thrives when cultivated simply by itself: it requires to be combined with other grasses to secure its continuance in the soil, and to obtain its produce in perfection. It thrives best when combined with the *Hordeum pratense* (meadow barley), *Cynosurus cristatus* (crested dog's-tail), and *Anthoxanthum odoratum* (sweet-scented vernal-grass).

ffects most a calcareous soil, and that which ry. It grows naturally, however, in al- t every kind of meadow: it is always ent in the richest natural pastures. From details given in the table below, it will een that its produce is not very great, its nutritive qualities considerable. The itive matter it affords from its leaves properties of which are of more im- ance to be known than those of the s, for a permanent pasture grass,) con- proportionally more bitter extractive what is contained in the nutritive mat- of the grasses with which it is more rally combined in natural pastures, and ch have just now been mentioned. This r circumstance is the chief claim it has place in the composition of the produce ich pasture land; but more particularly, he land be elevated, and without good ter, this grass becomes more valuable, thrives better under such circumstances most other grasses, and sheep eat it as lily as they do most others. The seed ery small and light; but it vegetates ly if sown in the autumn, or not too y in the spring. I have sown the seeds this grass in almost every month of the r, and after making due allowance for state of the weather, the third week May, and the first week of August to ptember, were evidently the best. It wers in the first, and often in the second ek of July, and ripens the seed in the ginning of August. The value of the ss, at the time of flowering, is to that at time the seed is ripe, as 5 to 3.

he value of the grass, at the time of wering, exceeds that of the latter-math, to 1; and the value of the grass at the e the seed is ripe, is to that of the latter- th, as 9 to 5.

vena pratensis. Meadow oat-grass. This cies of oat-grass is much less common n the *Avena pubescens*, or *Avena flaves- s*. It is found more frequent on chalky n on any other kind of soils: I have also nd it in moist meadows as well as on dry ths. This property of thriving on soils such opposite natures is not common to different species of grass. When this ss was planted in an irrigated meadow, the produce did not appear to exceed that which it afforded on a dry elevated soil, though it appeared more healthy, by the superior green colour of the foliage; and it thus appears to thrive under irrigation. The produce and nutritive powers, however, seem to be inferior to many other species of the secondary grasses. The produce or value of the yellow oat is superior to that of the meadow oat in the proportion nearly of 7 to 3. The downy oat-grass is also superior to the meadow oat-grass in the quantity of nutritive matter it affords from the crops of one season, in the proportion nearly of 3 to 2. From these facts and observations it cannot justly be recommended for cultivation in preference to either of the two species with which it has now been compared. Its nutritive matter contains a less proportion of bitter extractive and saline matters than any other of the oat-grasses that have been submitted to experiment. It flowers in July, and the seed is ripe in August.

Avena pubescens. Downy oat-grass. This grass has properties which recommend it to the notice of the agriculturist, being hardy, and a small impoverisher of the soil; the reproductive power is also considerable, though the foliage does not attain to a great length if left growing. Like the *Poa pratensis*, it seldom or never sends forth any flowering culms, after the first are cropped, which is a property of some value for the purpose of permanent pasture, or dry soils, which are sooner impoverished by the growth of plants than those that are moist. Among the secondary grasses, therefore, I hardly know one whose habits promise better for the purpose now spoken of. The nutritive matter it affords contains a greater proportion of the bitter extractive principle than the nutritive matter of those grasses that affect a similar soil, which lessens its merits in those respects, and must prevent its being employed in any considerable quantity as a constituent of a mixture of grasses for laying down such soils to grass. In one part of Woburn Park, where the soil is light and silicious, the downy oat grows in considerable abundance. The downy hairs which cover the surface of the leaves of this grass when growing on poor, dry, or chalky soils,

Description of Grass.	Soil.	Green Produce per Acre.	Dry Produce per Acre.	Produce per Acre of Nutritive Matter.
		lbs.	lbs.	lbs.
flavescens, in flower	Clayey loam	8,167 8 0	2,858 10 0	478 9 0
———, in seed, ripe	—	12,251 4 0	4,900 8 0	430 11 5
———, latter-math	—	4,083 12 0	- -	79 12 2
pratensis, in flower	Sandy loam	6,806 4 0	1,871 11 8	239 4 8
———, in seed, ripe	—	9,528 12 0	2,858 10 0	148 14 3
pubescens, in flower	—	15,654 6 0	5,870 6 4	366 14 6
———, in seed, ripe	—	6,806 4 0	1,361 4 0	212 11 2

(*Sinclair's Hort. Gram. Wob.*)

almost disappear when cultivated on richer soils. The crop at the time of flowering is superior to that at the time the seed is ripe, in the proportion nearly of 5 to 3. The grass of the latter-math, and that at the time the seed is ripe, are of equal proportional value. It flowers in the second or third week of June, and the seed is ripe about the beginning or in the middle of July.

AVENS, COMMON, or HERB BENNET. (*Geum urbanum.*) An indigenous perennial plant, which grows plentifully in woods and about shady dry hedges, producing small bright yellow flowers from May till August. The stalks of this useful plant attain two feet high, they are erect, round, finely hairy, branched at the upper part, bearing several flowers. The root consists of a root-stock and many stout brown fibres, which are astringent, and in some degree aromatic in spring. They are said to impart an agreeable clove-like flavour when infused in beer or wine. In medicine, the powdered root of the common Avens has been employed with good effect in conjunction with Peruvian bark, or quinine, in cases of ague and intermittent fever, and it is also valuable in long-standing cases of diarrhœa, and in the last stage of dysentery. The dose is from thirty to sixty grains. Sheep are extremely fond of its herbage, which may likewise, when young, be used for culinary purposes, and especially in the form of salad. It is stated (*Trans. of Swed. Acad.*) that if a portion of the dried root be placed in a bag and hung in a cask of beer, it will prevent the beer from turning sour. There is a variety of this plant called the great-flowered Avens. (*Eng. Flora*, vol. ii. p. 429.; *Willich's Dom. Ency.*)

AVENS, WATER. A variety of the before-named plant, which is common in moist meadows and woods, especially in mountainous countries, and is not rare in the north of England, Scotland, Wales, nor even in Norfolk. It has drooping flowers, which distinguish it from the common Avens. It is readily produced by transplanting the wild roots into a dry gravelly soil, by which the flowers become red, as well as double and proliferous, with many strange changes of leaves into petals, and the contrary. (*Smith's Eng. Flora.*)

AVENUE. (Fr.) An alley or walk planted on each side with trees. These kinds of walks were formerly much more the fashion than they are at present. When they are to be made, the common elm answers very well for the purpose in most grounds, except such as are very wet and shallow, and is preferred to most other trees, because it bears cutting, heading, or lopping in any manner. The rough Dutch elm is approved by some, because of its quick growth; and it is a tree that will not only bear removing very well, but that is green in the spring almost as soon as any plant whatever, and continues so equally long. It makes an incomparable hedge, and is preferable to all other trees for lofty espaljers. The lime is very useful on account of its regular growth and fine shade; and the horse-chesnut is proper for such places as are not too much exposed to rough winds. The common chesnut does very well in a good soil, or on warm gravels, as it rises to a considerable height when planted somewhat close; but, when it stands single, it is rather inclined to spread than grow tall. The beech naturally grows well with us in its wild state, but it is less to be chosen for avenues than others, because it does not bear transplanting well. The abele may also be employed for this use, as it is adapted to almost any soil, and is the quickest grower of any forest tree. It seldom fails in transplanting, and succeeds very well in wet soils, in which the others are apt to suffer. The oak is but seldom used for avenues, because of its slow growth.

The old method of planting avenues was by regular rows of trees, a practice which has been adhered to till lately; but now, when they are used, a much more ornamental way of planting them is adopted, which is by setting the trees in clumps or platoons, making the opening much wider than before, and placing the clumps of trees from one to three hundred feet distant from each other. In these clumps there should always be planted either seven or nine trees; but it must be observed that this method is only proper to be practised where the avenue is of considerable length, as in short walks such clumps will not appear so sightly as single rows of trees. The avenues made by clumps are the most suitable for large parks. The trees in the clumps in such should be planted thirty feet asunder; and a trench thrown up round each clump to prevent the deer from coming to the trees and barking them.

AVER. A local name for a labouring beast of any kind.

AVERAGES. (Fr. *aver;* Lat. *averagium.*) In the corn trade, is the average amount of the prices at which the several kinds of corn are sold in the chief corn markets of England, as ascertained by the returns of certain inspectors, according to the act of the 9 G. 4. c. 60. (See Corn Laws.)

AVERDUPOIS, or AVOIRDUPOIS WEIGHT. (*Avoir du poids*, Fr., Dr. Johnson says, but he should have added,

weight one ton. It is most com-
ritten *avoirdupois*.

LAND. Such lands as were
l by the tenants for the use of their
e formerly so termed.

RY. (Lat. *avis*, a bird.) A place
: for the feeding and propagating

ET. In ornithology, the *Recur-*
avosetta, is thus described by Yar-
The beak black, about 3½ inches in
aving very much the appearance of
flat pieces of whalebone coming
t, and curving upwards; the irides
brown; top of the head, occiput,
d back of the neck, black; upper
the back, white; legs and toes, pale
The food of the avocet consists of
aquatic insects, and the thinner
crustaceous animals, which they
or in soft mud. The nest, a small
the drier part of marshes. The eggs
o in number, of a clay colour, about
hes in length by one and a half in
The length of the avocet is about
s. (*Brit. Birds*, vol. ii. p. 555.)

S. (Goth. *ahana*; Sw. *agri*.) The
ike bristles which form the beards
t, barley, and other grasses. The
, in some parts of England, pro-
l *ails* and *iles*.

S (Lat., axel, Sw.), or axle-tree.
rong piece of wood or iron which
s the weight of waggons, carts, car-
&c. and round the extremities of
he wheels turn. Messrs. J. Aird and
op have recently invented an im-
axle and nave for the wheels of
s on railways; a description of which
in *Trans. High. Soc.* vol. ii. p. 65.

a dressing like salads. For the first crop, a rich light soil must be selected; for the succeeding sowings a more retentive one, but for the two last a return must be had to a drier and warmer situation. These precautions are absolutely necessary, for in either extreme of moisture or dryness the plants will not thrive. A small bed will be only required at each sowing: one 20 feet by 4 is sufficient for the largest family. It is propagated by seed, which may be sown for successional crops, from the beginning of March until the close of July, at intervals of a month, for after attaining its full growth it immediately advances for seed. The seed is sown in drills two feet asunder, to remain, scattered thinly, that is, about two inches apart, and about half an inch below the surface. When well come up, about three or four weeks after sowing, they must be small-hoed, to kill the weeds, from which they should be kept completely clear throughout their growth, but at that time only thin to 3 or 4 inches asunder, as it cannot thus early be determined which will be the most vigorous plants. After the lapse of another month they may be finally thinned to 7 or 8 inches' distance from each other. Moderate waterings are required throughout their growth, during dry weather; and in the meridian of hot days the beds are advantageously shaded, until after the plants are well up. When of advanced growth, about ten weeks after coming up, the stems must be earthed up to the height of 5 or 6 inches, to blanch for use, which will be effected in 10 or 14 days. In the whole about 12 or 14 weeks elapse between the time of sowing, and their being fit for use. In autumn, if frosty mornings occur,

AZOTE, is as commonly known by the name of nitrogen. The name of azote (derived from the Greek α, from, and ζοε, life) was given to it by the French chemists, from animals being unable to breathe it. This gas, which constitutes 79·16 parts per cent. of the air we breathe, was discovered in 1772 by Dr. Rutherford. Before his time there had been much confusion with regard to the composition of the atmospheric and other gases: they were chiefly regarded by the old chemists as being all of the same kind, but mixed with various unknown substances. When all the oxygen is absorbed from a confined portion of atmospheric air, the remainder is nearly pure azote; it is known only in the state of gas. Azotic gas is invisible and elastic, and has no smell; its specific gravity is 0·969. Animals cannot breathe it: when they are placed in a jar of it they die as rapidly as if immersed in water; neither will it support combustion. It unites with oxygen in various proportions: thus,—

Parts.		Parts.		
1·75	azote and	2	oxygen forms	nitrous gas.
1·75	—	5	—	nitric acid, or aqua fortis.
1·75	—	4·178	—	nitrous acid.

Azote, or nitrogen, abounds in animal substances, for it forms 16·998 per cent. of gelatine; 15·705 per cent. of albumen (white of egg), &c., and these are commonly present in all animal substances. Azote unites also with hydrogen gas and forms the volatile alkali ammonia, which is composed of—

Azote - -	- 26 parts.
Hydrogen - -	- 74

Now, as both these substances exist in animal matters, when such substances putrefy or are subjected to the destructive distillation, they readily unite and form the volatile alkali ammonia.

Azote exists also in gluten; and wherever this substance is present in vegetable matters, there, in consequence, azote is to be found, but otherwise it does not often enter into the composition of vegetable substances. And yet it is worthy of remark, that although azote cannot be regarded as a direct food of plants, yet most of those substances which contain it are exceedingly grateful to them, such as ammonia, saltpetre, animal matter, &c.; and again, vegetables certainly emit, and probably inhale, this gas. Thus some plants of *Vinca minor* being made to vegetate in a confined portion of air for six days, and the composition of the air being ascertained by M. Saussure (*Rech. Chim.* p. 40.), the following were the results in cubic inches:—

	Composition of Atmosphere, when put in.	when taken out.
Azote -	- 211·92 -	- 218·95
Oxygen	- 56·33 -	- 71·05
Carbonic acid	- 21·75 -	- 0·00
	290·	290·

The plants therefore had evidently increased the proportion of azote and oxygen, but had entirely exhausted the air of its carbonic acid gas.

Similar experiments made with the *Mentha aquatica*, *Cactus opuntia*, *Lythrum salicaria*, and the *Pinus genevensis*, afforded similar results.

Azote, therefore, evidently fulfils a more considerable office in vegetable economy than we are yet exactly aware of, and it is more than probable that considerable discoveries are yet to be made in the investigation of its uses to vegetable life. See Gases, their use to vegetation. (*Davy's Chem. Phil.* p. 255.; *Thomson's Chem.*)

B.

BAC or **BACK**. The common name for a large flat tub in which wort is cooled.

BACCIFEROUS. (From *bacca*, a berry, and *fero*, to bear.) A term applied to trees bearing berries.

BACK, the spine. The back of a horse should be straight, in order that it may be strong: when it is hollow, or what is termed *saddle-backed*, the animal is generally weak.

Back sore. A complaint which is very common to young horses when they first travel. To prevent it, their backs should be cooled every time they are baited, and now and then washed with warm water, and wiped dry with a linen cloth. The best cure for a sore back is a lotion of 1 oz. of Goulard's extract (sugar of lead and vinegar), 1 oz. of turpentine, 1 oz. of spirit of wine, and 1 pint of vinegar.

Back sinews, sprain of the. This is often occasioned by the horse being overweighted, and then ridden far and fast, especially if his pasterns are long; but it may occur from a false step, or from the heels of the shoes being too much lowered. Sprain of the back sinews is detected by swelling and heat at the back of the lower part of the leg; puffiness along the course of the sinews; extreme tenderness, so far as the swelling and heat extend; and very great lameness.

The first object is to abate the inflammation, and this should be attempted by bleeding from the plate vein; by means of which blood is drained from the inflamed part. Next, local applications should be made to of the leg in the form of foment- water sufficiently hot and fre- repeated. At the same time, as ain as possible should be taken from by putting a high calkin on the e shoe. When the inflammation the deposit between the tendon heath should be taken up by ban- ich should be gradually tightened y. In very bad cases it may be to fire the leg. (*Clater's Far.* -256.)

ING A COLT. The breaking to , or bringing him to endure a rider.

STONE. A provincial term, ap- Yorkshire to a flat stone put over bake cakes upon.

N. Probably from *baken*, that is, sh. Dr. Johnson says, and Mr. ooke contends, that it is evidently participle of the Saxon *bacan*, to ry by heat. (*Div. of Pur.* vol. ii. I may, however, refer perhaps as to the old French *bacon*, which ied flesh and pork. The Welsh *bacwn*. The flesh of the hog after en salted and dried, and it is either r kept without smoking, when it is reen bacon. (*Todd.*)

ogs as have been kept till they are vn, and have then attained to a , are for the most part converted to pose of bacon. The seasons for ogs for bacon are between October ch, but it of course varies according n and circumstances in peculiar

The process of curing bacon is so wn throughout the country, that it ly necessary to add any thing on ect; but the following practical y not be without their utility. In have good bacon the hair should be off, not scalded, the flesh will be d and firm. The best method of is is to cover the hog thinly with d to set light to it in the direction ind. As the straw is burnt off, it e renewed, taking care, however, rn or parch the skin. After both e been treated in this way, the hog scraped quite clean, but water must sed. After the hog has been pro- t up, the inside, or flesh-side of each to be well rubbed with salt, and above each other in a tray, which ave a gutter round its edge to drain brine. Once in four or five days should be changed, and the flitches ly moved, putting the bottom one nd then again at the bottom. Some in curing bacon, add for each hog pound of bay salt, and a quarter nd of saltpetre, and one pound of very coarse sugar or treacle. Very excellent bacon may, however, be made with common salt alone, provided it be well rubbed in, and changed sufficiently often. Six weeks, in moderate weather, will be time sufficient for the curing of a hog of twelve score. Smoking the bacon is much better than merely drying it. The flitches should, in the first place, be rubbed over with bran or fine saw-dust (not deal), and then hung up in a chimney out of the rain, and not near enough to the fire to melt. The smoke must be from wood, stubble, or litter. If the fire is tolerably constant and good, a month's smoking will be sufficient. The flitches are afterwards frequently preserved in clear, dry wood ashes, or very dry sand.

The counties of England most celebrated for bacon, are York, Hants, Berks, and Wilts. Ireland produces great quantities, but it is neither so clean fed, nor so well cured as the English, and is much lower priced. Of the Scotch counties, Dumfries, Wigtown, and Kirkcudbright, are celebrated for the excellence of their bacon and hams, of which they now export large quantities, principally to the Liverpool and London markets. The imports of bacon and hams from Ireland have increased rapidly of late years. The average quantity imported during the three years ending the 25th of March, 1800, only amounted to 41,948 cwt.; whereas during the three years ending with 1820, the average imports amounted to 204,380 cwt.; and during the three years ending with 1825, they had increased to 338,218 cwt.

In 1825 the trade between Ireland and Great Britain was placed on the footing of a coasting trade; and bacons and hams are imported and exported without any specific entry at the Custom-house. We believe, however, that the imports of these articles into Great Britain from Ireland amounts, at present, to little less than 500,000 cwt. a year. The quantity of bacon and hams exported from Ireland to foreign countries is inconsiderable, not exceeding 1500 or 2000 cwt. a year. The duty on bacon and hams being 28*s*. the cwt. is in effect prohibitory. By the 7 G. 4. c. 48. bacon is not to be entered to be warehoused except for exportation only; and if it be so warehoused, it cannot be taken out for home use. (*Baxter's Agr. Lib.; M'Culloch's Com. Dict.*)

BADGER. (*bedour;* French, *metis.*) An animal that earths in the ground, common in some parts of England, and which is known under the several local and provincial names of a grey, a brock, a boresor, a bansor.

The badger, in the zoological classification of Linnæus, was grouped with the bear, and he certainly has several characters in common with that animal. Like the bear, the badger remains during the winter in a semi-torpid state, and it is also said to be equally as fond of honey. Its internal organs of assimilation prove it to be omnivorous; and while we know it capable of living on vegetable matter, it presents sufficient tokens of carnivorous aptitudes; nor are we by any means satisfied that the prejudice against this animal for destroying game, poultry, &c., is wholly without foundation. The badger breeds annually, and brings forth four or five young in the spring. The young of this animal when found, and reared by hand, become very tame and docile. In China, the flesh of the badger is a most common food; but the hind quarters are the only parts eaten in this country, and the hams are considered by many as superior in flavour to those of the hog. The fat is in great request for ointments; the skin dressed with the hair on is used for pistol furniture: the Highlanders also make their pendant pouches of it; and the hair furnishes the artist with brushes to soften and harmonise the shades in painting. The badger is sometimes hunted at night, that being the time he roves abroad in quest of food. Many fanciful tales are told of this animal: one is, that pork will entice him out of his retreat in the day, which is equally true with an olden opinion, that his legs of one side are shorter than those of the other.

BAGGING. A mode of reaping corn or pulse with a hook, in which the operator effects his object by striking the straw or haulm, instead of drawing the hook through it. In other words, it is separating the straw or haulm from the root by chopping, instead of by a drawing cut. (*Brande's Dict. of Science.*)

BAILIFF. A word of doubtful etymology, but borrowed by us from *baillie*, French. In old vocabularies written *baily*, and so a steward is still called in many places. The under steward of a manor; also a superior sort of farm-servant, who has often the whole care and management of the farm.

A farming Bailiff. — He should, says an excellent periodical, be industrious, active, intelligent. He should be first in the morning, and last at night. He should not only order men to work, but lead the way; and should on all occasions move from one department to another without delay, assisting and directing where requisite, but always keeping the adage in view, the "Eyes of a master do more than the hands." He should be the first power to the machine, and the best implement on the farm, and should assist his master to manage the men, not the men to manage the master. He should be punctual in his accounts, honest in his dealings, regular in his business. He
should every night note down in a bo
operations of the day, the labour o
men, the corn and food consumed b
cattle and horses, the corn bought and
and having done this, write down w
required to be performed on the foll
day on the opposite side, which the
night's account will confirm; he should
inspect the premises — see that all the
are secure, the cattle safely housed, an
tire early to bed, as the only certain st
rising early in the morning. He, by fo
ing these directions, will find next mo
no difficulty in carrying out his arr
ments, and will learn thereby that m
and order are the first principles of ac
this will, by his example, be communi
to the whole concern. The workmen
be regular, and even the horses will pa
of the benefit; working tools, sacks,
implements will be taken care of, "
will be a place for every thing, and
thing in its place:" if the articles ar
to others they should be charged to
account, and credit given to them whe
turned — it is by thus attending to th
nutiæ of farming matters that the pr
obtained: "take care of the pence, an
pounds will take care of themselves."
will take care at all times to be promp
decisive with the workmen, and if
are idle, dissolute, or disorderly, adm
them: if no reform takes place, disc
them. He will, on the other hand, a
treat them with kindness and civility
will not fail to obtain the same in retu
he will never allow his men to indul
abusive or blasphemous language,
drunkenness, much less will he eve
precept, give them encouragement to
the example, or allow them to suppo
can be guilty of such practices himse
he will do well to discharge all that
the continual practice of either. H
endeavour to pay them fair wages,
only sure mode to have work well
formed, and to encourage his labour
be honest. He will ascertain what is
price for labour by the piece, and give
if he lowers the price in consequen
their making good earnings, he will,
doing, check the exertions of the men
induce them to cheat him on every occ
for if men at piece-work are not allow
exceed certain wages weekly, they
always require a great price for their
which they will, by their duplicity,
him believe is due for their exertions,
their labour is only half-bestowed.

BAILIWICK. (Fr. *baillie*, and
pic.) The place of the jurisdiction
bailiff within his hundred, or the
franchise. It is that liberty which

empted from the sheriff of the county, over which the lord of the liberty appointeth a bailiff *cowel.*

BAIRNWART. A provincial name for the daisy.

BAIT. (Sax. baꞇan, German, *baitzen.*) A feed of oats, or any other material given to an animal employed in travelling or labour. These should always be proportioned to the condition of the animal, and the nature of his labour. It also signifies any thing applied with the view of catching an animal.

BAITS, for angling, are of two kinds; first, the matters which constitute the usual or the occasional food of fishes; and, secondly, the artificial representations of such matters as they are known to seek after. Fishes being as we know nearly omnivorous, the list of their edibles must necessarily be extensive and diversified. The angler need therefore never be fettered by the trammels of rules in procuring fish baits; for experience will convince him that the localities of every water will always furnish the means of support to its inhabitants. Baits may, therefore, be considered as always at hand; and the ingenious mind will be able to devise means for obtaining them. Judgment in the selection of baits depends considerably on experience in the gastronomy of the fishes of well-fed rivers, or the influence of seasons, and on the locality and geography of the country. Full particulars on the subject of living and artificial baits may be found in *Blaine's Encyc. of Rural Sports*, p. 998. et seq. and *Walton's Angler.*

BAITING OF ANIMALS. The practice of setting smaller or weaker beasts to attack or harass greater and stronger ones. This custom is nearly extinct in this country. Lawrence long since observed of this relic of barbarism, that "chaining and staking down wretched captives to be worried and torn to pieces by other animals, purposely trained for such useless barbarity, is a foul disgrace of common sense, and never ought to be tolerated for a moment in a government which claims to be instituted for the protection of rights, and the advancement of morality. The origin of the infamous practice of baiting bulls, which had afterwards the sanction of an ignorant and barbarous legislature, is said to have been as follows: By custom of the manor of Tutbury, in Staffordshire, a bull was given by the prior to the minstrels. After undergoing the torture of having his horns cut, his ears and tail cropped to the very stumps, and his nostrils filled with pepper, his body was besmeared with soap, and he was turned out in that pitiable state, in order to be hunted. This was called bull-running; and if the bull was taken, or held long enough to pull off some of his hair, he was then tied to the stake, and baited.

BAKEWELL, ROBERT. A celebrated agriculturist and improver of live stock. He was born about the year 1725, on his paternal estate at Dishley, in Leicestershire, and died there, October 1. 1795. Though it does not appear that he contributed any thing to literature, even on the subjects to which he devoted his life, yet his efforts, particularly to improve the breed of sheep, justly procured for him a widely extended reputation. The cross breed which he introduced is well known as the Dishley, or new Leicestershire breed. He is to be distinguished from a Mr. Robert Bakewell, who, in 1808, published *Observations on Wool*, with notes, by Lord Somerville. (*Penny Cyclop.; Gent. Mag.* vol. lxv. p. 969.) Of his cattle, Arthur Young remarked, in 1783, and Young was no flatterer — when speaking of another excellent farmer — "His cattle are of Bakewell's breed, which is giving them sufficient praise." (*Ann.* vol. ii. p. 156.) And in the same volume, p. 379., when noticing his breed of sheep, he says, "I have not a doubt that it is, without any exception, the first in the world." To attain this excellence Bakewell devoted himself. Travelling in search of stock to breed from, not only over England, but into Ireland and Holland. In 1787 his fame enabled him to reap some reward for these labours; for in that year he let three rams for 1250*l.*, and was offered 1050*l.* for twenty ewes. The principles which guided him in the breeding of stock are given, in *Ann. of Agr.* vol. vi. p. 466. by Arthur Young, who twice visited him at Dishley. He kept constantly in view, in all his exertions, these objects — the most meat from the least food — the least offal, and the size of the best joints. He thought, it seems, that the pale coloured beasts yielded finer meat than the dark ones: he was one of the first who *generally* introduced the practice of *feeling* stock under examination; not but what it was a practice partially adopted, even in the days of old Holinshed. Young describes, vol. viii. p. 473., the Dishley sheep, and Bakewell's neat cattle at p. 486., which were, perhaps, the finest of his day; and then his great heavy black cart horses, speaking of them as "by far the finest I have seen of that breed." Bakewell did much, too, in the construction of water-meadows (*Ibid.* p. 490.), and it is evident from his various observations reported by Young, that he was an enlightened and successful agriculturist, as well as breeder. The Dishley sheep have long been celebrated for their aptness to fatten, their quietude, and the smallness of their bones — they will long hand down the *name of Bakewell* as one of the farmers' best benefactors. Bakewell made no secret of his modes of improving stock, and rarely, if ever, entered into controversies with rival breeders. That with Mr. Chaplin of Tathwell, in Lincolnshire, is perhaps the only exception. (*Young's Ann.*, vol. x. p. 562.)

BAKING. The application of heat in the preparation of bread. See BREAD.

BAKING OF LAND. A term applied to such kinds of land as are liable, from the large proportions of clayey or other matter which they contain, to become hard and crusty on the surface. In order to prevent this, the best practice is to lessen the tenacity of such soils by the application of substances capable of rendering them more open and friable, as lime, and other calcareous materials, rich earthy composts, sand, &c.

BALANCE. See WEIGHTS and MEASURES.

BALD MONEY or SPIGNEL. (*Meum athamanticum.*) A plant of the fennel species: is found in mountainous pastures in the north, in Westmoreland, Lancashire, the north of Yorkshire, and Merionethshire, and abundantly in the Highlands of Scotland. It is a perennial, flowering in May and June. The whole plant, and especially the root, is highly aromatic, with a flavour like melilot, which it communicates to milk and butter, from the cows feeding upon its herbage in spring. A strong infusion of this herb is said to give cheese the taste and odour of the Swiss *chapziegar*. (*Smith's Eng. Flora.*)

BALK. From the Dutch and German *balk*; Welsh and Saxon *balc*. Also derived by Skinner from the Italian *valicare*, to pass over, and the Su-Goth. balk. (*Todd.*)

A provincial term applied to a piece of land which has been either casually overslipped, and not turned up in ploughing, or purposely left untouched by the plough, for a boundary between lands. Much valuable land is in this way, in many parts of England, needlessly left useless. It also signifies the great beam or dormar of a house, and the frame posts on which corn stacks are placed. And balks, or *bawks*, implies poles or rafters laid over an outhouse, stable, or barn for a roof.

BALL. Whatever was round was called by the ancients either *bal*, or *bel*, and likewise *bol* and *bül*. In farriery, a well-known form of medicine, for horses or other animals, which may be passed at once into the stomach. They should be made of a long oval shape, and about the size of a small egg, being best conveyed over the root of the tongue by the hand. This method of administering medicines is preferable in most cases to that of drenches.

BALLARD. A provincial term used in Devonshire to signify a castrated ram.

BALLS. (Dan. and Dutch *bol.* rally, any thing made in a globular f In farriery, this is a mode of adminis medicine to horses, by far the safest a easiest. I subjoin the recipes for a those most commonly used by the far

Mild Physic Ball.

Barbadoes aloes	6 dra
Powdered ginger	2
Castile soap	2
Oil of cloves	20 dro

Syrup of buckthorn sufficient to form

Strong Physic Ball.

Barbadoes aloes	8 dra
Ginger, powdered	2
Castile soap	2
Oil of cloves	20 dro

Syrup of buckthorn sufficient to form a

Calomel Ball for a Riding Horse.

Calomel	1 dra
Aloes, powdered	6 –
Ginger, powdered	2 –
Castile soap	2 –
Oil of cloves	20 dro

Syrup of buckthorn sufficient to mak a ball.

Calomel Ball for a Cart Horse.

Aloes, powdered	8 dra

Otherwise same as the last.

Diuretic Ball.

Castile soap	4 oun
Nitre, powdered	2 –
Rosin, powdered	2 –
Oil of juniper	½ –

Aniseed powder and treacle sufficie make into eight balls.

Cordial Ball.

Cummin seed, powdered	4 oun
Aniseed, powdered	4 –
Caraway seed, powdered	4 –
Liquorice powder	4 –
Ginger, powdered	2 –

Honey sufficient to make into balls th of a hen's egg.

BALM, or BAUM. (*Melissa offic* From Gr. μελι, honey, on account of th being supposed to collect it abundantly their flowers.) Balm is used both as dicinal and culinary herb. The leav employed green, or dried.

The soil best suited to its growth i poor friable one, but rather inclini clayey than silicious. Manure is nev quired. An eastern aspect is best It is propagated by offsets of the root by slips of the young shoots. The first may be practised any time during the

ımn, but the latter only during May
If offsets are employed, they may
ed at once where they are to remain,
twelve inches; but if by slips, they
inserted in a shady border, to be
emoved, in September or October,
they are to remain. At every re-
ater must be given, if dry weather,
l they are established. During the
they require only to be kept clear
. In October the old beds require
ssed, their decayed leaves and stalks
away, and the soil loosened by the
light digging.

eds may be gathered from in July,
ng, but their green leaves, from
o September; and those planted in
vill even afford a gathering in the
of the same year. For drying, the
re cut with their full clothing of
o the very bottom, and the process
ed gradually in the shade. (*G. W.*
's Kitchen Garden.)

very common and well-known plant
itchen gardens is fragrant in smell,
root creeps and spreads rapidly and
ntly. It flowers in July, and is best
an infusion when fresh, as it loses
rable power when dried. Its me-
qualities are derived principally
he proportion of volatile oil, resin,
ter extractive, which it contains. It
sionally used in consequence of its
ately stimulant powers, in conjunc-
ith more potent drugs, to produce
perspiration. Mixed with honey
egar, it forms a good gargle for an
d sore throat.

M, BASTARD. There are two
found in the woods and hedges of
h and west of England. The red-
stard-balm (*Melittis melisophyllum*),
purple and white bastard-balm (*M.*
ora). The plant when it begins to
omes highly fragrant, like woodruff,
al grass.

OTADE. The leap of a horse.

SAM. (*Impatiens Balsamina.*) This
e flower is a native of the East In-
l Japan, where the natives, accord-
Thunberg, use the juice prepared
m for dyeing their nails red. It is
annual, rising from one to two feet
ith a succulent branchy stem, ser-
aves, and various coloured flowers. It
rom July to October, and its flowers
gle and double, red, pink, white, or
ted. It loves a good soil, and shelter
hot sun. It blooms very handsomely
adow. Sow the seed early in March
t bed. Pot the plants singly, and
m them by degrees to the open air.
hem in larger pots, or put them out in the garden in May. They will require no watering, after being well rooted. Stir the earth round each plant frequently, and do it gently, with a small trowel.

The varieties are infinite, but not so marked or permanent as to have acquired names. The seed from one plant will hardly produce two alike.

BALSAM TREE. (*Tacamahacca.*) This tree possesses considerable medicinal virtues. It is known among us as the Tacamahac tree, from its similitude to the real tree of that name, which is a native of the East and of America. The leaves of our balsam tree are long, of a dusky green on the outside, and brown underneath. The buds of the tree in spring are very fragrant, and a sticky substance surrounds each bud, which adheres to the fingers on touching them.

BALSAM, YELLOW. (*Noli me tangere*, Touch me not.) Is sometimes but very rarely met with in watery shady places in the north. In several parts of Westmoreland, also in Yorkshire, Lancashire, and Wales, Ray tells us it is met with more frequently; and on the banks of Wyndermere in little brooks and watery places near Rydall Hall, more plentiful. (*Smith's Eng. Flora.*)

BANDAGE. In farriery, a long narrow slip, or fillet, of flannel, cotton, or linen, made use of by veterinary surgeons, to retain dressings, &c. upon wounds, as well as to assist their healing, by its gentle uniform mechanical pressure.

BAN-DOG. A corruption of band-dog, a large kind of fierce dog, which was formerly kept chained up as a watch-dog.

BANDS. The cords by means of which sheaves and trusses are tied. They are formed of twisted straw or hay.

Bands, where the straw is tender, should be made in the morning, that they may not crack; for the straw will not twist so well after the sun is up. The turning of three or four of the stubble or bottom ends of the straw to the ears of the band sometimes tends greatly to add to their strength and toughness.

The bands for the sheaves should not be spread out, except in fair weather, because they will grow sooner than any other part of the corn if rain should come; for they cannot dry, on account of their lying undermost. But though the bands may be made while the morning dew is upon them, the sheaves ought never to be bound up wet; for, if they are, they will grow mouldy.

BANDS OF A SADDLE are two pieces of iron, made flat, and three fingers broad, nailed upon the bows of a saddle, one on each side, contrived in such a way as to hold the bows in the situation that makes the form of the saddle.

BANE. The disease in sheep generally termed the rot.

BANE BERRIES (*Actæa*), and **BLACK BANE BERRIES** (*Herb Christopher*). Perennial herbs, natives of cold countries, with compound or lobed cut leaves and clustered white flowers. The berries of the former are black, red, or white, of the latter, purplish, black, juicy, the size of currants, and have fetid, nauseous, and dangerous qualities. These herbs are found sometimes in bushy, mountainous, limestone situations, and frequently in the north-west part of Yorkshire: toads are reported to enjoy the fetid odour of this plant. (*Smith's Engl. Flora.*)

BANE-WORT. See Deadly Nightshade.

BANGLE-EARS. An imperfection in the ears of horses.

BANKS, of rivers and marshes, &c. (banc, Sax.) In agriculture, are heaps or mounds of earth piled up to keep the water of rivers, lakes, or the sea, from overflowing the grounds which are situated contiguous to them on the inside. (See Embankments.)

The 7 & 8 G. 4. c. 30. s. 12. enacts, that if any person shall unlawfully and maliciously break down or cut down any sea-bank, or sea-wall; or the bank or wall of any river, canal, or marsh, whereby any lands shall be overflowed or damaged, or shall be in danger of being so, or shall unlawfully and maliciously throw down, level, or otherwise destroy any lock, sluice, flood-gate, or other work on any navigable river or canal, every such offender shall be guilty of felony; and, being convicted thereof, shall be liable, at the discretion of the court, to be transported beyond the seas for life, or for any term not less than seven years, or to be imprisoned for any term not exceeding four years; and if a male, to be once, twice, or thrice publicly or privately whipped (if the court shall so think fit), in addition to such imprisonment. And if any person shall unlawfully and maliciously cut off, draw up, or remove any piles, chalk, or other materials fixed in the ground and used for securing any sea-bank, or sea-wall, or the bank or wall of any river, canal, or marsh, or shall unlawfully and maliciously open or draw up any flood-gate, or do any other injury or mischief to any navigable river or canal, with intent so as thereby to obstruct or prevent the carrying on, completing, or maintaining the navigation thereof, every such offender shall be guilty of felony, and, being convicted thereof, shall be liable, at the discretion of the court, to be transported beyond the seas for the term of seven years, or to be imprisoned for any term not exceeding two years; and, if a male, to be once, twice, or thrice publicly
or privately whipped (if the court
think fit), in addition to such impriso
(*Archbold's Crim. Law.*)

BANKS, SIR JOSEPH, was
Revesby Abbey, the seat of his fat
Lincolnshire, in 1743. He was educ
Eton and Oxford, which university
in 1761, on the death of his father.
herited an ample fortune, yet the
pursuit of scientific discoveries was
his taste than literary ease. In 1
made a voyage to Labrador and New
land. In 1768 he went round the
with Cook, and in 1772 made a voy
Iceland and the Western Isles of Sc
Natural history was the favourite
scientific studies, and every departn
it was enriched by his researches.
elected, in 1771, LL.D. at Oxfor
1778 he was created a Knight of the
and made president of the Royal S
and three years afterwards he was
baronet. He at first gave much diss
tion to some of the members of the
Society, so as nearly to cause it to
but it gradually passed away; and fro
time until his death, May 9. 1820,
universally hailed as a munificent fr
science and literature. He is enti
the grateful remembrance of the farm
amongst other things, his valuable rese
into the nature and origin of ru
mildew. (*G. Johnson's Hist. Eng.*

BANNOCK. The Scotch name
small loaf or cake of oatmeal.

BARB. A general name for hor
ported from Barbary. The barb, one
most celebrated of the African racer
be met with throughout Barbary, M
Fez, Tripoli, and Bornou. It seldom e
fourteen hands and a half in height.
countenance of the barb is usually ind
of its spirit, and the facial line, in dire
tradiction to that of the Arabian, i
slightly rounded; the eyes are prom
the ears, though frequently smal
pointed, are occasionally rather lon
drooping; the neck is of sufficient l
the crest is generally fine, and not ove
with mane; the shoulders are flat a
lique; the withers prominent, and th
almost invariably deep; the back is
straight; the carcass moderately r
only; the croup long, and the tail
rather high; the arms and thighs
commonly muscular and strongly m
the knee and hock are broad and low
the back sinews singularly distinct an
marked from the knee downwards; t
terns rather long, and the feet firm, a
moderately open.

The barb requires more excitem
call out his powers than the Arabia

sufficiently stimulated, his qualities of
and endurance render him a powerful
onist, while the superior strength of his
and enables him to carry the greater
t of the two. The Godolphin barb,
was imported from France at the con-
n of the last century, about 25 years
the Darley Arabian, was one of those
worthy of note. The former appears
e rivalled the latter in the importance
get. He was the sire of Lath, Cade,
ham, Regulus, Bajazet, Tarquin, Dor-
e, Sultan, Blank, Dismal, and many
horses of racing note; and without
the English blood-breeds were more
ted to the Darley Arabian and the
phin barb than to all the other east-
orses which had previously entered
untry. Among other barbs of some
ety, introduced in the 18th century,
y mention the Thoulouse, the Curwen
Old Greyhound, St. Victor's, Tarran's
, Hutton's Bay, Cole's Bay, and
ton's Barb. (*Blaine's Encyc. Rural*
s, p. 243.)

RBEL, COMMON. (*Cyprinus bar-*
Bluish-white carp, with four beards,
olive-coloured back. It is a fresh-
r fish, and, in some situations, acquires
ge size, occasionally measuring nearly
e feet in length, and weighing from
ve to eighteen pounds. It has some-
t of an elongated, elliptical form. The
y is covered with small pale gold-
ured scales, edged with black on the
and sides, and white on the belly: the
is smooth and the eyes are large. The
el is found chiefly in deep ponds and
-flowing rivers. It is a social fish,
ys swimming in company. This fish
be caught with red worms, gentles,
es, cheese, and the young brood of
s, hornets, and bees. Barbels spawn
t the middle of April, and are in
n about a month after. The roe of
arbel is said to have very poisonous
ties, causing vomiting, diarrhœa, and
ings in those who eat it. It is at best
fish, in reference to the table. (*Wal-*
Angler; Blaine's Encyc. Rur. Sports,
56.)

RBERRY, COMMON, or PIP-
IDGE BUSH. (*Berberis vulgaris*.) An
enous thorny shrub, bearing bunches of
yellow drooping flowers in May, which
succeeded by oblong scarlet berries,
ing in September. The branches are
ble, covered with alternate tufts of de-
ous, egg-shaped, pinnated leaves, finely
ed on the edge. Sharp three-cleft
s rise at the base of each leaf-bud.
barberry likes any kind of soil, and
es good hedges. It may be *propa*gated by seed, or by layers, which should remain two years before they are removed. The gross shoots, if the shrub stands singly, should be pruned away, and it will fruit better. The berries are gratefully acid, and the juice, when diluted with water, may be used as lemonade in fevers. The leaves, eaten in salad, are like sorrel. The fruit, made into conserve, is good. It is also excellent as a pickle and a preserve.

The common barberry bush is a native of this country; and, notwithstanding the high state of cultivation this kingdom has now arrived at, it is still to be found growing wild in many parts of the northern counties. Gerarde says, in his time (1597), most of the hedges near Colnbrook were nothing else but barberry-bushes. It is now very properly introduced into our gardens and shrubberies, being both ornamental and useful; but it should not be planted near the house or principal walks, on account of its offensive smell when in blossom. The flowers are small but beautiful; and, on their first appearance, have a perfume similar to that of the cowslip, which changes to a putrid and most disagreeable scent, particularly towards the evening and at the decay of the flowers. Barberries are of an agreeable, cooling, astringent taste, which creates appetite. The fruit and leaves give an agreeable acid to soup. The Egyptians were used to employ a diluted juice of the berries in ardent and pestilential fevers; but it is merely an agreeable acidulous diluent. The inner bark, with alum, dies a bright yellow, and, in some countries, is used for colouring leather, dyeing silk and cotton, and staining wood for cabinet and other purposes. Cows, sheep, and goats, are said to feed on the leaves; but horses and swine refuse them. A very singular circumstance has been stated respecting the barberry-shrub; that corn sown near it becomes mildewed, and proves abortive, the ears being in general destitute of grain; and that this influence is sometimes extended to a distance of 300 or 400 yards across a field. This, if correct, is a just cause for banishing it from the hedge-rows of our arable fields, for which otherwise its thorny branches would have made a desirable fence.

I will cite a few instances which have been brought forward in proof of the injurious effects of this plant upon standing corn. Mr. Macro, a very respectable farmer at Barrow, in Suffolk, planted a barberry bush in his garden, on purpose to ascertain the disputed fact. He set wheat round it three succeeding years, and it was all so completely mildewed that the best of the *little grain it* produced was only about th size of thin rice, and that without any flour. He adds, that some, which he set on the opposite side of his garden on one of the years before mentioned, produced very good grain, although the straw was a little mildewed. From this observation, Mr. Phillips was induced to try the experiment by sowing clumps of canary seed in his shrubbery. Those which were planted immediately under the barberry bush certainly produced no seed; but other plants of this grass yielded seed, although not at many yards' distance. The celebrated Duhamel and M. Boussonet, who have paid such particular attention to agriculture, assure us that there is no just reason for ascribing this baneful effect to the barberry bush; and Mr. G. W. Johnson is of the same opinion. (See Mildew.) On the other hand, we have it affirmed to be most destructive and injurious to all kinds of crops of grain and pulse, as proved by various observations, experiments, and testimonies made in Brandenburgh, Hanover, Prussia, and Germany. (See *Com. Board of Agr.* vol. vii. pp. 118—126.; and the writer there says, towards the conclusion of his article, "To those still inclined to regard the barberry as innocent, notwithstanding all the above proofs to the contrary, I would only make the request that they no longer urge their opinion on abstract and general grounds, until they have collected the result of impartial observation and careful experiment.")

The Rev. Dr. Singer, in the *Trans. High. Soc.*, vol. vi. p. 340., in considering the barberry as the cause of rust or mildew on corn crops, says, when quoting the survey of Dumfries-shire, "On one farm alone, that of Kirkbank, the tenant lost about 100*l.* in his oat-crops yearly; and altogether the annual damage in the county was considerably above 1000*l.* The views of Sir Joseph Banks, and of some intelligent practical farmers, relative to the evil influence of the *Berberis vulgaris*, induced the late Admiral Sir William Johnstone Hope to give orders for the total extirpation of the barberry bushes which grew intermixed with thorns in his hedgerows; and since that was done, and for above twenty years, no such distemper has appeared in these fields. The same thing has been done in some parts of Ayrshire, and the like result has followed. "These facts," adds Mr. Singer, "appear to indicate some connection between the occurrence of rust or mildew on growing corn and the neighbourhood of barberry bushes." Phillips inquires (*Pom. Brit.*) whether the blighting effects of this shrub may not in some degree be accounted for by its May-flowers alluring insects, which breed on the branches, and then feed their progeny on the nutritious juices of the su rounding blades of young corn?

BARFAN. A provincial term used denote a horse-collar.

BARGAIN. See Buying and Sellin

BARILLA. See Soda.

BARING *Roots of Trees.* A practi formerly much adopted, but which lat experience has shown to be highly injurio and hurtful to their growth.

BARK. (Dan. *Barck*; Dutch; *ber* from the Teutonic *bergen*, to cover.) T rind or covering of the woody parts of tree. The bark of trees is composed three distinct layers, of which the oute most is called the *epidermis*, the next, *parenchyma*, and the innermost, or that contact with the wood, the *cortical laye* The epidermis is a thin, transparent, tou membrane: when rubbed off, it is gr dually reproduced, and in some trees cracks and decays, and a fresh epiderm is formed, pushing outwards the old: hen the reason why so many aged trees ha a rough surface. The parenchyma is te der, succulent, and of a dark green. T cortical layer, or *liber*, consists of th membranes encircling each other, and the seem to increase with the age of the pla The liber, or inner bark, is known by whiteness, great flexibility, toughness, a durability: the fibres in its structure a ligneous tubes. It is the part of the st through which the juices descend, and the gan in which the generative sap from whe all the other parts originate is receiv from the leaves. The bark in its intersti contains cells which are filled with juices very varying qualities; some, like that the oak, remarkable for their astringenc others, like the cinnamon, abounding wi an essential oil; others, as the jesuits' ba containing an alkali; some mucilagino many resinous. Several of these barks ha been analysed by various chemists: th have found them to consist chiefly of carb oxygen, and hydrogen, with various sa and earthy substances. (*Thom. Chem.* vol. p. 231.) The Quinquina bark was analys by M. Fourcroy: he found in the ashes o tained from 9216 grains of the bark,—

	gr
Carbonate of potash - -	1
Sulphate of potash - -	1
Muriate of potash (chloride of potassium) - - -	3
Phosphate of lime - - -	2
Carbonate of lime (chalk) -	42
Silica (flint) - - -	4

Red Peruvian bark, when burnt, leave ash, consisting of—

Carbonate of potash - -	1
Muriate of potash - - -	0

of potash - - -	0·5
e of lime - - -	9·0
	12·

ch superior analyses have been ed in a different manner, and the are the constituents of the best or Quinquina bark, (or, as it is he market, *Crown bark*,) by Bu-

cinchonia - -	1·53
lime - - -	1·30
n - - -	9·97
resin - - -	1·56
tter - - -	0·78
cid, with some chloride of	
a - - -	5·80
- - - -	4·43
- - - -	0·20
woody fibre) - -	74·43
	100·

burning Cinchona bark, many of nces contained in this list must be decomposed, and converted its mentioned by Fourcroy. Denalysis, however, gives only the the process, not the real constihe bark which has been submitted ation by its means. It is thered mode of determining the value a manure, but it affords no cornation respecting the constituents ks.

sure (*Chem. Rec. Veg.*) found in f the ashes of the barks of various ollowing substances: —

	Oak.	Hazel.	Poplar.	Mulberry.	Hornbeam.
s - -	7·	12·5	6·	7·	4·5
sphates -	3·	5·5	5·3	8·5	4·5
bonates -	66·	54·	60·	45·	59·
- -	1·5	0·25	4·	15·12	1·5
ides -	2·	1·75	1·5	1·12	0·12

his analysis the farmer will see earthy and saline ingredients of f forest trees must be considerers: it is only to the slowness refuse tanner's bark undergoes n that its neglect by the culst be attributed. It might cerwever, be mixed with farm-yard ith very considerable advantage, n often done with saw-dust and he manner so well described by of Hathershew (*Journ. of Roy. Soc.* vol. i. p. 135.), see FARMNURE; and in its half putrefied fresh state it produces on some s very excellent effects as a top and in instances where carn object, even its ashes would be m the quantity of earthy *car*bonates and phosphates which they contain, a very useful manure.

The different uses of barks in tanning and dyeing are numerous and important. The strength or fineness of their fibres is also of consequence: thus, woody fibres are often so tough as to form cordage, as exemplified in the bark of the lime, the willow, and the cocoa-nut; the liber of some trees, as for example the lime and the paper mulberry, is manufactured into mats; and it is scarcely requisite to refer to hemp and flax for spinning and weaving. The bark of the papyrus, or flag of the Nile, was first used for paper; that of the mulberry is still employed in the cloth of Otaheite; that of the powdered Swedish pines, as bread for the poor peasants of Scandinavia. In England, the bark of the oak is used for affording tannic acid in the manufacture of leather; but other barks, such as that of the Spanish chestnut and the larch, are also employed. The following table of Davy will show the relative value of different kinds of bark to the tanner: it gives the quantity of tannic acid afforded by 480 lbs. of different barks in that great chemist's own experiments. (*Lect.* p. 83.)

Average from the entire bark of —	lbs.
Middle-sized oak, cut in spring	- 29
——— cut in autumn	- 21
Spanish chestnut - -	- 21
Leicester willow (large size) -	- 33
Elm - - - -	- 13
Common willow (large) -	- 11
Ash - - - -	- 16
Beech - - - -	- 10
Horse chestnut - -	- 9
Sycamore - - -	- 11
Lombardy poplar - -	- 15
Birch - - - -	- 8
Hazel - - - -	- 14
Blackthorn - - -	- 16
Coppice oak - - -	- 32
Larch, cut in autumn - -	- 8
White interior cortical layers of oak bark	72

The difference of seasons makes a considerable variation in the produce of tannic acid; it is the least in cold springs. The tannic acid most abounds when the buds are opening, and least in the winter; 4 or 5 lbs. of good oak bark of average quality are required to form 1 lb. of leather. The consumption of oak bark in Great Britain is about 40,000 tons, more than one half of which is imported from the Netherlands.

Cork is the outer bark of a species of oak, which grows abundantly in the south of Europe. The average quantity imported annually, is about 44,551 cwts.

The quantity of *Quercitorn* bark, which is the production of black oak, (*Quercus nigra*,) is 22,625 cwts.

The quantity of Cinchona, or *Peruvian* bark, is on an average about 300,000 lbs., but the consumption does not exceed 45,000 lbs.: the remainder is re-exported.

The bark of trees is best cleansed from the parasitical mosses with which it is wont to be infected, by being washed with lime-water or a solution of common salt in water (4 oz. to a gallon), applied by a plasterer's brush.

BARK-BOUND. A disease common to some fruit and other trees, which is capable of being cured by making a slit through the bark, from the top of the tree to the bottom, in February or March; where the gaping is pretty considerable, fill it up with cow-dung, or other similar composition.

BARKER. A term used provincially in Devonshire, to signify a rubber or whetstone. It is also applied to those persons who bark trees.

BARKING IRONS, are instruments for removing the bark of oak and other trees. They consist of a blade or knife for cutting the bark, while yet on the trunk, across at regular distances, and of chisels or spatulæ, of different lengths and breadths for separating the bark from the wood.

BARKING OF TREES. The operation of stripping off the bark or rind. It is common in this country to perform the operation of oak-barking in the months of May and June, as, at that season, the bark, by the rising of the sap, is easily separated from the wood. This renders it necessary to fell the trees in these months. The tool commonly made use of in most counties is made of bone or iron. If of the former, the thigh or shin-bone of an ass is preferred, which is formed into a two-handed instrument for the stem and larger boughs, with a handle of wood fixed at the end. The edge being once given by the grinding-stone, or a rasp, it keeps itself sharp by wear.

Two descriptions of persons are usually employed in this business, the hagmen or *cutters*, and the *barkers*. The latter chiefly consists of women and children. The cutters should be provided with ripping-saws, widely set, with sharp, light hatchets, and with short-handled pruning hooks. The barkers are provided with light, short-handled, ashen mallets, the head being about eight inches long, three inches diameter in the face, and the other end blunt, somewhat wedge-shaped; with sharp ashen wedges, somewhat spatula-shaped, and which may either be driven by the mallet, or, being formed with a kind of handle, may be pushed with the hand; and with a smooth-skinned whin, or other land-stone. The cutters are divided into two parties; hatchet-men, who sever the stem, and hook-men, who prune it of small twigs, and cut it into convenient lengths. Small branche
twigs are held by one hand on the ston
bark is then stripped off, and laid reg
aside, as in reaping of corn, till a bun
convenient size be formed. The trun
branches, as large as the leg, &c. ar
along the ground; the bark is start
the thick end, by thrusting or driving
wedge, which, being run along the
length, rips it open in an instant; the
is applied on both sides of the incisi
the manner of the knife in skinning a
A skilful barker will skin a tree or
as completely as a butcher a beast.
the point most particularly to be ob
in this art is, to take off the bark in a
shreds or strands as possible, for the
nience of carriage to, and drying it
horses. These are formed of long bra
and pieces of a yard in length, sh
ed at one end, and having a knag
other to receive and support the end
former.

The horses or supports may stand
four or five feet of each other, and a
ways to be placed on a dry, elevated
that the bark may have free air in
At the end of each day's work, the
is carried to, and laid across, the
to the thickness of about six or eight
The large pieces are set up on end,
against the horses, or they are forme
small pyramidal stacks. Due attentio
be paid to turning the bark once, o
haps twice a day, according to the s
the weather. Good hay weather is good
ing weather. Gentle showers are ben
but long continued rains are produc
much evil; nor is the bark the bett
being dried too fast. A careful h
will take pains to lay the strong pi
the trunk in such a manner as to sh
the wet, in continued rains, from the
bark of the extremities; at the same
preserving as much as possible the
of the inner bark, and consequent
value of the whole, by turning th
tural surface outwards. For it is chi
the high brown colour of the inner
and by its astringent effect upon the
when tasted, that the tanner or me
judges of its value. These properti
lost, if through neglect, or by the
tudes of the weather, the inner ba
blanched or rendered white.

After it becomes in a proper state,
completely past fermentation, if it
conveniently be carried off the groun
housed, it must be stacked. An
rienced husbandman who can stack h
also stack bark. But it may be pro
warn him against building his stac
large, and to caution him to thatch it

method of drying bark in Yorkshire
rally the common one of setting it in
ng posture against poles lying hori-
on forked stakes. But in a wet
or when the ground is naturally
t is laid across a line of top-wood,
into a kind of banklet, raising the
out a foot from the ground. By
ctice no part of the bark is suffered
the ground; and it is, perhaps,
e whole, the best practice in all sea-
l situations.

LEY. (Lat. *hordeum.*) A species of
rn, which ranks next to wheat in
ce, and of which there are several
. The generic name seems either
, from *horreo*, on account of its long
as it was anciently written, *fordeum*,
rom φερβω, to feed or nourish,
ορβη and *forbea*, and, changing the
fordeum. (*Vossius.*) The name is,
, derived by Junius from the He-
. The plant belongs to the natural
raminea, or grasses. It readily ac-
ates itself to any climate, bearing
of the torrid zone, and the cold of
l, and ripening in both equally well.
enus *Hordeum*, says Professor Low,
wing species may be enumerated as
ed for their seeds:—

wo-rowed barley (*Hordeum disti-*

wo-rowed naked barley (*H. gymno-*
m).

wo-rowed sprat, or battledore barley
icho-zeocriton).

-rowed barley (*H. hexastichum*).

-rowed naked barley (*H. gymno-*
um).

-rowed sprat, or battledore barley
sticho-zeocriton).

wo leading species of this grain in
on are (No. 1.) the two-rowed, or
barley, and (No. 4.) the six-rowed
The minor varieties of two-rowed
re numerous, and are distinguished
y the quality of the grain, and by
bit of early or later ripening; and
rieties are more productive than
effects apparently dependent upon
es of climate and situation.

y is an annual plant, but like wheat it
own in autumn, and then it acquires
it of later ripening, and is termed
arley.

rowed naked barley is said to have
troduced into England in the year
It is now little cultivated, and is by
erted, though without any evidence,
e into the common species.

next species, two-rowed sprat, or
re barley, is scarcely cultivated in
nd, the shortness of the straw being regarded as an objection; but it is much esteemed in Germany, where it is termed *rice barley*, owing to its smelling like rice in boiling, when it is decorticated.

The fourth enumerated species is six-rowed barley. When sown before winter, this species acquires the habit of late ripening, and is then termed winter barley.

One of the kinds of six-rowed barley, and the best known in this country, is bere, bear, or bigg. Bigg ripens its seeds in a shorter period than the two-rowed barleys. It is cultivated very generally in the north of Scotland, in Denmark, Sweden, and other parts of Europe, and in the south of England for green food in spring, and for this purpose is sown early in the autumn. The number of its grains is greater than in the two-rowed kinds, but they do not weigh so heavy in proportion to their bulk. It is hence regarded as an inferior crop, and is only cultivated in the more elevated parts of the country. It ripens very early when sown in spring, thence the advantages which it possesses in a late climate. (*Low's Prac. Agr.* p. 240.)

The six-rowed naked barley is cultivated in various parts of Europe, and is greatly esteemed for its fertility. In some parts of Germany it is regarded as the most valuable kind of barley, and by the French, on account of its supposed productiveness, it has been termed *orge céleste*. An excellent variety of this naked barley has been produced by Mr. C. Alderman of Kintbury, in Berkshire, and M. Mazucco, in a French paper, earnestly recommends the more general cultivation of naked barley, as he states that it weighs as much as the best wheats, and its quality resembles them so much, that it may be used for the purpose of making good bread, and also for pearl barley. In mountainous countries, its produce is twenty-four to one. (*Quart. Journ. of Agr.* vol. iii. p. 373.) This and the other superior kinds of barley deserve more attention than they have yet received. Mr. Warren Hastings, (in an article in the *Com. to the Board of Arg.* vol. vi. p. 304.), after twelve years' experience in the cultivation of naked barley, very justly observes, "that it is of the greatest importance to promote the culture of this sort of grain." "It is," he adds, "the corn that, next to rice, gives the greatest weight of flour per acre, and it may be eaten with no other preparation than that of boiling. It requires little or no dressing when it is sent to the mill, having no husk, and consequently produces no bran. It is gathered into the barn, and may even be consumed, when the seasons are favourable, in about eighty or ninety days after being *sown; and there is* no species of grain better calculated for countries where the summer is short, provided the vegetation be rapid."

The last of the species to be mentioned, says Professor Low, is six-rowed sprat, or battledore barley. This has been sometimes termed six-rowed barley; whereas the character of six-rowed barley does not belong to it alone. An examination of the plant will show that it is the common battledore barley, with all the florets entire. Much confusion has arisen in the arrangement by agriculturists of the cultivated barleys, and in an especial degree, by their speaking of four-rowed and six-rowed kinds. There is, however, no barley to which the term four-rowed can be applied. Barley is termed two-rowed, or six-rowed, according to the number of its fertile florets. In two-rowed barley, one row of florets on each of the two sides of the spike is fertile, and consequently one row of seeds on each side is perfected.

In six-rowed barley, three rows on each side are perfected. In this sense only it is termed six-rowed barley. But there is no species known to us in which only two rows on each side of the spike are fertile. Slightly examined, indeed, six-rowed barleys frequently present the appearance of four rows; but this is in appearance only, for such barleys have always the three rows on each side perfect. In poor soils and unfavourable situations, two of the rows run much into each other, and this has perhaps given rise to the mistake; but the two rows which thus run into each other in appearance are on the opposite side of the rachis. I have ventured, adds Professor Low (from whose work the above preliminary observations are taken), to propose a new arrangement of the cultivated barleys; under which it will be seen that the *Hordeum vulgare* of some botanists is *Hordeum hexastichum*, and that the *Hordeum hexastichum* of some botanists is *Hordeum hexasticho-zeocriton*. Particular varieties have been in great repute at different times, when first introduced, and then seem to have, on many soils, lost their superiority. "Of this kind is the *Moldavian* barley, which was much sought after some years ago; and lately, the *Chevalier* barley, so called from the gentleman who first brought it into notice, has risen into great repute. It is said, that, having observed an ear of barley in his field greatly superior to the rest, he carefully sowed the seed, and cultivated it in his garden, till he had a sufficient quantity to sow a field. It has since been extremely multiplied and diffused through the country. Some eminent maltsters and brewers have declared, that it forms more saccharine matter than any other sort; and the trials hitherto made have convinced most agriculturists that it is not
only heavier in the grain, but
ductive. In 1832 Lord Leicester
always foremost in all agricultur
ments and improvements, sowed
able portion of land with this
the result is said to have been
satisfactory. In 1833 two acres of
barley were sown in the same
some of the best of the comm
The soil was poor, light sand,
order and very clean. The prod
whole was nearly the same, 4 qu
acre; but the Chevalier barle
57 lbs. per bushel, while the com
weighed only 52. This gives the
advantage of ten per cent. The
very fine, and the whole that the
could spare was eagerly purcha
neighbours for seed at his own p
long in the ear, and very plum
plant *tillers* so much, that half
seed may be saved per acre. T
bably owing to its grains being
and vegetating rapidly. The stra
of the other long-eared barley
weak in proportion to the ear;
also to be harder, and not so
cattle. These are circumstances
perience alone can ascertain. Th
it has a decided superiority over
sorts, no one who has tried it fai
prepared lands seems to deny." (

A new and seemingly very
riety has lately been introduced,
Annat barley. (See *Quart. Jour*
vol. v. p. 618.) It is the produ
ears, which were picked by Mr.
field in Perthshire in the harve
since which period it has been
Annat Gardens, thence its name.
it was sown on a ridge in the
field, with common barley on th
and Chevalier barley on the othe
of straw it seemed to have the a
both these kinds; it was five
ripe than the former, and about
before the latter, and it was also
bushel heavier than the Cheval
meeting of the Stoke Ferry Far
in February of the present yea
was stated by one of the membe
Chevalier was decidedly the bes
good barley land; but for very
he preferred the Moldavian;
bably, even this was surpassed
usually known as the old field b
Annat barley was alluded to by on
who had tried it last season; but
thrashed it, he could only say th
appearance it augured well.
adopted the drill system, using
coulters, so as to disperse the
rows as much as possible, givin

the appearance of having been ploughed in. Very little difference of opinion existed as to the superiority of the Chevalier over any other variety, on the average of soils. One member had grown 15 coombs an acre on it; but he acknowledged it was on very excellent land. A curious fact was elicited in connection with this stock of barley; which was, that however much the crop might be laid and beaten down, either by storms or by its own weight, the grain did not receive that injury to which any other sort under similar circumstances would be liable. (*Brit. Farm. Mag.* vol. v. p. 190.)

There can be no doubt of the general superiority of the Chevalier as a malting barley. Its introduction has occasioned a complete revolution in certain districts, where formerly no such thing as malting barley was thought of. It is one of the greatest improvements of modern times, and now commands a higher price in the market than other barleys by two or three shillings a quarter.

Barley is evidently a native of a warmer climate than Britain; for in this moist atmosphere it is observed to degenerate, when either neglected or on a poor soil. We have the best authority for its having been cultivated in Syria so long back as 3153 years; therefore that part of the world may be fairly fixed as its native soil. We find that the Romans obtained barley from Egypt, and other parts of Africa, and Spain. It was also grown in France, as Columella calls one variety of barley *Galaticum*.

Barley, like all grains, is liable to diseases, namely smut, the burnt ear, blight, and mildew, for an account of which I must refer the reader to these words. It is also apt to germinate in the ear even before it is reaped, in wet weather, giving the ear a singular appearance, and rendering the grain, even when kiln-dried, unfit for malting, and only of use to feed fowls or pigs. The diseases of barley are not so numerous or fatal as those of wheat. It is attacked by the larvæ of certain flies. The smut, which attacks it in a partial degree, is generally the fungus *uredo segetum*.

Barley is now extensively cultivated in most European countries, and in the temperate districts of Asia and Africa. It may also be raised between the tropics, but not at a lower elevation than from 3000 to 4000 feet, and then it is not worth cultivating. In Spain and Sicily it produces two crops in the year. Large quantities of barley have been for a lengthened period raised in Great Britain. Recently, however, its cultivation has been supposed, though probably on no good grounds, to be declining. In 1765, Mr. Charles Smith estimated the number of barley consumers in England and Wales at 739,000; and as a large proportion of the population of Wales, Westmoreland, and Cumberland continue to subsist chiefly on barley bread, I am inclined to think that this estimate may not, at present, be very wide of the mark. "Barley" (husked), says Pliny, "was the most ancient food in old times, as will appear by the ordinary custom of the Athenians, according to the testimony of Menander, as also by the surname given to sword fencers, who, from their allowance or pension of barley, were called *Hordearii*, barley men." (Book xviii. chap. 7.) It was not until after the Romans had learnt to cultivate wheat, and to make bread, that they gave barley to their cattle. They made barley-meal into balls, which they put down the throats of their horses and asses, after the manner of fattening fowls, which was said to make them strong and lusty.

There are no means of ascertaining whether barley was cultivated in Britain when the Romans discovered this country; but as Cæsar found corn growing on the coast of Kent, it is probable that this species of grain had been obtained from Gaul.

In the rotation of crops, barley may succeed to summer fallow, to potatoes, turnips, or any other green crop, and to any of the pulse crops. It now generally follows turnips, and is a very important crop in the rotation, best adapted to light soils. The principal barley counties of England are Norfolk, Suffolk, Cambridge, Bedford, Herts, Leicester, Nottingham, the upper parts of Hereford, Warwick, and Salop. The produce varies according to soil, preparation, season, &c., from about 25 to 60 or 70 bushels an acre. The usual crop is from 28 to 36 or 38 bushels. The Winchester bushel of good English barley generally weighs about 50 lbs.; but the best Norfolk barley sometimes weighs 53 or 54 lbs. Its produce in flour is about 12 lbs. to 14 lbs. of the grain.

Barley is said to contain 65 per cent. of nutritive matter; wheat contains 78 per cent. A bushel of barley weighing 50 lbs. will therefore contain about 32 lbs. of nutriment; while a bushel of wheat weighing 60 lbs. contains 47 lbs. Good oats weighing 40 lbs. contain about 24 lbs. of nutritive matter; so that the comparative value of wheat, barley, and oats, in feeding cattle, may be represented by 47, 32, and 24, the measure being the same. The experiments on which this calculation is founded were carefully made by Einhof, and confirmed on a large scale by Thäer, at his establishment at Mögelin, the account of the results being accurately kept.

Barley is a tender plant, and easily h in any stage of its growth. It is more hazardous than wheat, and is, generally speaking, raised at a greater expense, so that its cultivation should not be attempted except where the soil and climate are favourable for its growth. There is no grain perhaps more affected (says Baxter in his *Lib. of Agr. Knowledge*, p. 36.) by soil and cultivation than barley, the same species exhibiting opposite qualities, modified by the nature of the soil from which it is produced: these opposite productions of the same individual will, if sown at the same period, on the same land, and under the same course of cultivation, exhibit corresponding differences, which are manifested during the growth of the crop, and subsequently in the quality of the sample when in hand. Thus the finest samples, the growth of suitable and well-cultivated lands, would, if sown on a poor and sterile soil, become alike coarse in appearance, and indifferent in quality. This fact, however important, has hitherto but little engaged the attention of the farmer; and the spring or early barley is therefore indiscriminately sown, as being found more productive for the purpose of malting than any of the afore-mentioned varieties. The sprat, or battledore barley, makes good malt; and being short and erect in the ear, and tapering in the stem, is, on strong lands, less liable to injury from falling, and is consequently preferred by a few individuals. The common, or long-eared barley, being long in the ear and weak in the straw, is very liable to lodge early, whereby the grain is rendered inferior in quality, and is, therefore, not extensively cultivated. Naked barley, or wheat barley, is so termed in consequence of the grain separating readily from the chaff when thrashed. It is a native of the north, and will bear sowing early in the season; it is not, however, in much estimation in the south of England, and is seldom cultivated, although it makes strong malt, and is excellent for fattening of hogs and cattle. Winter barley, or square-eared barley, is grown to considerable extent in the north-western part of England, and in Scotland. It is usually sown for the feeding of sheep in the south of England, and mixed with tares for the soiling of cattle. As food for sheep, it is far more productive than rye, as it admits of being fed down every two or three days during summer; and if intended for seed, it may previously be fed off by sheep early in the season, without injury to the crop.

The land that produces the best barley is generally of a silicious, light, dry nature: for a good mellow preparation and free soil are essential to the growth of malting barleys. Cold wet soils, which
retentive of water, are ill
growth of this grain, both i
its weight and its malting
whole matter of barley and
tains more silicious particles
any other grain cultivated
farmer; and hence one reaso
soil is most congenial to the
plant. Barley is propagated
either broadcast or in drills,
varying according to the qual
cultivation, and time of sowi
required on rich mellow land
soils; early sowing, with go
quiring less seed than late
different tillage. The qua
generally varies from 2½ to
acre (or sometimes more),
broadcast; but when drilled,
seed need not exceed two
acre.

Barley is an early ripeni
therefore it may be sown at
as the month of May; but th
is April, and the sooner the
more early that barley can
produce in grain is the sure
bulk of the straw will be le
mon sprat barleys may be
second week in March, if the
dry, until the 10th of May.
variety of the winter barle
against the wind, and may
in the autumn or the beginn
The bear, or square barley,
as early in the autumn as
the harvest will admit, and
after wheat, barley, oats, or
being a plant of sturdy gr
choice of seed, great care sh
that it is not of a reddish h
case, it is more than probabl
part of it will never vegetat
should be of a pale, lively co
form. Some farmers, not a
portance, are in the habit
corn; but unless the land is
from its nature and cultiv
fullest encouragement of th
in the end be found a "p
pound-foolish" speculation.
will be well for the farmer
finest samples and the plum
in unfavourable seasons the
grain is always delicate, an
unkindly hue, whilst, on
plump seed throws up strong
capable of resisting the effect
seasons, and, in more cong
pushing forth with renewed
doubled strength. Barley,
part, succeeds best after

ts, mangel wurzel, or other
ting crops; but does not suc-
after wheat or other white
r after rape so well as other
xcept on the South Downs
certain lands adjoining the
e both the quantity of grain
he quality better, after wheat
heat sown upon a clover ley),
rape, than from any other
ge. The lands require more
ng, according to the quality
the state in which it is found
n for the working of it com-
retentive soils, as compact
if the turnips have been fed
t weather, the earth breaks up
, and requires to be reduced
and at least a second ploughing
ven before the barley can be
On light soils of the best
ploughing may be sufficient;
land is twice ploughed in the
oon as it is sufficiently dry for
e, it will be found amply to
the labour and expense. After
eds are sown, the barley-land
o further tillage. Should any
s appear, they may be pulled up
; but it is the evidence of bad
f a spring-sown barley crop
ling during the comparatively
n which it is on the ground.
e necessary, it should be at-
y, or the crop will be injured
nd the roller should be used
de becomes spindled.
esting of barley more care is
in taking any of the other
even in the best of seasons;
ars it is often found very diffi-
t. When the period of harvest
y must be allowed to be suffi-
but not become what is termed
It may be cut either by the
e sickle. Barley, says Professor
count of the softness of its
e tendency of its ears to vege-
e apt to be injured, and even
y wet weather than any of the
grasses. For this reason the
in a humid climate like ours,
when cut down in sheaves and
not to allow it, as is frequently
lie loose upon the ground. By
, however, it is suffered to lie
until the straw is quite dry,
over early in the morning
w is still upon it. This prac-
is found to improve the colour
nd thereby render the grain
e to the maltster. It should
rried unless perfectly dry,

otherwise it is in danger of being heated in the mow, which reduces the value very materially, for the undue action of the heat destroys the spear, or germination of the grain; the malting process is consequently very unequally performed, and as the duty has to be paid upon the whole bin, maltsters will scarcely purchase such samples, unless for the purpose of grinding, and then always at an inferior price. It will be prudent, therefore, not to carry barley until the heat of the sun has evaporated the dew from it, when it should be carried in a perfectly dry state the remainder of the day, until the dew is again deposited in the evening. It is a very common practice to sow clover and other grass seeds with this crop; but great care must be taken that they are thoroughly harvested, for otherwise considerable fermentation will be created, and the sample injured. It not unfrequently occurs, that when it is supposed to be well harvested, heat is soon found to subsist in the mows, which should be daily examined, by placing a long iron spit, that should be kept for that purpose, deep into the mow; when, if the heat is found to increase, no delay should take place, but the middle should be instantly cut asunder, and taken out in proportion to the size of the mow, when it will generally escape without further injury. This operation, however, must not be deferred, as the injury sustained rapidly increases. By heating in the stack, it quickly becomes discoloured and injured. When barley is grown in large quantities, it is usual to tread the mows with horses or oxen, to get as much as possible into the barns, in which case more guarded caution is necessary than when thrown loosely over the floor.

This grain should never be thrashed by a machine, as the injury done thereby is frequently of a very serious nature; it bruises the malting spear, which is as injurious to the maltsters as if heated in the mow, and, therefore, should be guarded against. Care must also be taken not to have too large heaps lying together without frequent examination, as, until it has undergone a proper fermentation in the mow, it will be very apt to heat in the heap; in order to prevent which it requires to be moved daily, or every other day, till cleaned up from the chaff, which, from the fineness of its texture, scarcely admits the introduction of air, and consequently promotes fermentation.

The principal demand for barley in Great Britain is for conversion into malt, to be used in the manufacture of ale, porter, and British spirits; and though its consumption in this way has not certainly increased proportionally to the increase of wealth and population, still there does not seem to be any grounds for supposing that it has diminished.

But it is not only the most useful for making into malt, it is the best food for promoting the fattening of hogs, after they have been fed to a certain extent with beans, peas, &c., from which it has been found that the meat is not only more tender, but increases in boiling; whilst the meat of those fed on beans and peas alone has not only been hard, but has not yielded any increase. Barley is employed for various other purposes. It is excellent for fattening poultry. The flour is still used in some parts for bread; but the bread, though sufficiently nutritious, is dark and strong-tasted. Barley, in its green state, especially the Siberian winter-barley, makes excellent spring food for milch cows, as is well known to the cow-keepers about London; it comes in early, and greatly increases the milk. For sheep it is more nourishing than rye, and is earlier. When fed off quite close in April, it will spring up again, and on good land produce a fair crop of grain in August; but, in general, it is ploughed up as soon as it is fed off, and succeeded by spring tares or turnips. It is also good food for horses, when given in the spring of the year in small proportion with oats, sparingly at first, and after being soaked in water, and allowed to vegetate. It is in general use in the south of Europe. (*Com. Board of Agr.* vol. vi. p. 298.) Mixed with other grain, in its ground state, it has been found an excellent food for fattening bullocks. The straw is employed partially for fodder. but chiefly for litter. It is lighter than the straws of oats and wheat, and less esteemed than either. The awns are given to stock, either in their natural state or boiled. Malt is the great purpose, however, to which barley is applied in this country. To understand the process of malting, it may be necessary to observe, that, in the germination of grasses and grains before the young plant is produced, the fecula of the seed is changed by the heat and moisture of the earth into sugar and mucilage. Malting grain is only an artificial mode of effecting this object. The grain is steeped in cold water during a certain period; the water is then allowed to drain off, the grain is spread out into a deep heap: it gradually heats, the rootlets begin to shoot out, afterwards the plumula begins to grow; and when this has grown to a certain extent within the grain, the further germination is checked by exposing the grain on a kiln, heated by fire to such a degree as extinguishes the vitality of the seed. At this period it is found that the starch is, in a great

measure, converted into saccharin
and by subsequent fermentation, or
tion, either beer or spirits is obtaine
Fermentation, Malting, and B
It is only necessary to add here t
requires the best and heaviest bar
its germinating powers entire.

Barley was formerly in general u
country as bread corn: it is still,
purpose, much used on the Continen
generally used in the warmer climat
food for horses, for which purpose,
it appears to answer equally as wel
In this country, in some seasons, a
able saving may be made by using
purpose inferior barley. This was
the season of 1840 by Mr. Hewitt
Spring Park, who sold his oats at
price that he gave for the barley.
this end the farmer should remem
two parts of barley are fully equal,
ing properties, to three parts of
Germany they grind the barley, a
it into cakes, with which they fe
horses; and it is no unusual circu
in travelling in that country, to
driver take a slice off the loaf wi
he baits his horses.

Wine made from malt, when k
proper age, has a good body, and
nearly as agreeable as the generality
deira wines. The wort of malt is
scurvy, but it is apt to increase the
which attends that disease. Barley
by the ancients for many medicinal p
Pot barley, pearl barley, and Frencl
are only barley freed from the hu
mill; the distinction between then
that the pearl barley is reduced to
of small shot, all but the very hear
grain being ground away. For a
tion of the mode of manufacture, I
reader to the *Penny Cyclop.* vol. iii.
Barley-water is a decoction of either
and is reputed soft and lubricating
useful cooling drink or gruel in m
orders, and is recommended to b
with nitre in fevers. Its use is of g
tiquity, as Hippocrates wrote a wh
on the merits of gruel made of
Barley-water is an admirable liqui
minister any medicine in, being
emollient, and cooling. The Fr
Scotch barley is principally used to
broth and soup.

A German chemist, Einhof, has
ripe barley, and found 100 parts t
of 70·05 parts of *meal*, 18·75 of *h*
11·20 of water. The meal he found
tain 67·18 parts of *starch*, 5·21 of *u*
izable sugar, 4·62 of *gum*, 3·52 of *glu*
of *albumen*, 0·24 of *superphosphate*
and 10·79 of water and loss, in 10

ntains a bitter principle which he decoction of entire barley.

re has carefully analysed the ced by burning barley and its he result of his experiments is *herches Chem. sur la Veg.*, Paris,

reduced to ashes, with its skin, 100 parts, 18 of ashes, which

	18·
of potash	9·2
potash	1·5
potash	0·25
sphates	32·5
	35·5
ides	0·25
	2·8
	100·

s of the straw produced 42 of ning :—

	16·
potash	3·5
potash	0·5
sphates	7·75
bonates	12·5
	57·
ides	0·5
	2·25
	100·

ducts no doubt vary in different he proportion of silica in the the skin of barley is remark- barley grew on a chalky soil. to these the cubic saltpetre, or da, is usually found in minute in barley.

age price in England, per Win- rter of barley, according to was in

£	s.	d.		£	s.	d.
1	5	8	1800	3	0	0
1	6	0	1805	2	4	8
0	17	0	1810	2	7	11
0	17	2	1815	1	10	3
1	5	6	1819	2	6	8
1	17	8				
1	13	10	1835	1	9	11
2	0	1	1840	1	12	8
1	12	7				

unt in imperial quarters of the ley and barley-meal entered for imption every five years since *M'Culloch's Com. Dict.*) —

	qrs.
	160·
	—
	270·679
	52·107
	137·374

ual average, from 1801 to 1825, nported into England, in Win- rters, was from

	qrs.
Russia	7·112
Sweden and Norway	·987
Denmark	18·808
Prussia	18·718
Germany	24·839
Netherlands	9·500
France and Southern Europe	1·097
United States	31·
British North America	51·
Other countries	2·194
Ireland	33·331

For further particulars as to the prices of Barley, the quantities imported and exported, &c., see CORN LAWS and CORN TRADE, and MALT. And for further details as to its consumption and culture, see *Smith's Tracts on the Corn Trade*, 2d ed. p. 182.; *Penny Cyclop.*, vol. iii. p. 461.; *Brown on Rural Affairs*, vol. ii. p. 42.; and *Elements of Prac. Agr., by Prof. Low*, p. 246., &c.; to which last-named valuable work I have, in this, and other articles, been under very considerable obligation.

(*Phillip's Cult. Veg.; M'Culloch's Com. Dict.; Com. Board of Ag.* vol. vi.; *Hitchin in Baxter's Ag. Lib.*; *Professor Low's Ele. of Ag.; Brande's Dict. of Science.*)

BARLEY-BRAKE. A kind of rural play, at which the trial of swiftness is the principal exhibition. From an appointed goal numbers start, whom one is to catch, after they have reached a given distance, before which he stirs not from his post. Those whom he catches are obliged to assist him in overtaking the remainder; the game closes with the person last captured, and recommences with him who had been first captured as the catcher. Dr. Jamieson says, that in Scotland it is generally played in a corn-yard, whence the Scottish expression *barla-bracks*, about the stacks; and that a stack is the goal from which they start. The game has, however, fallen into disuse in Scotland.

BARLEY GRASSES. Some coarse kind of grasses which are known under the several names of meadow barley grass, wall barley grass, way-bennet, and mouse barley, and are of little use to the farmer. (See HORDEUM *murinum*, and *H. pratense*.)

BARLEY HUMMELLER. This is an instrument worked by the hand, which is employed when the thrashing machine is not in use, or performs its work imperfectly. It consists of a set of parallel iron plates fixed to a frame, and worked by the hand like a paver's instrument. The barley to be hummelled is laid upon the barn-floor, and by repeated strokes of the hummeller is freed from its awns. Messrs. Grant, wheelwrights of Aberdeenshire, have described this instrument very fully, with some improvements, in *Trans. High. Soc.* vol. iv. p. 334.

BARLEY MILL. A mill for the purpose of preparing barley for various domestic uses. (See MILL.)

BARLEY MOW. A pile, rick, or heap of reaped barley, stowed away for future use.

BARM. The foam or froth of beer or any other liquor in a state of fermentation, which is used as a leaven in the making of bread, &c. (See YEAST.)

BARN. A covered building, constructed for the purpose of laying up grain, &c. Farms should always be furnished with barns proportioned to the quantity of grain they produce; but since the practices of stacking, and thrashing by mills have become more general, there is much less need of large barns. They should have a dry situation, and be placed on the north or north-east side of the farm yard, so that the sun at noon-day may shine on the thrashing-floor; and the lean-toos for stock in the yard be thus open only to the south. Every farm should have at least two thrashing-floors, that different kinds of grain may be thrashing at the same time. Barns may either be constructed of timber, or be built of brick or stone, whichever the country affords in the greatest plenty, but wooden barns are best for the corn; and in either case there should be such vent-holes or openings in their sides or walls, as to afford free admittance to the air, in order to prevent the mouldiness, that would otherwise occur from the least dampness, lodging in the grain. The foundations, and for two feet out of the ground, are best made of brick or stone, on account of greater solidity, and the protection from vermin; the whole may be roofed with either thatch, slate (which is the best of all), or tiles, as can be most conveniently procured. They should have two large double folding-doors facing each other, one in each side of the building, for the convenience of carrying in or out waggon-loads; and these doors should be of the same breadth as the thrashing-floor, to afford the more light and air. Formerly a much larger expenditure in the number and size of these buildings was incurred, than is now requisite since the practice of stacking has become general. It is found that all grain is a better sample from stacks than from barns; vermin have less chance of injuring it, indeed may be set at defiance, and at harvest the corn may admit of being carried two days sooner for stacking than for housing. (See BARN-FLOOR.)

BARNACLE or CLAKIS. (See GOOSE.)

BARNACLES. A name given to horse twitchers or brakes, a sort of instrument used by farriers to put upon horses' noses, when they will not stand quietly to be shod, bled, or dressed.

BARNED. A term used to si
housed or secured in the barn.

BARN-FLOOR. The portion, spac
floor in the barn, on which the gra
thrashed out. It is for the most part
in the middle of the barn, but may be
down in any other part, if more conven
and should always be so formed as t
perfectly close, firm, and strong. It is s
times called the thrashing-floor. In
structing these floors, various sorts of
terials are employed, such as composi
of different earthy kinds, stones, lump
bricks, and wood. The last substance,
properly laid and put together, is the
and most secure from the defects and ca
which are liable to injure the grain,
as those of damps, &c. The floors of b
when made of wood, are sometimes so
trived as to be moveable at pleasure, w
is a great convenience in many cases. B
floors are made of different dimensions,
from twelve to fourteen by eightee
twenty feet are in general proper size
most purposes; when of timber, they sh
be laid hollow, to admit of the more r
destruction of vermin, and by this pla
timber is also better preserved from da

The best barn-floor, both for thras
upon and for keeping corn, is that whi
the driest, smoothest, most completely s
and consequently freest from cracks
holes, in which insects and vermin
shelter themselves, and breed. The anc
were remarkably careful in this respec
is evident from the writings of Cato, V
and Columella. The last of those exce
writers relates particularly the great
they took, first to dig up the groun
some depth, in order to moisten it with
lees of oil, &c., but not with any that had s
matters in them; then to mix it thorou
with chaff, and ram it down as close as
sible; afterwards as it dried, to stop all
cracks and crevices that appeared, to
tinue beating it down with great forc
render it quite level; and, lastly, to str
again with chaff, which they trod in,
then left it to be completely dried by
sun. All of them agree, that the lees o
thus used, prevented the growth of wee
the floors, and contributed to preserve
corn from being plundered by the mice
ants. In this they were, however,
bably mistaken. Their barns were al
seated high, and as dry as possible. A
made in the above manner, was us
preferable either to stone, or the ear
floors common in many parts of Engl
from which such dampness has been
municated to the corn, as has rend
wheat, for example, much worse, eithe
keeping or exporting; and to these

ould suggest, that the modern asphalte d form an admirable floor, probably r than any other.

arded thrashing-floors, made of sound, , well-seasoned planks, are excellent for e, will last a long time, and may afters be converted into good floorings for s, by planing them down, after they have ne too uneven for the purpose originally ded. These are much the best for corn. ere are many different methods of conting and laying down barn-floors, when ed of wood. The most usual is that of ng the planks, or boards of which they omposed, after their edges have been true, and well fitted and jointed, close to wooden joists or sleepers, firmly d and secured upon the ground, or place for the purpose. But in the nd districts, another practice is pur- ; instead of the planks being nailed to sleepers in the ordinary way, the is first laid with bricks, and the planks d over these, with no other confine- than that of being "dowled" together, is, ploughed and tongued, and their let into sills or walls, placed in the way, on each side the floor. By this od of putting down the planks, prod the brick-work be truly level, vermin ot have a hiding-place beneath them; a communication of damp air being efually prevented, floors thus laid are od to wear better than those laid upon pers. The planks for this method of g ought to be thoroughly seasoned.

t is evident, that where barn-floors can ade hollow, they must be much better the purpose of thrashing upon than as are either placed on brick-work, or ground. From their great pliability elasticity in thrashing upon, the grain f course thrashed out with more ease, ainty, and despatch. But in whatever ner wooden floors are formed or conucted, they become expensive, and do not any great length of time. For various s with regard to the construction of s, &c., I am indebted to Mr. Hewitt is, a very extensive land agent, of the ymarket, London. For an excellent are on barn management, I would refer the der to the *Quart. Journ. of Agr.* vol. iii. 980.

BARN OWL. (*Strix flammea.*) The te, or screech owl, unlike some of the cies, is resident in this country throughout year, and is so peculiar in the colour of plumage, and so generally diffused, that it robably the best known of all the British cies of owls. It inhabits churches, barns, malting kilns, or deserted ruins of any , and also holes in decayed trees. *If unmolested,* the same haunts are frequented, either by parent birds or their offspring, for many years in succession. As a constant destroyer of rats and mice, and that to a very considerable extent, the services performed by barn owls for the agriculturist have obtained for these birds toleration at least, while by some they are, as they deserve to be, strictly protected in return for benefits received. Unless disturbed, these birds seldom leave their retreat during the day; and, if the place of concealment be approached with caution, and a view of the bird obtained, it will generally be observed to have its eyes closed, as if asleep. About sunset, the pair of owls, particularly when they have young, issue forth in quest of food, and may be observed flapping gently along, searching lanes, hedge rows, orchards, and small enclosures near out-buildings. "In this irregular country," says White of Selborne, "we can stand on an eminence and see them beat the fields over like a setting dog, and often drop down in the grass or corn." Besides rats and mice, they feed on shrews, small birds, insects, &c., and have sometimes been known to capture and eat fish. It is said of this owl, that, when satisfied, it will hide the remainder of its meat like a dog. The barn owl lays from three to five eggs, which are oval and white, measuring one inch six lines in length, and one inch three lines in breadth. Young birds are found from July to September, and occasionally as late as December. The young birds are easily tamed, and live in harmony, with other birds. The barn owl is common in most, if not all, the counties of England, and, according to Mr. Thompson, it is also the most common owl in Ireland. In Scotland, it is less numerous. Over the temperate part of the European continent, and in North America, it is generally diffused. Its form and colour are too common to need description. The whole length of the bird is about fourteen inches. (*Yarrell's Brit. Birds*, vol. i.)

BARN-YARD. The straw or fold yard which immediately adjoins the barn or stack-yard.

BAROMETER. The word is derived from two Greek words, which signify the measurer of weight. This, the most valuable instrument for meteorological observations in the farmer's possession, was invented about the middle of the 17th century, by Torricelli, an Italian philosopher. Some observations of Galileo had, perhaps, led the way to the discovery; the attention of this great philosopher, according to a well-known story, having been drawn to the fact that water would not rise higher than 32 *feet in a tube* exhausted of air, by some workmen of the Duke of Florence, who had vainly endeavoured to construct a common lifting pump to raise water a greater height. Galileo *explained* the phenomenon, by saying that nature had a horror of a vacuum, but that this horror had its limits. It was found by Torricelli, that a column of water of about 32 feet exactly balanced the weight of the atmosphere which surrounds our earth, and that this was equal to the weight of a column of mercury of about 28 inches. Now this column of mercury, under various outward shapes, forms the barometer, or weather-glass, so useful to the farmer. For as the pressure of the atmosphere commonly varies with approaching changes in the weather, the consequent rise or fall of the mercury merely marks its amount: one end of the bent mercurial tube is hermetically sealed, and is void of air, so that the quicksilver rises or falls in it unresisted; but the other end of the tube is open, and upon its quicksilver, therefore, the atmosphere operates by its varying pressure. And it will be evident to the farmer that the pressure of the mercury down one leg of the bent tube forces it up the other leg, which is, in most barometers, exposed to view. When, therefore, the quicksilver *rises*, the atmospheric pressure is increasing; when it falls, the pressure is diminishing: a fact, however, which is entirely opposed to the very common erroneous conclusion.

It is more from this rising and falling of the barometer, observes Mr. Forster, than from its height or lowness, that we are to infer fair or foul weather. In very hot weather, the falling of the mercury indicates thunder: in winter, the rising indicates frost; and in frosty weather, if the mercury fall three or four divisions, there will follow a thaw; but, in a continued frost, if the mercury rises, it will snow. When foul weather happens soon after the falling of the mercury, it will not continue; and, on the contrary, you may expect, if the weather becomes fair as soon as the mercury rises, that it will be of short duration. In foul weather, when the mercury rises much and high, and so continues for two or three days before the foul weather is quite over, then expect a continuance of fair weather to follow.

Many are the natural indications of vegetables which portend changes in the weather; thus, the Pimpernel, or *Anagallis arvensis*, is styled the poor man's weather-glass. This little plant blooms in June, in our stubble fields and gardens, and continues in flower all the summer. When this plant is seen in the morning with its little red flowers widely extended, we may *generally expect* a fine day; on the contrary, it is a sign of rain when its petals are closed. (*The Farmer's Almanac.*)

The following table has been constructed from a long series of observations made in London; they will apply, however, to a considerable distance around the metropolis: —

	Barometer, mean Height.	Thermom. mean Temperature.	Mean quantity of Rain in Inches.
January	29·921	36·1	1·483
Feb.	30·067	38·	0·746
March	29·843	43·9	1·440
April	29·881	49·9	1·786
May	29·898	54·	1·853
June	30·020	58·7	1·830
July	29·874	61·	2·516
August	29·891	61·6	1·453
Sept.	29·931	57·8	2·193
Oct.	29·774	48·9	2·073
Nov.	29·776	42·9	2·400
Dec.	29·693	39·3	2·426

BARRED SHOES. See Bar Shoe.

BARREL. A cask or vessel for holding liquids, particularly ale and beer. Formerly the barrel of beer, in London, contained only 32 ale gallons = 32½ Imperial gallons. By a statute of 1 *W. & M.*, the ale and beer barrels were equalised for every part of England, except London, and ordered to contain 34 gallons; but it was enacted by 43 Geo. 3. c. 69., that 36 gallons of beer should be taken to be a barrel; and by the 6 Geo. 4. c. 58., it is enacted, that whenever any gallon measure is mentioned in any excise law, it shall always be deemed and taken to be a standard Imperial gallon. At present, therefore, the barrel cantains 36 Imperial gallons. It may be worth while observing, that the barrel or cask is exclusively the produce of European ingenuity, and that no such article is known to any nation of Asia, Africa, or America, who have not derived it from Europeans. The term barrel was formerly used to denote, in a rough way, other sorts of goods. Thus, a barrel of salmon was 42 gallons; a barrel of soap, 256 pounds. In common language, any hollow cylinder is called a barrel. Air and water-tight iron barrels coated with waterproof composition are now used in the navy, and might be made useful to the farmer. (*M‘Culloch's Com. Dict.*; *Brande's Dict. of Science.*)

BARREL DRAIN. See Drain.

BARREN CORN. (Fr. *baraigne*, sterile, unfruitful.) See Abortive Corn.

BARREN FLOWERS are those which either have stamens and no pistil, or which have neither stamens nor pistil. The latter are the production of art.

BARREN LAND. See Waste Land.

OILS, in general, owe their
presence of too great a pro-
icular earths — saline, or or-
No soil can be productive in
out of 20 are composed of
r other substance. — The im-
uch soils constitutes the great
ring and tillage. Lands con-
ss of calcareous matter may
y the addition of clay or sand.
be dressed with clay or marl,
atter. Where organic mat-
ss, the earths may be applied.
removed by draining. (*Davy's*
3.) See Soils.

VORT, ALPINE. (*Epi-*
n.) A perennial plant, grow-
gh, which is found in York-
land, and near Glasgow and
It blooms in April and May
ery handsome, and singular
rs, whose dark red petals are
th the pale lemon-coloured
h are full of honey, and very
s a native of the south of
ves shade and moisture, fre-
ntain thickets. It is propa-
ng the roots. It will flower
August, if kept out of the
he flower stalks are brittle
ked; leaves thrice ternate,
reen colour; root fibrous.

. The common term for
e mounds of earth which were
er times over the bodies of
rriors: many of which exist
day on the plains of Wilts and
Dorset, Surrey, Sussex, and
. Barrow is also the name
d for any kind of carriage
ne by the hand. The most
ws in use at present are the
which is employed for the
ht loads, as of earth to short
e for building, manure from
spreading, and the like. The
s, under certain circumstances,
or the wheel-barrow. The
is used for carrying filled
rom the granary, &c.

farriery, a term applied to
of the crust or hoof of horses
ted inwards, and which form
at are situated between the
frog.

Horse's Mouth. — The fleshy
across the upper part of the
ach almost quite to the palate,
ishable in some young horses.
at part of the mouth on which
rest, and have its effect.

E. A particular kind of shoe,
times of necessity used *to protect* a tender frog from injury, the hinder part of the shoe being thickened and hollowed over the frog; but unless it is made exceedingly heavy, it will soon be flattened down, and in the mean time it will most injuriously press upon the heels.

BARTER. (Span. *baratar;* Fr. *barrater;* Ital. *barratare*, which signify to cheat as well as to barter: hence also our word barratry.) The exchanging one commodity for another, without the payment of money. The term *barter* seems to have been derived from the languages of southern Europe. This rude mode of trade grows into desuetude as a country or nation advances in commercial knowledge, and progresses in civilisation; and even where an actual exchange of commodities does take place between merchants and traders, their comparative value is expressed by certain current monies, and balanced accordingly, and not by the proportionate value one article bears to another. The exchanges of a civilised people amongst themselves, or with other countries, are principally carried on by bills of exchange. The actual money payments in a country by no means represent the amount of its commercial transactions. (*Penny Cyclop.*)

BARTH. A provincial term, which signifies a warm inclosed place or pasture for calves, lambs, and other young animals.

BARTON, or BARKEN. (Sax. beꞃe-ꞇun, an area.) A term employed in some districts to signify the yard of a farm-house. Blount describes this word as meaning the demesne lands of a manor; the manor-house itself, and sometimes the out-houses. Most of our old lexicographers explain it as an enclosed place, or inner yard, where poultry is kept, or husbandry used. Blount's is the provincialism of the west of England; the latter is still used in other places.

BASE. (Fr. *Bas.*) An old rustic play, in several counties called *prison-bars* or *-base*, in which some are pursuers and others prisoners, one party being opposed to another in the trial of swiftness: it is yet in use. Frequent allusion is made to the game in the works of our poets; thus Drayton says, "at hood-wink, barley-brake, at tick, or prison-base;" and Davies, in *Witte's Pilgrimage* —

"Beauties do run at *base*, and kindly take
Each other *prisoners*, for sweet beauty's sake."

BASIL, SWEET. (*Ocymum.* Probably from οζω and μενω, on account of its lasting fragrance.) A culinary aromatic exotic used in salads and soups; the peculiar flavour of mock-turtle soups is chiefly derived from this valuable pot-herb. There are two species commonly cultivated, both annuals, and originally coming from the East Indies. 1. The sweet-scented or larger *basil (O. basilicum)*, and, 2. the dwarf-bush basil (*O. minimum*). They thrive most in a rich light soil, entirely free from any overshadowing body; but they require, especially for the earliest plants, a sheltered border. In wet earth, the seed always rots.

BASIL, COMMON WILD. (*Chenopodium vulgare.*) This is also slightly aromatic, and is a perennial succulent herb, growing in bushy places, about hedges, and by road sides, on a gravelly or chalky soil. The herb rises about a foot high on a wavy, light green, hairy stem, with ovate leaves, an inch long, serrated, and the ribs beneath armed with bristly hairs. The whole of the flowers are also bristly, on branched hairy stalks, both arising from the axilla of the leaves and the top of the stem, of a light purple colour. The flowers blow in July and August. This plant flourishes abundantly in gardens. It is well known among kitchen herbs. Its very odour is fragrant and refreshing.

BASIL-*Thyme.* (*Thymus acina.*) A leafy, small annual plant, much branched and spreading, but scarcely nine inches high, with acute, bluntly serrated leaves, rough at the edges, and slightly aromatic. The flowers are in axillary whorls of a bluish colour, variegated at the tip with white and dark purple; six on a whorl on simple stalks. It grows luxuriantly in cultivated fields, especially on a sandy, gravelly, or chalky soil. (*Smith's Eng. Flor.*)

BASIL. The skin of a sheep tanned.

BASILISK. (Lat.) The name for a serpent.

BASIN, or BASON. (Fr. *bassin;* It. *bacino.*) In agriculture, a natural or artificial hollow or excavation in the ground, for the reception and preservation of water. (See Pond.)

BASKETS. (*Basged,* Welsh; *bascauda,* Lat., probably from *bass,* of which baskets were often made.) They are made principally of the interwoven twigs of willow, osier, and birch, &c., but frequently also of grass, rushes, splinters of wood, straw, &c. They are made to hold all sorts of dry goods, and constructed of every variety of quality and shape, from the small fruit-pottle to the bushel basket. For market baskets the osiers are used whole. Besides the vast quantities produced at home, some of the finer kinds are imported under an *ad valorem* duty of 20 per cent. In 1832 this duty produced 1044*l.* 7*s.* 9*d.*, showing that the value of the foreign baskets entered for home consumption in the same year had been 5221*l.* 18*s.* 9*d.* The fishing-basket, pannier, or creel for the angler, should be made of wicker-work, with two openings for a leather strap to pass through, which strap should encircle one shoulder
and be buckled, so that it may be let
or taken up as occasion may suit.
are great varieties of these panniers;
are made of sufficient width to carry
of four or five pounds at full length.

BASS. The material of which pa
mats are made. It consists of the ba
the lime tree.

BASTARD ALKANET. (Corn
well, *Lithospermum arvense.*) An
weed common in waste grounds and
fields, especially among rye, flower
May and June. It may be easily kno
its tapering root, with a bright re
which communicates its colour to oi
stances, as well as to paper, linen, a
faces; and it is therefore occasional
by the young girls in Sweden to colo
cheeks. This colouring matter is al
to tinge some ointments, especia
salves, of a red colour. From t
usually rises a single stem, about
high, rough, and generally branch
spreading at the top; sometimes dec
The flowers are small and white, sur
with five long, narrow, hairy leaves.
denow says, he has seen a variety w
flowers. (*Smith's Eng. Flor.*)

BASTARD-TOADFLAX. (
linophyllum.) An English perenni
plant, with terminal clusters of wh
yellowish blossoms, many-flowered
generally branched or subdivided, f
in July. Its root is woody and y
stems widely spreading, angular, le
span or more in length; leaves turned
side, rough-edged, light-green, an inc
at most. Found in high open chalky pa

BAT, or FLITTERMOUSE. (
roptera, a hand and wing.) A mam
rous animal which has a body like a
with wings not feathered, but consisti
a membranous skin extended. These w
of the bat, osteologically considered,
hands; the bony stretchers of the cutan
membrane being the digital phalange
fingers, extremely elongated; one digi
finger of each wing is tipped with a
nail. Bats are widely spread over
globe; they are to be found in the Old
New World, and in New Holland.
lerably temperate climate seems nece
for them, and the greatest developme
the form takes place in warm coun
Generally speaking, they remain in
cealment during the day in caverns,
ous buildings, hollow trees, and such hi
places, and flit forth at twilight or suns
take their prey. They feed mostly on
insects, &c., but do not refuse raw fle
that the notion that bats go down chim
and gnaw men's bacon is no improb
story.

ats are divided into two classes, the omnivorous or fruit-eating, and the insectivorous. Those who are desirous of further investigating the subject will find ample particulars under the head "Cheiroptera" in the *Penny Cyclo.* vol. vii. p. 19.

BATEABLE HERBAGE. Provincially, such herbage as has the tendency of readily fattening stock of different kinds.

BATFOWLING. A particular manner of bird-catching in the night, while they are at roost under the eaves of barns, or upon trees or hedges. The fowler lights torches of straw, and beats the bushes, upon which the birds, dazzled by the light, fly into the flames, and are then knocked down with sticks, or caught either with nets or by other means.

BATHING. In farriery, cold-bathing has been found beneficial in the removal of locked-jaw in a horse. It was applied by swimming the animal, at certain intervals of time, in a river or other water; and the same remedy has been applied in the removal of lameness, from rigidity in the muscles. Local bathing, where medicinal substances have been diffused in the water, has likewise been recommended in some cases.

The cold-bath invigorates the system, increases the tone of the solids and circulation of the fluids, and promotes insensible perspiration; hence it becomes a corroborant, deobstruent, and general evacuant: whilst the warm and vapour baths have the power of relaxing the solids, determining the fluids externally, and, by these means, greatly promoting the sensible perspiration. They may be considered as relaxants and evacuants.

BATING. An abbreviation of abating. From bate, to lessen any thing, to retrench, to sink the price. Thus Locke says, "When the landholder's rent falls, he must either bate the labourer's wages, or not employ or not pay him." It is also used synonymously with *barring*, to except.

BATTEN. (Probably from the French tie, from its slender width.) A name in mon use for a slip or scantling of wood m 2 to 4 inches broad and one inch thick, length inconsiderable, but undefined. Above seven inches wide, it is called deal. It also signifies strong broad fencing rails. sometimes written *batton.*

ATTIN. A provincial name for a truss raw.

AVINS. Bundles of wood, or faggots with the brushwood at full length.

WSIN. The old English name for a r.

Y. (Lat. *badius*; old Fr. *baye*, *bai*, rouge Ital. *baio.*) The term for a colour ing to a chestnut. In reference to the this colour has various shades, from the very light bay, to the dark bay, which approaches nearly to the brown; but it is always more gay and shining. There are also coloured horses that are called dappled bays. All bay horses are commonly called brown. Bay horses have black manes, which distinguish them from the sorrel, that have red or white manes. There are light bays, and gilded bays, which are somewhat of a yellowish colour. The chestnut bay is that which comes nearest to the colour of the chestnut.

The bay is one of the best colours of horses, and horses of all the different shades of bays are commonly good.

BAYARD. A provincial term for a bay horse.

BAY OF A BARN. That part where the mow is placed. Hence such barns as have the thrashing-floor in the middle, and a space for a mow on each side, are called barns of two bays, &c.

BAY-SALT. The salt made naturally on the sea-shore at St. Ubes and other bays, in the natural hollows of the sea-shore which are only overflowed at spring tides. The salt thus made at a low temperature by the action of the sun and wind is the strongest and best for butter and other agricultural purposes. (*Brownrigg on Salt. Brande's Dict. of Science.*)

Bay-salt is in large, moderately white cubes. St. Ubes' salt contains 960 parts of pure chloride of sodium in 1000 parts; the remainder consists of 28 parts of sulphate of lime and of magnesia; 3 parts of chloride of magnesia, or bittern; and 9 of insoluble matter. It is consequently very pure. Similar salt, but less pure, is made at St. Martin and Oleven. (For its dietetical uses and as a manure, see SALT, SALTING.)

BAY-TREE. (*Laurus nobilis.*) This plant, the laurel of antiquity, is a native of classical ground. We cannot ascertain at what exact period the bay-tree was first cultivated in this country; but in all probability it was planted by the Romans, and fell with their villas. Chaucer, who wrote in the time of Edward III., mentions it; and Turner, our oldest writer on plants, says, in 1564, "the bay-tre in England is no great tre, but it thryueth there many parts better, and is lustier than in Germany." We find that during the reign of Elizabeth it was common to strew the floors of distinguished persons in England with bay-leaves. And we may conclude that it was rare in this country, even so late as the beginning of the eighteenth century, for Bradley says, in 1716, "they (bay-trees) should be put in pots or cases, and housed in the winter, that their beauty may be preserved." He states, that "he has seen pyramids and headed plants of bays introduced in parterre work, but he cannot advise the doing it, lest they should be injured by the weather." There need be no such care taken now, for they have become thoroughly hardy and acclimated. Bradley adds, the finest bay-trees he had ever seen, either abroad or in England, were then in the royal gardens of Kensington, and were of very great value.

The bay is a small tree, seldom exceeding fifteen to twenty feet in height. The bark is greenish, smooth, and aromatic: the leaves lanceolate, sharp-pointed, wavy on the edge, and leathery and smooth on both sides. The flowers are four or six in a cluster, of a yellowish white, glandular, and dotted. The fruit is about the size of a large pea, black, and succulent.

Observation instructs us to place this tree in situations where it is sheltered from north and north-east winds, which affect its beauty, and often its growth. It thrives under the very wings of larger trees, where it is difficult to make other shrubs prosper, and this is of importance in our plantations. A warm, dry, sandy, or gravelly soil is recommended for the bay; but it thrives well on a rich loam. We are told by Mortimer, that bay-trees, whose branches are killed by the weather, or other accident, if cut down to the ground, will send up strong shoots, which we know by experience to be correct; therefore, the roots should not be grubbed up too hastily. This tree should never have a branch taken from it but in the spring. The directions for raising these trees from seed are given in the same manner by all writers on the subject, from Pliny down to Miller. It is, to gather the fruit when quite ripe, which is not before January or February. The berries are then to be preserved in dry sand until the middle of March, when they may be sown in a shady border of rich, loose, undunged earth. The berries, should be dropped in rows as French beans are planted, and covered with fine, rich mould about an inch thick. The young plants will require frequent but moderate watering for the first two years. The French nurserymen raise them under glass, or in an orangery. The bay-tree will grow by cuttings, but these should be planted in a moderate hotbed, and kept moist and covered from the heat of the sun during summer, and from the frost in winter. April is the proper time to plant cuttings, but layers may be laid down either in March or August, which, by the second spring, will make good plants.

The variegated bay is increased by budding it on the common sort. Neither the broad nor the narrow-leaved varieties are so hardy as the common bay. The
leaves and berries of the bay-t
an aromatic, bitter, astringent t
a fragrant smell; and are accou
machic, carminative, and narcotic;
are not much used in medicin
present day, although old writers
voluminous in describing their
(*Phillips's Syl. Flor.*)

This well-known evergreen i
handsome in shrubberies, and gr
It prefers a northern aspect: in
may almost consider the bay-tree
of our island, since gardens and sh
are now rarely formed without t
sence. The leaves and berries ar
medicine; the leaves should be dri
proper way, pounded, and kept
bottles; they are said to be cordial a
ficial in nervous complaints, and
ralysis: in large doses they prov
The green leaves applied to t
allays the pain of the sting of be
berries of the bay-tree contain bot
and fixed oil, wax, resin, uncrys
sugar, gums, starch, some salts
peculiar substance, which has bee
laurin, and bears some resemb
camphor. The dried berries are
powder or infusion in flatulent c
they are of little value.

BEACE. A provincial word
signify cattle, evidently a vulgar c
of beasts. It also sometimes i
cattle-stall.

BEACH. See SAND, SEA.

BEAGLE. (Fr. *bigle.*) A sm
proportioned hound, slow but sur
an excellent nose and most endur
gence; formerly much in fashion
ing the hare, but now comparativ
lected, its place being occupied, wh
hunting is patronised, by the harrier
are still several varieties of beagles,
merly there appear to have been ma
from the deep-flewed diminutive
the old southern hound, to the fleet
gant fox-hound beagle, to which
add the pigmy breed called lap-dog
Beagles were formerly distinguished
rough and the smooth, The roug
haired, or terrier beagle, is now sel
with, although it was a hardy, and al
a vermin-loving breed, and very
formed. (*Blaine's Encyclopædia*
Sports.)

BEAKED PARSLEY. (*Anthri*
garis.) This wild herb is an annual
on banks and waste grounds, chie
large towns, on a stem 2 or 3 feet hi
right, leafy, round; very smooth,
lished; swelled under each joint; le
most beautiful light green, especial
young; their edges, ribs, and stalk

The whole herb has a sweetish, aro-
flavour, approaching to the garden
, to which it is in habit very nearly
(*Smith's Eng. Flor.*)

AK OF A BIRD. (Fr. *bec*; Welsh,
ret. *beg*; Dutch, *beik*, *beck*. — *Todd's*
n.) The bill or horny mouth of a bird.
any, a hard sharp termination of any
f the fructification. It is Latinised
trum.

AK-RUSH. (*Rhynchospora.*) Of the
rush there are two kinds, the white
e brown. The white beak-rush is a
nial, flowering in July and August;
on turfy bogs, most frequent in
ainous countries. The whole plant
oth and slender, from 6 to 12 inches
heads abrupt, stamens two, leaves
ng, and numerous bristles at the base
seed. The brown beak-rush is smaller
he white, and its leaves are narrower,
re even thickness, not tapering. It has
stamens; heads ovate-oblong; leaves
-shaped. It is met with occasionally,
rely, in bogs. (*Smith's Eng. Flora.*)

AL. A local word applied to the
ing of cattle.

ALE, DR. JOHN, was an ardent
ter of horticulture and agriculture,
lly orcharding. He was a native of
rdshire, which country he greatly
ed. His family, which had long
hed in Herefordshire, seemed to in-
a zeal for the plantation of orchards;
he individual, of whom we are now
ing the biography, was fully gifted
he family hereditament. He so im-
l the orchards of his country, and
roduce, that in a few years it gained
hundred thousands of pounds by the
sed reputation. (*Gough's Antiquities*,
.) His enthusiastic love of the agri-
arts is manifested in every one of his
gs. He was a man of talent, and the
nion of men of genius. Many of his
are preserved in Boyle's works.
hilosopher thus speaks of him: "There
in life a man in this whole island, nor
e continents beyond the seas, that
be made more universally useful to
od to all." He was in the church.
in 1603, and died in 1683. He wrote,

Treatise on Fruit Trees. Oxford. 1653 and 1657.
663. 12mo. 2. The Hereford Orchards; a Pat-
the Whole of England. By J. B.: London. 1657.
1724. 8vo. This is dedicated to Samuel Hartlib,
he most celebrated of his works. 3. Observations
Parts of Bacon's Natural History, as it concerns
rees, Fruits, and Flowers. Oxford. 1658. 4to.
rtisement concerning Cider, in Evelyn's Sylva.
rs on Nurseries, Orchards, &c. London. 1677.
Experiments on Vegetation. 7. The connection
n Parts of the Tree with Fruit. These two in
il. Trans. 1669. 8. Remarks on the Vinetum
icum. Some writers have made two persons
of the above works. From No. 6. downwards,
y Dr. John Beale, and those preceding by Mr.
ale. (*G. W. Johnson's Hist. Gard.*)

BEAM. The principal piece of timber which supports a building.

BEAM OF A PLOUGH. The upper principal timber into which the handles and all the other parts of the tail of the plough are fixed. It is most commonly made of ash wood, somewhat bent in its form, and of different lengths according to the nature of the plough. (See PLOUGHS.)

BEAM-TREE. The *Pyrus Aria* of botanists. The white beam-tree or wild pear-tree, is a deciduous British tree of small growth inhabiting the mountainous parts of the country, and resembling a small apple tree with berries like those of the mountain ash. Its leaves are strongly veined, in a plaited manner, and white underneath; the wood is hard, compact, and tough, and is used for axle trees, naves of wheels, and cogs of machinery. (*Brande's Dict. Science.*)

BEANS. (*Vicia Faba.*) A well known vegetable of the pulse species, largely cultivated both in gardens and fields. Sax. bean; *vicia* is the Latin name for the tare or vetch; derived, according to Varro, *a viciardo*, because its tendrils entwine or bind round other plants. The bean was called in Greek Κύαμος; by the Falisci, a people of Etruria (now Tuscany), *Haba*, whence the name *Faba* seems to be taken. Martinius derives the word from πάω, to feed, as if it were *Paba*; Isidorus from φάγω, to eat. Its cultivation is of much importance in rural economy, inasmuch as it has gone far to supersede fallows on strong loams and clays. The bean is a plant of considerable importance to the farmer, as affording him a valuable food for both horses and swine; its varieties are numerous, but as it is cultivated both for agricultural and horticultural purposes, it will be necessary, in treating of its cultivation, to adopt the following arrangement: — 1. Field beans; 2. Garden beans. The English growth of beans has of late years diminished, a large portion of the consumption of this country now coming from abroad; yet I am of opinion that beans or peas, according to the soil, should enter into the rotation of the crops of all farms: for if drilled and well horse-hoed, it is one of the finest preparations for wheat. And it may be well to observe, that the Russian or winter bean may be successfully cultivated on moist soils.

The flowers of the bean emit a most agreeable perfume. Of all the pulse kind, this was held in the first rank in ancient times. We find the Athenians used beans sodden, in their feasts dedicated to Apollo; and the Romans presented beans as an oblation in their solemn sacrifice called Fabaria. Pliny informs us that they offered cakes made of bean meal unto certain gods and goddesses in these ancient rites and ceremonies. Lempriere states that bacon was added to the beans in the offerings to Cama, not so much to gratify the palate of the goddess, as to represent the simplicity of their ancestors. One of the most noble and powerful families of Rome derived the name of Fabii from some of their ancestors having cultivated the bean called *Faba*. The meal of beans is the heaviest made from pulse, and was called in Latin *lomentum*. This was mingled with *frumentii* corn, whole, and so eaten by the ancients; but they sometimes bruised it first; it was considered a strong food, and was generally eaten with gruel or pottage. Many superstitious customs and notions were in olden times attached to this pulse. The ancients made use of beans in gathering the votes of the people, and for electing the magistrates. A white bean signified absolution, and a black one condemnation. From this practice, no doubt, was derived the plan of black-balling obnoxious persons. The Roman husbandmen had a religious ceremony respecting this pulse, somewhat remarkable: when they sowed corn of any kind, they took care to bring some beans from the field for good-luck's sake, superstitiously thinking that by such means their corn would return home again to them; these beans were then called *Refrinæ* or *Referinæ*. The Romans carried their superstition even further, for they thought that beans mixed with goods offered for sale at the ports would infallibly bring good luck to the seller.

In some places bean meal is still mixed with other meal in making coarse bread; or the beans are boiled into a mess with fat meat, in which state they are very nutritious. Bean meal given to oxen soon makes them fat; mixed with water and given as a drink to cows, it greatly increases their milk. A small quantity of beans is generally mixed with new wheat when ground to flour: the millers pretend that soft wheat will not grind well without beans, and they generally contrive that there shall be no deficiency in the necessary proportion. Thus a quantity of beans is converted into what is considered as wheaten flour.

The bean came originally from the east, and was cultivated in Egypt and Barbary in the earliest ages of which we have any records. It spread thence into Spain and Portugal, from whence some of the best varieties have been introduced into this country. The proportion of nutritive matter in beans, compared with other grain, is, according to Einhof, as follows: —

	By weight.	Or in a bushel.
Wheat	- 74 per cent.	- about 47 lbs.
Rye	- 70 —	- — 39
Barley	- 65 per cent.	- about
Oats	- 58 —	- —
Beans	- 68 —	- —
Peas	- 75 —	- —
French beans	84 —	- —

The same chemist obtained from
parts of marsh beans (*Vicia Faba*), o

Starch - - - -
Albumen - - - -
Other matters, nutritive, gummy, starchy, fibrous, analagous to animal matter - - -

And from kidney beans (*Phæseolus vu*
of

Starchy matters - - -
Albumen, and matter approaching t animal matter in its nature -
Mucilage - - - -

(*Davy Ag. Chem.*, p. 1

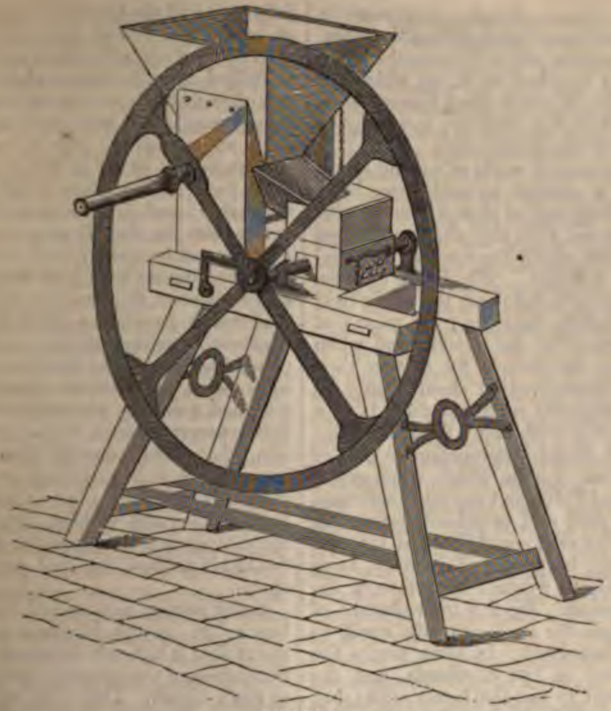
Beans are best given broken, espec
aged live stock. On the opposite
an outline of an excellent bean mi
structed by the Messrs. Ransome of I

This mill will break one quarter o
in an hour; and it is also made with a
roller and plate for malt; and is som
constructed so as to render it suita
horse power.

Field Beans. — The sorts usually
vated in the fields are, the tick be
horse bean, and the small Dutch Heli
or prolific bean. In some situatio
mazagon, longpod, and winter or
bean, have produced good crops in th
the first three are, however, best su
general cultivation. The last, a n
useful variety, has been more rece
troduced, and has lately come into v
neral cultivation in various parts
kingdom. It is planted in autumn
usual manner, and is superior to the c
bean, inasmuch as it is capable of r
the severest frost, and is ready for h
ing two months earlier.

There are several varieties of beans,
differ but little in their appearance.
rience is the best guide in choosing t
which suits particular soils and situ
The small, round, regular-shaped be
generally preferred, as obtaining th
prices in the markets, especially in
towns where there is a great consu
of beans by hard-working horses.

All the varieties thrive best on
clay soils, heavy marls, and deep loa
moist description. In such soils th
duce is sometimes 30 to 60 bushels p
but an average crop on moderate
about half that quantity. The Helig
and especially the Russian bean, hav
found very productive when grown



BEAN MILL.

hazel moulds, and deep chalk soils intermixed with loam, as they do not require so close a soil as the other varieties. The last-named varieties seldom succeed sufficiently to repay the grower, if attempted to be raised on light lands; indeed, sandy soils or late climates are ill adapted to the successful cultivation of the bean. On very rich land, beans have produced extraordinary crops, by being sown broadcast and very thick, the stems being brought up to a great height in favourable seasons. A small field of very rich land, in the county of Sussex, was sown in the year 1832 with four bushels of the small tick bean, which came up so thick, that the proprietor thought of thinning out the plants by hoeing; but he was advised to see what the produce would be, and when they were thrashed out, there were ten quarters and one bushel of beans. He had the ground accurately measured, and it was found to be one acre and twenty-nine perches, which makes the crop above sixty-eight bushels per acre.

Beans are propagated by seed, which may be sown broadcast, drilled, or dibbled; if sown broadcast, three or four bushels of seed per acre will be required, which should be ploughed or harrowed in; if drilled, two and a half or three bushels per acre will be sufficient. Beans are tolerably hardy, and will bear moderate dry frosts; but they suffer much from alternate frost and thaws, which in this climate are so common in February. The end of February or the beginning of March is, therefore, generally preferred for bean sowing. When the season is remarkably mild, early sowing is a great advantage. As a general rule, spring beans may be sown from the middle of February to the middle of March. There are two modes of drilling beans. In one of these, the lands or ridges are divided by the plough into ridgelets, or "one bout-stitches," at intervals of about twenty-seven inches.

If dung is applied to beans, the seed ought to be deposited first, as it is found inconvenient to run the drill machine afterwards. The dung may then be drawn out from the carts in small heaps, one row of heaps serving for three or five ridgelets; which is evenly spread and equally divided among them. The ridgelets are next split back or reversed, either by means of the common plough, or one with two mould-boards, which covers both the seed and the manure in the most perfect manner. When beans are sown by the other method in the bottom of a common furrow, the dung must be previously spread over the surface of the winter or spring ploughing. Three ploughs then start in succession, one immediately behind the other, and a drill-harrow either follows the third plough, or is attached to it, by which the beans are sown in every third furrow, or at from 24 to 27 inches asunder, according to the breadth of the furrow-slice.

Another improved mode of sowing beans when dung is applied at seed time, is to spread the dung and to plough it down with a strong furrow; after this, shallow furrows are drawn, into which the seed is deposited by the drill machine. Whichever of these modes of sowing is followed, the whole field must be carefully laid dry, by means of channels formed by the plough, and when necessary, by the shovel; for neither then nor at any former period should water be allowed to stagnate on the land. It is a common practice with many farmers to mix and sow with beans a proportionate part of peas, about one fourth, which, when growing, are called Polts, and are thus cultivated both on the drill and broadcast system. In either case the seed should be put into the ground by the latter end of January, or as soon after as the weather and state of the land will permit. By this intermixture of peas and beans, the straw or haulm is said to be greatly improved. In some places the peas are sown on the headlands, and the haulm is used to tie the beans with; but peas cling round the bean-stalks and impede the setting of the pods; they also interfere with the hoeing and weeding, so that the practice is not to be recommended. Peas require a lighter soil, and are best sown separately, except when they are sown broadcast mixed with beans, in order to be mown in a green state as fodder for cattle or pigs. Sowing beans for this last-mentioned purpose is not much practised in England, but is found very useful on the Continent, especially in Flanders; in this case they are mown like tares, soon after the pods are formed. In order to have a succession of this green food, they should be sown at different times within a week or a fortnight of each other. By this means a great deal of grass is saved, which may be reserved for hay. The cattle fed in the stables or yards thrive well on this food, and produce a quantity of rich manure, chiefly in a liquid state, which fills the tanks and reservoirs, which are indispensable appendages to every farmyard. By having winter tares when the turnips are consumed, peas and beans after the first crop of clover, and summer tares to succeed them, cattle may be fed in the stables all the year round with great advantage; the land may be tilled at the best season of the year and prepared for wheat, as well as by a clear fallow, while the green crop will
fully repay all the expenses. Three
of beans, and two of peas, mixed to
are required per acre when sown bro
or drilled in each furrow after the
It is often advantageous to cut in a gre
those beans which were sown for a
crop, when food for pigs is scarce.
will go nearly as far in this way in
store pigs, as the beans would hav
when ripe: and the ground is left in
better state for the following crop.
Cyclop., vol. iv. p. 82.)

Many farmers have long and adv
ously adopted the practice of dibb
their beans, by which a great saving
is effected; neither are they require
planted so early as by the old system
sides being more evenly deposited
soil, and properly covered over, th
better preserved from rooks, and oth
min, that would destroy them. D
however, is still preferred by mos
culturists, as being a less expensive
Both drilling and dibbling have eac
advantages over the broadcast syste
the latter method the land cannot
clean.

Some parties recommend the top
beans just as the blossoms are
assert that it not only improves the
but increases the quantity, and caus
to ripen sooner. They may be swit
with an old scythe-blade, set in a
handle, with which one man can ea
two acres a day. Others object, a
much justice, to this indiscriminate
and topping. The reason for doing
garden culture is, that when a pl
borne pods a certain time, it is m
vantageous to remove it, and the to
soms, of course, never come to per
In the field this is not the case, ther
no succession of plants; and, unless
blossoms are very late, or the black
(*aphis*) begins to appear, which is sh
the honey-dew on the upper shoots,
vantage is gained by topping the plan
the labour is thrown away. The be
is generally harrowed to destroy
weeds; sometimes just before the
make their appearance, and sometim
the beans have got their first green
and are fairly above ground. Aft
beans have made some growth, the
hoe is employed in the intervals b
the rows, and followed by the hand-
the purpose of cutting down such w
the horse-hoe cannot reach; all the
that grow among the beans, should b
up with the hands. The same ope
are repeated as often as the conditio
land in regard to cleanliness may re

When the leaves of the beans b

n colour, and the pods to turn
›p should be reaped with the
ade into small sheaves, tied
nds or tarred twine, and set
to dry. But if the haulm is
of the long-pod and mazagan
it is a more profitable course
p by the roots, and lay them
e same as if cut, by which
west and earliest pods are
ed and harvested. Mr. J. C.
(*Com. to the Board of Agr.*,
) gives some details of the
riments made in 1803 and
g beans whilst in a perfectly
h state. 40 acres of beans
n February 1804, and from
ddle of July the ploughs and
onstantly at work in it. By
gust the beans had shot the
ich is the criterion of seeds
formed. The weather prov-
ble, prevented their being
iately, but they were even-
the 20th of August, spread
posed two days to the sun
nding and removing to an
where they remained three
re then found perfectly dry
king. Mr. Curwen adds, as
of the benefit resulting from
ttings, that he was enabled,
lling with wheat, to give the
loughings, harrowings, &c.,
rts three (the extreme foul-
ce of land requiring what in
would be necessary); and to
d 60 loads of compost per
mplete the whole by the 20th
Mr. John Sherif, of Hading-
rd of Agr.*, vol. iv. p. 172.),
arvesting beans, "This crop
down as soon as the eye has
eepest dye, and instantly, if
heaved. The sheaves of any
ought not to exceed 9 inches
and I think that sheaves
inches would be far safer in
climate. By cutting at this
state of the crop, the bean
of triple value of what stands
fall off; the grain too will be
hat bleached by the weather
er the haulm and grain of the
d in the rick. Shocks of any
or grain ought not to exceed
the above-mentioned size."
hn Ramsay, of Ayrshire, and
s, of Kent, also give the result
rvations on bean husbandry
of Agr. vol. vi. p. 141—146.),
1 valuable, are of too confined
ature for me to notice.

The diseases to which beans are subject, are the rust, mildew, which is a minute fungus that grows on the stems of leaves, and is caused by cold fogs and frequent sudden transitions of weather, and the black dolphin or fly, also called the *collier*, an insect of the aphis tribe. For the mildew no remedy has yet been found. Whenever it has attacked the plants, generally before the pods are filled, the best method is to cut down the crop in its green state; and if it cannot be consumed in the farm-yard, to plough it into the ground, where it will decay rapidly, and be an excellent manure for the succeeding crop of wheat. If allowed to stand, the crop will not only be unproductive, but the weeds will infest the ground, and spoil the wheat crop by their seeds and roots, which will remain in the soil. Whenever the tops of the beans begin to be moist and clammy to the feel, it is the forerunner of the aphis. They should then be immediately cut off, and this, if done in time, may save the crop from the ravages of the insects; but the most effectual way to prevent any disease from attacking the plants in their growth, is to have the ground in good heart, and well tilled; to drill the beans at a sufficient distance between the rows, to allow the use of the horse-hoe, and thus to accelerate the growth of the plants, and enable them to outgrow the effect of incipient disease, which seldom attacks any but weak plants. In the year 1831, there were imported from abroad 23,388 qrs. of beans. The largest proportion came from the following countries; Denmark, 1299 qrs.; Prussia, 1157 qrs.; Germany, 7664 qrs.; the Netherlands, 7070 qrs.; France, 1454 qrs.; Italy, 3691 qrs.; Malta, 1031 qrs. The total quantity of pulse (for beans and peas are included in the return) entered for home consumption in 1834, was 102,080 qrs.; in 1835, 94,540 qrs. (*Appendix to Second Agr. Report for* 1836, p. 282.; *Phillips's Cultivated Vegetables; Penny Cyc.* vol. iv.; *Baxter's Agr. Lib.; Prof. Low's work on Agr.; Com. Board of Agr.*, vols. iv. and vi.; *M'Culloch's Com. Dict.*)

Garden Beans.—The following varieties are those principally cultivated:—Early mazagan, a great bearer, and a good sort. Early Lisbon, or Portugal bean, a small and sweet kind. Common sword, and other long-pods, the most abundant bearers, and consequently more generally found in the cottager's garden than any other sort. Small Spanish. Broad Spanish. Toker, a good bearer, middling large. White and black blossomed, good sorts, and bear well; middling size: the seed, when old, is apt to degenerate if not saved with care.

Windsor, one of our best-tasted beans when young; but not a hardy kind. Green nonpareil, smallish. Besides these, there are the Munford, Dwarf-cluster, or Fan, and the Red blossomed, varieties of little value. In some places the Fan is, however, much grown. It grows only from 6 to 12 inches high; the branches spread out like a fan, and the pods are produced in clusters. The soil should vary with the season. For the winter-standing and early crops, a moderately rich and dry soil is best adapted to them, since, if too moist, the seed is apt to decay, &c., whilst a moist aluminous one is best for the spring and summer insertions. Although the bean will succeed in much lighter soils than is generally imagined, yet, if such are allotted to it when thus late inserted, the produce is much diminished. The situation cannot be too unincumbered, but still a protection from violent winds is very beneficial, as no plant is more liable to suffer if its leaves are much injured. It is propagated by seed. For the first production, in the following year, a small plantation may be made at the close of October, or during November, and a rather larger one in December. These should be inserted on a south border, in a row, about a foot from the fence, or in cross rows. If intended for transplanting, the seed may be sown likewise during these months. Regular plantations may be continued to be made from the beginning of January to the end of June, once every three weeks. Early in July and August the two last crops must be inserted. The Windsor, which is the principal variety then planted, should have a south border allotted; it comes into production about Michaelmas.

The experiments of Bradley serve as a guide in some respects, whereby to apportion the extent of the plantations. He found that a rod of ground, containing 14 rows, in pairs, at 2 feet distance, the plants in which are 6 inches apart, or 34 in number, will yield 47 quarts of broad beans. Smaller varieties only from one-half to one-third as many. (*General Treat. on Husband. and Garden.*, vol. iii. p. 16.) If the plants are intended to be transplanted, which is only practised for the early crops, the seed must be sown thick, about an inch apart, in a bed of light earth, in a sheltered situation, and of such extent as can be covered with a frame. If frames and hand-glasses are deficient, matting or litter, kept from pressing on and injuring the plants, by means of hooping &c., are sometimes employed. These, however, afford such imperfect shelter, that there is scarce any advantage superior to the mode of sowing at once, where the plants are to remain, since the
intention of this practice is to keep t
vigour, and to forward their growth,
curing them from ungenial weather.
must be taken that they are not we
from a deficiency of air or light; to
against this, the lights should be tak
tirely off every day that excessive wet
does not imperatively forbid their re
The usual time for removing them in
open ground, in a south border, is Feb
if, however, the season is inclement
may be kept under the frame until
but then a week previous to their re
Bradley informs us, they ought to
down within two inches of the g
(*Gen. Treat. on Husband. and G*
When removed, as much earth as p
should be retained round the ro
plants; and they must be set at
distances as the main crops. No w
required, unless the season be ver
When sown to remain, the seed may
serted in rows, by a blunt dibble,
drills, drawn by the hoe, from two
half to three feet apart, from two
inches apart in the row, and two de
earliest crops and shortest varieties
set at the smallest distances. These
may be considered as large by som
deners; but the beans, Miller, from
rience, asserts, are more productive
set twice as close. Previous to sow
summer, if dry weather, the seed sho
soaked for two or three hours in wa
if sown in drills, these must be well w
immediately before the insertion.
advanced to a height of two inches,
between, and drawing earth about th
of the plants, may commence. Thi
be often repeated, and even sooner
to the early and late crops, as it affor
siderable protection from frost and
As soon as the various crops com
blossom, two or three inches length o
stem is broken off; this, by prevent
increase in height, causes more sap
afforded to the blossom, consequently c
it to advance with more rapidity, a
more abundantly. Some gardeners r
mend the tops to be taken off wh
plants are young, not more than six
high, declaring it makes them branc
be more productive. This may be ulti
the effect, but it is certainly incorrect t
that it brings them into production s
the effect in this respect is much th
trary. The winter-standing crops re
in the early stages of their growt
shelter of dry litter, prevented to
the plants by small branches, &c.
only requisite during very severe we
it must be constantly removed in mil
days, otherwise the plants will be sp

ned. For the production of seed,
of the several varieties should
bout the end of February, in a
than that their produce is after-
e grown upon. No two varieties
grown near each other; and in
reserve the early ones as uncon-
as possible, those plants only
om and produce their pods the
be preserved. Water ought to
wo or three times a week, from
their blossoming until their pods
swelling. None of the pods ought
red for the table from them; the
ction of seed is never so fine, and
aised from it are always deficient
They are fit for harvesting when
have become blackish, which oc-
end of August or early in Sep-
hey must be thoroughly dried,
d against a hedge until they are so,
seed is thrashed out and stored;
nly should be preserved that are
rfect. Some gardeners even re-
he pods from the lower part of
one to be selected. Seed beans
nes vegetate after being kept for
years, but are seldom good for
hen more than two. The plants
n seed of this age are not so apt
luxuriant as from that produced
eding year.

KIDNEY. (*Phaseolus vulgaris*,
ds resembling a species of ship,
st to have been invented at Pha-
n of Pamphylia.) Of this vege-
are two species, the one being a
y plant, the other a lofty climbing

Dwarfs there are twelve va-

-coloured.
peckled.
e.
o, or black.
hite.
white.

Black speckled.
Brown speckled.
Streaked or striped.
Large white.
Dun-coloured.
Tawney.

unners there are six varieties:—

ner.
e.
e Dutch.

Canterbury small-white.
Small white.
Variable runner.

for them may be any thing rather
r tenacious, for in such the greater
e seed, in general, decays without
g; whilst those plants which are
re contracted in their produce and
ce. A very light mellow loam,
ning to a sand, is the best for the
wings, and one scarcely less sili-
gh moister, is preferable for the
er crops; but for the later ones a
must be made to a soil as dry as for the early insertions. In all cases the subsoil must be open, as stagnant moisture is inevitably fatal to the plants or seed. For the early and late crops, a sheltered border must always be allotted, or in a single row about a foot from a south fence, otherwise the situation cannot be too open.

Dwarfs.—The sowing commences with the year. They may be sown towards the end of January in pots, and placed upon the flues of the hot-house, or in rows in the mould of a hotbed, for production in March, to be repeated once every three weeks in similar situations during February and March, for supplying the table during April, May, and June. At the end of March and April a small sowing may be performed, if fine open weather, under a frame without heat, for removal into a sheltered border early in May. During May, and thence until the first week in August, sowings may be made once every three weeks. In September forcing recommences, at first merely under frames without bottom heat, but in October, and thence to the close of the year, in hotbeds, &c. as in January. Sowings, when a removal is intended, should always be performed in pots, the plants being less retarded, as the roots are less injured, than when the seed is inserted in patches or rows in the earth of the bed. It is a good practice likewise to repeat each sowing in the frames without heat after the lapse of a week, as the first will often fail, when a second, although after so short a lapse of time, will perfectly succeed. In every instance the seed is buried 1½ or 2 inches deep. The rows of the main crops, if of the smaller varieties, may be 1½, if of the larger two feet apart, the seed being inserted either in drills or by the dibble four inches apart; the plants however to be thinned to twice that distance.

If any considerable vacancy occurs, it may always be filled by plants which have been carefully removed by the trowel from where they stood too thick. A general remark, however, may be made, that the transplanted beans are never so productive or continue so long in bearing (although sometimes they are earlier) as those left where raised. The rows of the earlier crops are best ranged north and south. The seed inserted during the hottest period of summer, should be either soaked in water for 5 or 6 hours, laid in damp mould for a day or two, or the drills be well watered previous to sowing. The only after-cultivation required, is the destruction of weeds, and earth to be drawn up round the stems.

The pods of both species are always to be gathered while young; by thus doing, and care being had not to injure the stems in detaching them, the plants are rendered as prolific and long-lived as possible.

Forcing. — The hot-bed must be of moderate size, and covered with earth 8 or 9 inches thick. When the heat has become regular, the seed may be inserted in drills a foot apart, and the plants allowed to stand 6 inches asunder in the rows. Some gardeners erroneously sow thick in a hotbed, moulded over about six or seven inches deep, and remove the plants, when two or three inches high, to the above-mentioned distances, in another for producing, water and shade being afforded until they have rooted. Air must be admitted as freely as to the melon. The same precautions are likewise necessary as to keeping up the temperature, taking the chill off the water, &c., as for that plant. When the seed begins to sprout, the mould should be kept regularly moistened; and when grown up, water may be given moderately three times a week. The temperature should never be less than 60°, nor higher than 75°.

Some plants of the hotbed sowing at the end of March, are often, after being gradually hardened, planted in a warm border: this will at most hasten the plants in production a fortnight before those sown in the open ground in May.

Those sown under frames in March for transplanting into a border, when two or three inches in height, must in a like manner be hardened gradually for the exposure, by the plentiful admission of air and the total removal of the glasses during fine days. If any are raised in pots in the hot-house, they must in a like manner be prepared for the removal, by setting them outside in fine days, and there watering them with colder water. If the season is too ungenial after all to remove them even to a warm border, the plants are often inserted in patches, to have the protection of frames or hand-lights at night, or as the weather demands. It has been lately stated in a provincial paper, that kidney-beans appear of a perennial nature. In Somersetshire, they have been observed to vegetate for several years — the plants being in the vicinity of a steam-engine, and so situated that the frost could not penetrate to the roots. I have not yet had an opportunity of putting this statement to the test of experiment.

Runners. — As these are more tender, and the seed is more apt to decay, than those of the Dwarfs, no open ground crop must be inserted before the close of April, or early in May, to be continued at intervals of four weeks through June and July, which will ensure a supply from the middle of this last month until October. Some gardeners force them in a similar manner to the Dwarfs: they certainly require similar treatment; but they will endure a higher temperature by a few degrees. They are so prolific, and such permanent bearers, that three open-ground sowings of a size proportionate to the consumption will, in almost every instance, be sufficient.

The runners are inserted in drills, either singly, three feet apart, or in pairs, ten or twelve inches asunder, and each pair four feet distant from its neighbour. The seed is buried two inches deep and four inches apart in the rows, the plants being thinned to twice that distance. If grown in single rows, a row of poles must be set on the south side of each, being fixed firmly in the ground: they may be kept together by having a light pole tied horizontally along their tops, or a post fixed at each end of a row, united by a cross-bar at their tops; a string may be passed from this to each of the plants. If the rows are in pairs, a row of poles must be placed on each side, so fixed in the ground, that their summits cross, and are tied together. They are sometimes sown in a single row down the sides of borders, or on each side of a walk, having the support of a trellis work, or made to climb poles which are turned archwise over it.

As the plants advance to five or six inches in height, they should have the earth drawn about their stems. Weeds must be constantly cleared away as they appear. When they throw up their voluble stems, those that straggle away should be brought back to the poles, and twisted round them in a direction contrary to that of the sun: nothing will induce them to entwine in the contrary direction, or from left to right.

For the production of seed, forty or fifty plants of the Dwarf species will be sufficient for a moderate-sized family, or thirty of the Runner. They must be raised purposely in May, or a like number from the crop in that month may be left ungathered from; for the first pods always produce the finest seeds, and ripen more perfectly. In autumn, as soon as the plants decay, they must be pulled, and, when thoroughly dried, the seed beaten out and stored. (*G. W. Johnson's Kitchen Garden.*)

BEAN-FLY. A beautiful bluish-black fly, generally found on bean flowers. It is sometimes called the *collier*. The aphides of beans are invariably brought on by very dry weather; they are most prevalent on the summits of the plants. (See BEANS.) The larvæ of the lady-bird, or lady-cow, (*Coccinella septempunctata*), as well as the perfect insects, devour the aphis greedily, feeding almost entirely upon these insects. Several of the summer birds also live upon them among which are the largest willow

ddle and smallest wren, whitethroat
r whitethroat, black-cap, and Dart-
bler. See American Blight.
-GOOSE. (*Anser ferus.*) A spe-
ldfowl, which is to be distinguished
wild goose (*A. palustris*) by its
ively small and short bill, which is
pressed towards the end, and also
colour and other peculiarities. In
goose the base of both upper and
ndibles and the nails of both are
rest being of a reddish flesh colour,
to orange-red. In the true wild
bill is orange-red, and the nail
hite. The wings of the bean-
en closed, reach beyond the tail.
es the following account of its
m personal observation: — "In
is well known as a regular winter
rriving in large bodies, from its
summer haunts, during September
ginning of October, and seldom
final departure before the end of
he beginning of May. The various
ing their residence in this country,
their particular haunts or feeding
to which, on each ensuing season,
riably return. They feed much
tender wheat, sometimes injuring
to a great extent; and they fre-
the stubbles, particularly such as
own with clover and other grasses.
rly part of spring they often alight
newly sown bean and pea fields,
p greedily such of the pulse as is
e surface; and I am inclined to
t their trivial name has been ac-
m their apparent predilection for
food, rather than from the shape
t of the nail of the upper mandible,
it has been generally attributed.
the bean-goose is generally rather
the grey lagg, or true wild goose;
accordingly sometimes called pro-
the small grey goose; but it not
ntly equals the other in size and
The head and upper part of the
line to brown, with a greyish tinge,
eathers of the latter hue are so dis-
almost to produce a furrowed ap-
. The lower parts of the body are
, with transverse darker shades;
ack and scapulars are brown with
nge, the feathers being edged with
(*Penny Cyclo.*)
ean-goose flies in lines forming a
ape; and, on the wing, maintains a
in which the voices of the sexes
istinguished.
. A species of barley, called also
rley, square barley, and big. It is
s written *bere.* This grain is
ltivated in Scotland, the northern parts of England, and Ireland. It yields a very large return, but is not esteemed so good for malting as the common barley, for which reason it is very little cultivated in the southern parts of England.

BEAR BERRY (*Arctostaphylos; Uva ursi.*) The wild arbutus. Smith defines two sorts of this shrub, the black and the red bear-berry. Both grow on stony mountainous heaths, and are not uncommon on the most dry and barren moors of Scotland. The stem is woody and trailing, covered with a peeling bark; the leaves small, leathery, evergreen, glossy above, pale beneath, the margin entire and rounded. The flowers are terminal, clustered, consisting of a pitcher shaped corolla, of a pinkish colour, transparent at the base. The fruit of the first-named sort has smooth black berries, of the size and flavour of black currants. The second has globose, depressed, scarlet berries, mealy within, which are very austere and astringent, and left untouched by birds. The leaves of this plant, under the name *Uva ursi*, are advantageously used as an astringent and tonic in medicine. The constituents of the leaves of *U. ursi* are, in 100 parts, 37·6 of *tannic* and *gallic acid;* 4·4 of *resin;* 15·7 *acetic acid;* 17·6 *extractive;* 3·11 *salts of lime* and *soda;* and 15·6 *lignin* and *water.* The tannic acid, when the powdered leaves are swallowed, is separated by the digestive process and taken into the blood, whence it passes through the kidneys, and acts on the urinary organs. In hæmorrhages from the bladder, the tannic acid is thus applied to the diseased organ, and proves most beneficial. It is also a useful astringent in diarrhœa. In gravel it is of no value. The dose of the powdered leaves is a scruple to a drachm. (*Smith's Eng. Flor.* vol. ii. p. 253.)

BEAR-BIND. See Black Bind-weed.

BEARD. (Sax. beaꞃꝺ.) The same with the awn of a plant.

BEARD OF A HORSE. The hairs scattered on the under lip, or the place where the curb or the bridle rests, are sometimes thus denominated.

BEARD-GRASS. (*Polypogon.*) There are two sorts, the annual beard-grass (*P. monspeliensis*) and the perennial beard-grass (*P. littoralis*). They are found in moist pastures and near the sea, in muddy salt-marshes, but are not often met with.

BEARDED OAT-GRASS. See Wild Oats.

BEARDED TIT. This British bird lives mostly in marshy places, and builds an open cup-shaped nest, which is placed on the ground. The food of this species is seeds, insects and their larvæ, and small-shelled snails. Their food during the winter is principally the seed of the reed. In an adult male, the beak and irides are of a most delicate orange colour; the head, neck, and ear-coverts, pearl-grey: descending from the space between the base of the beak under the eye, is a black pendent whisker or moustache, of three quarters of an inch in length, and ending in a point; back, greater wing-coverts, &c. fawn colour; chin, throat, and breast, white, tinged with grey, and passing into yellowish white on the belly. The whole length rather more than six inches. The eggs are from four to six in number, rather smaller than those of the great tit, and less pointed, eight lines and a half long by six lines and a half in breadth, white, and sparingly marked with pale red lines or scratches. (*Yarrell's Brit. Birds*, vol. i. p. 349.)

BEAR'S BREECH. (*Acanthus mollis.*) This plant grows wild in moist and stony places, and very freely in gardens: blooming in summer, and ripening its seed in autumn. The stalk is thick and round; the leaves spring from the root a foot in length, of a dark glossy green. The flowers stand at the top of the stalk intermixed with small floral leaves, and are large and white. The soft leaves make a useful poultice.

BEAR'S-EARS. (*Auricula ursi.*) This is the botanical name for our beautiful auriculas, which are so decorative to our gardens in April and May.

BEAR'S FOOT. See HELLEBORE.

BEAST (Su. Goth. *beest*, Ger. *bestie*, Fr. *beste*, Lat. *bestia.*) A term generally applied to all such quadrupeds, or four-footed animals, as are made use of for food, or employed in labour; but farmers apply the term more particularly to neat cattle.

BEATERS are such parts of mills or machines as beat against substances introduced into them; thus, those parts of thrashing machines which strike out the grain are denominated beaters.

BEATING AXE. An implement formerly employed in the operation of paring and burning.

BECK. (Sax. becc, Dutch *bece*, Dan. *beck*, Ger. *back.*) A common word in the north of England for a small stream.

BED. (The participle of the Sax. beddian, to spread.) A name given by some writers on drill-husbandry to the spaces occupied by the rows of corn, to distinguish them from the intervals, or open spaces between the beds, which they term alleys.

BED-STRAW, YELLOW, LADIES'. (*Galium verum.*) It is sometimes termed *cheese-renning* and *maid's hair*, or *petty muguet* or *mugwort*, and *yellow goose-grass*. A perennial weed, flowering from June till October, more common in the hed waysides than in the body of pastur slender stalks rise to about a foot in The leaves come out in whorls, eight together. They are long, narrow, green colour. Two little branche rally come out near the top of th supporting a considerable number golden yellow flowers, consisting petal divided into four parts, and su by two large kidney-shaped seed flowers of this plant are said to late boiling milk, and the better Cheshire cheese are sometimes p with them. A kind of vinegar is s have been distilled from the floweri The French prescribe them in epile hysteric cases; but they are of n Boiled in alum-water, they tinge w low. The roots dye a fine red not to madder, and are used for this pu the island of Jura. Sheep and goat plant; horses and swine refuse it; not fond of it. Smith enumerates 1 of bed-straw:— 1. cross-wort bed-s mugweed; 2. white water bed-st rough heath bed-straw; 4. smoot bed-straw; 5. rough marsh bed-s upright bed-straw; 7. grey spreadi straw; 8. bearded bed-straw; 9. fruited bed-straw; 10. rough-fruit bed-straw, or three-flowered goos 11. smooth-fruited corn bed-straw; mountain bed-straw; 13. yellow be 14. great hedge bed-straw; 15. w straw; 16. cross-leaved bed-stra goose-grass, or cleavers. (*Hort. Gra* p. 329.; *Smith's Eng. Flora*, vol. i. —210.)

BEECH. *Fagus sylvatica.* Sa or boc.) The beech is one of th somest of our native forest trees, stateliness and grandeur of outline with the oak. Its silvery bark, con with the sombre trunks of other tr ders its beauties conspicuous in our while the gracefully spreading pe boughs, with their glossy foliage, elegance in the park or paddock. is only one species, the differenc wood arising from the effects of situation. The beech is a native greater part of the north of Europ finest beeches in England are said to Hampshire. The tree is also much g Wiltshire, Surrey, Sussex, and Ken forest of St. Leonard's, near Horsh sex, abounds with noble beech tree shade of the beech tree is very inju most sorts of plants that grow near it, believed by the vulgar to be very sa to human bodies. The wood of t which is hard, and rather handsome,

his *Dict. of Science*, p. 193.) is
perishable, and liable to become
. Phillips admits, that it is subject
hen exposed to the air without
says, that the timber of these
int of actual utility, follows next
nd the ash, and is little inferior
for water-pipes. It is used, he
of Fruits, p. 60.), by wheel-
d chairmakers, and also by
making domestic wooden ware,
ls, shovels, churns, cheese-vats,
lves for dairies, &c. it being as
al, free from all disagreeable
without any inconvenient soft-
teads and other furniture are
with this timber; and no wood
, or holds so well together, as
at boxes, sword-sheaths, and a
ther things, are made from it.
called pottles, in which straw-
aspberries are usually sold in
e made from beech twigs and
the wood is also much in use for
, hoops, &c. Near large towns it
mand for billet wood. It affords
tity of potash and good charcoal.
ctured into a great variety of
ich its great hardness and uni-
e render it superior to all other
d. It is not much used in build-
n rots in damp places, but it is
piles in places which are con-
The purple and copper beeches
tations are seedling varieties of
tica. The beech-tree thrives
tains to a great size on clayey
nbent on sand; silicious sandy
so well adapted for its growth,
prosper on chalky, stony, and
, where many other timber trees
sper; and it is found to resist
e declivities of hills better than
trees. Where the soil is tolerably
will become fit to be felled in
ty-five years. The tree bears
d may, therefore, be trained to
ofty hedges.

es of the beech, gathered in au-
e they are much injured by the
id to make better mattresses than
haff, as they remain sweet and
ft for many years; they are also
mployed in forcing sea-kale, as-
. in hot-beds. The beech is pro-
sowing the nuts, or mast, which
athered about the middle of Sep-
en they are ripe, and begin to fall,
out on a mat in an airy place
to dry, when they may be sown.
er, recommended to keep them
until the spring, as there is less
heir being then destroyed by field
ther vermin. These nuts do not require to be covered more than an inch deep in mould, and it will be observed that only a part of them germinates the first year. Two or three bushels of seed are sufficient for an acre, to be sown mixed with sand, in the same manner as the ash.

The flowers of this tree come forth in May, and its kernels ripen in September. The Romans used beech leaves and honey to restore the growth of hair which had fallen of; but the moderns have not found it efficacious.

The nuts or seed of this tree, termed *beech mast*, are the food of hogs, and of various small quadrupeds. They are often called *buck-mast* in England, from the eagerness with which deer feed on them.

An oil, nearly equal in flavour to the best olive oil, with the advantage of keeping longer without becoming rancid, may be obtained from the nuts by pressure. It is very common in Picardy, and other parts of France, where the mast abounds; in Silesia it is used by the country people instead of butter. And in the reign of George I. we find a petition was presented, praying letters-patent for making butter from beech nuts.

The cakes which remain from the pressure, after the oil is made, are given to fatten swine, oxen, or poultry. A bushel of mast is said to produce a gallon of clean oil; but the beech tree seldom produces a full crop of mast oftener than once in three years. This nut is palatable to the taste, but when eaten in great quantities occasions headache and giddiness; nevertheless, when dried and ground into meal, it makes a wholesome bread. Like acorns, the fruit of the beech was long the food of mankind before the use of corn. Roasted, the mast has been found a tolerable substitute for coffee. (*Phillips's Hist. of Fruits*, p. 56.; *M'Culloch's Com. Dict.*; *Baxter's Agr. Library*; *Brande's Dict. of Science*.)

BEE-EATER. (*Merops apiaster*.) This small bird is a native of Africa. A few every year frequent this country. The birds of this genus take their prey, consisting of wasps, bees, &c. like the swallows, while on the wing. Their brilliant plumage, of colours which change according to exposure to light, the prevalent hues being azure and green, remind the observer of the kingfisher's gorgeous dress. The colour of the male bird is a rich reddish-brown on the top of the head, neck, back, and wing-coverts, passing on the rump to saffron-yellow; chin and throat rich saffron-yellow, bounded below by a bar of bluish black; breast, belly, &c. verdigris-green. The females are not so bright in colour as the males; the yellow on the throat is paler, and the green colour tinged *with red; the* whole length to the end of the elongated tail feathers eleven inches. (*Yarrel's Brit. Birds*, vol. ii. p. 200.)

BEEF (Fr. *bœuf*), is used either fresh or salted. Beef is also sometimes used for the name of an ox, bull, or cow, considered as fit for food. Formerly it was usual for most families, at least in the country, to supply themselves with a stock of salt beef in October or November, which served for their consumption until the ensuing summer; but in consequence of the universal establishment of markets where fresh beef may be at all times obtained, the practice is now nearly relinquished, and the quantity of salted beef made use of as compared with fresh beef is quite inconsiderable. Large quantities of salted beef are, however, prepared at Cork and other places for exportation to the East and West Indies. During the war large supplies were also required for victualling the navy. The vessels engaged in the coasting trade, and in short voyages, use only fresh provisions. The English have at all times been great consumers of beef; and at this moment more beef is used in London, as compared with the population, than any where else. We import considerable supplies of beef and of live cattle for slaughter from Ireland. See CATTLE. (*M'Culloch's Com. Dict.*)

BEELD, or BIELD. (Sax. behliðan; Icel. *boele*, a dwelling.) A term provincially applied in the north of England to any thing which affords shelter, such as a clump or screen of trees planted for the protection of live-stock.

BEE NETTLE. See NETTLE.

BEER. (Welsh, *bir*; Germ. *bier*; Sax. beaꞃ; Goth. *bar*, *barley*.) A liquor made from malt and hops, which is distinguished from ale either by being older or smaller. It may be prepared from any of the farinaceous grains, but barley is most commonly employed.

Beer is, properly speaking, the wine of barley. The meals of any of these grains being extracted by a sufficient quantity of water, and remaining at rest in a degree of heat requisite for this fermentation, are changed into a vinous liquor. But as these matters render the water mucilaginous, fermentation proceeds slowly and imperfectly. On the other hand, if the quantity of farinaceous matter be so diminished that its extract or decoction may have a convenient degree of fluidity, this liquor will be impregnated with so small a quantity of fermentable matter, that the beer or wine of the grain will be weak, and have little taste. These inconveniences are therefore remedied by preliminary operations which the grain is made to undergo. These preparations consist in steeping it in cold water, that it
may soak and swell to a certain degre
in laying it in a heap with a suitable
of heat, by means of which, and of t
bibed moisture, a germination begins
is to be stopped by a quick drying,
as the bud shows itself. To acceler
drying, and to prevent the farther
tation of the grain, which would im
saccharine qualities, the grain is
roasted, by means of a kiln, or ma
pass down an inclined canal suffi
heated. This germination, and this
roasting, change considerably the na
the mucilaginous fermentable matter
grain, and it becomes the malt of com
This malt is then ground; and all i
stance, which is fermentable and sol
water, is extricated by means of hot
This extract or infusion is evapora
boiling in caldrons; and some plan
agreeable bitterness, such as hops, is
to heighten the taste of the beer,
render it capable of being longer pre
Lastly, this liquor is put into cask
fermented, assisted by the addition o

Beer is nutritious from the sug
mucilage it contains, exhilarating fr
spirit, and strengthening and narcoti
the hops. Mr. Brande obtained the
ing quantities of alcohol from 100
different beers:—Burton ale, betw
and 9; Edinburgh ale, 6 to 7; Dor
ale, 5 to 6. The average of strong al
between 6 and 7; brown stout, 6
London porter about 4 (average);
brewers' small beer between 1 and 2.
BREWING.) "The distinction betw
and beer, or porter, has been," sa
M'Culloch, "ably elucidated by Dr.
Thomson in his valuable article on b
in the supplement to the *Encyc. Bri*

"Both ale and beer are in Great
obtained by fermentation from the
barley, but they differ from each o
several particulars. Ale is light-co
brisk, and sweetish, or at least fr
bitter; while beer is dark-coloured,
and much less brisk. What is called
in England is a species of beer;
term 'porter' at present signifies wh
formerly called *strong beer*. The
difference between ale and beer was
to the malt from which they were pre
ale malt was dried at a very low he
consequently was of a pale colour;
beer or porter malt was dried at a
temperature, and had of consequen
quired a brown colour. This in
charring had developed a peculiar and
able bitter taste, which was commu
to the beer along with the dark
This bitter taste rendered beer more
able to the palate and less injurious

ution than ale. It was consequently
ctured in greater quantities, and
came the common drink of the lower
in England. When malt became
riced, in consequence of the heavy
id upon it, and the great increase in
e of barley which took place during
r of the French revolution, the
found out that a greater quantity
of a given strength could be pre-
om pale malt than from brown malt.
nsequence was, that a considerable
ion of pale malt was substituted for
malt in the brewing of porter and
The wort, of course, was much paler
efore; and it wanted that agreeable
flavour which characterised porter,
ade it so much relished by most
At the same time various sub-
were tried to supply the place of
eable bitter communicated to porter
se of brown malt; quassia, cocculus
and we believe even opium, were
d in succession; but none of them
d to answer the purpose sufficiently."
of the articles other than malt, re-
to by Dr. Thomson, has been ex-
forbidden under heavy penalties by
d acts of parliament. The classi-
of the different sorts of beer ac-
to their strength, originated in the
aid upon them; and now that these
have been repealed, ale and beer
e brewed of any degree of strength.
m charged for brewers' licenses varies
ng to the nature and extent of the
cture, from 10*l.* to 5*l.* 5*s.* annually.
llowing is an account of the different
f beer made in England and Wales,
total produce of the duties (English
lons) for the last half century, com-
from parliamentary returns.
ng the 5 years ending with 1750, the
ewed amounted, at an average, to
80 barrels of strong, and 2,162,540
of small. (*Hamilton's Principles of*
ion, p. 255.)

years th July.	Barrels Strong Beer.	Barrels Table Beer.	Total Amount of Duty.
			£
796	42,253,466	5,614,813	21,061,492
806	54,007,941	10,273,638	25,395,158
816	57,318,622	15,926,056	30,251,916
825 ears.)	51,680,971	13,031,747	27,146,049
s ended Jan. 830	32,601,908	7,653,748	16,021,909

includes 149,142 barrels of intermediate beer, which paid duty at 4*s.* 11*d.* per barrel.)

rate of duty on strong beer was
r barrel until 1802, when it was
to 9*s.* 5*d.* In 1804 it was further
ed to 10*s.* In 1825, there were two descriptions of duty in force, 9*s.* and 9*s.* 10*d.* The rate of duty on table beer remained at 3*s.* until 1820, when two rates of duty, 1*s.* 9½*d.* and 1*s.* 11½*d.* per barrel, came in force.

In the ten years ending with 1796, 13,745,767 barrels of small beer were brewed, which was less strong than table beer, and on which a duty of 1*s.* 3*d.* per barrel was payable. In the six years ending with 1802, a further quantity of 9,671,570 barrels had been brewed; but after that the article seems not to have been in request, for no further duty was paid on this description of beer. In 1825 a quality called intermediate beer came into manufacture, which was subject to a duty of 5*s.* per barrel.

The duty on beer being repealed in 1830, there are no later accounts of the quantity brewed.

The number of barrels of strong beer brewed in Scotland in the five years ending 1830, was 597,737; table beer, 1,283,490; amount of duty paid thereon, 393,136*l.* (*Parl. Paper*, No. 190. Sess. 1830.)

No account has been kept of the quantity of beer brewed in Ireland since 1809, when it amounted to 960,300 barrels. (*Morewood on Intoxicating Liquors*, p. 353.) Perhaps it may now amount to from 1,000,000 to 1,200,000 barrels. Ale or beer exported to foreign parts is allowed a drawback of 5*s.* the barrel of 36 gallons, Imperial measure. The number of barrels of strong beer annually exported is, from England, about 70,000 barrels; Ireland, 15,000, and Scotland, 3,000. (*M'Culloch's Com. Dict.*)

BEER SHOP. See ALEHOUSE.

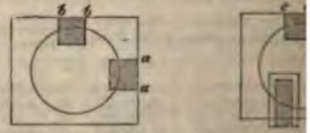
BEES. (Sax. beo, Lat. *apies.*) These industrious and useful insects are worthy the attention of all classes, and will repay the utmost care that can be taken in their management.

No farm or cottage garden is complete without a row of these busy little colonies, with their warm, neat, straw roofs, and their own particular, fragrant bed of thyme, in which they especially delight. Select a sheltered part of the garden, screened by a wall or hedge from the cutting north and easterly winds; let them enjoy a southern sun, but do not place them facing his early beams, because bees must never be tempted to quit their hive in the heavy morning dew, which clogs their limbs, and impedes their flight. Place them, if possible, near a running stream, as they delight in plenty of water; but if none is within their easy reach, place pans of fresh water near the hives, in which mix a little common salt; and let bits of stick float on the surface, to enable the bees to drink safely, instead of slipping down the smooth sides of the vessel, and perish. Never place hives in a roofed stand: it heats them, and induces the bees frequently to form combs outside of their hives, instead of swarming. Let the space before the hives be perfectly clear of bushes, trees, and every impediment to their movements, that they may wing their way easily to seek food, and return without annoyance. Bees, returning heavily laden and wearied, are unable to bear up against any object, should they hit themselves and fall. Let their passage to and from their hives be clear; but trees and bushes in the vicinity of their residence are advisable, as they present convenient spots for swarms to settle, which might otherwise go beyond sight or reach. A swarm seldom goes far from home, unless the garden is unprovided with resting-places, to attract the queen, who takes refuge in the nearest shelter. In the month of November remove your hives upon their stools, into a cool, dry, and shady room, or outhouse, where they will be protected as well from the winter sun as from the frosts. Warm days in winter often tempt bees to quit their cells, and the chilling air numbs and destroys them. Let them remain thus until February or March, should the spring be late and cold. Do not be satisfied with stopping the mouth of the hive with clay; the bees will soon make their way through it. *Remove them.* Bees are very subject to a disease in the spring, similar to dysentery. Before you place the hives in their summer quarters, examine the state of the bees by turning up the hive, and noticing the smell proceeding from it. If the bees are healthy, the odour will be that of heated wax; but if diseased, it will appear like that of putrefaction. In this case, a small quantity of port wine or brandy, mixed with their food, will restore them. In the early spring feed them, and do the same when the flowers pass away in autumn, until they are taken into the house; then disturb them no more. The proper food is beer and sugar, in the proportion of one pound to a quart; boil it five minutes only. In May, bees begin to swarm, if the weather is warm. New and dry hives must be prepared, without any doorway; the entrance must be cut in the stool. This is recommended by "An Oxford Conservative Bee Keeper."

Sticks across the inside of the hive are useless, and very inconvenient. Let the hive be well washed with beer and sugar, before you shake the bees into it. After swarming, place it upon a cloth with one side raised upon a stone; shade it with boughs, and let it alone till quite dusk, then remove it to the stool where it is to stand. The "Oxford Bee Keeper" advises food to be given to a swarm after hiving, for three or four days. Large hives are best: they do not consume
more food than small ones; this
and the same writer mentions it.
and casts are the second and thir
from a hive: they seldom live th
winter, and ought to be united to e
or to a weak hive. This is the pl
mended by several writers; as also
a smart or cast to the parent hi
have no hive weak enough to r
increase of numbers. In this
Huish recommends the following pl
the back of a chair parallel with the
of the hive, over which spread a sh
holding the hive containing the s
it, give a few sharp knocks at the
the bees will immediately fall dow
cloth; proceed then, either with y
or a stick, to guide a few of the b
entrance of the parent hive, and
instantly crowd into it. The q
should be caught and secured as
ceed: if this is not done, they kill
in a less merciful way.

To form a junction of two w
or a swarm and a hive, Huish d
the following method: Smoke ea
if for taking, only with a less d
fume, which will be mentioned
Spread all the bees of one hive up
and search carefully for the queen
her; sweep the bees of both hive
into one, sprinkling them with s
and sugar mixed; replace the h
fungus used for smoking bees is t
frog's cheese, found in damp mead
the largest, and put it into a bag
it to half its size, then dry it in a
before the fire, but not by a v
heat. Take a piece of this dried f
size of two eggs, and put it in a sti
one end, and sharp at the other, w
be fixed into the bottom of an e
turned upside down, to receive the
bees as they fall.

To prevent swarming, the "O
Keeper" recommends this treatm
"You see in the following figure



bottom board, with the doorway
it. It has another doorway, *b b*, on
side. The ring is meant to show
hive stands on it. The other bott
is just like it, only the second door
the left hand, so as to fit exactly t
entrance of the first board, whe
close together. As soon as the b
to hang out, in May, push the tw

close together. In the evening, when they are all in, stop up the entrance *a a*, and open the right hand one *b b*. Put an empty hive on the new board, with a glass worked into the back for observation. Each doorway has a bit of tin laid over as much of it as juts out beyond the hive. The bees must then find their way out by the new doorway; rub it with a little honey, and they will soon take to it. When the second hive is full, remove it thus: in the heat of the day, when many bees are out, slip a piece of tin or card between the two doorways, shut up the doorway *c c*, and open the old doorway *a a*. If the bees go on working quietly all day, you will be sure that the queen is in the old hive, and all is right. About half an hour before dusk, open again the doorway *c c*, and the bees, frightened by their long imprisonment, will hurry from one doorway to another to join the queen. As soon as they are gone, take away the full hive for yourself. If the old hive is very uneasy all day, you may be sure the queen is shut up in the new hive; if so, draw out the card or tin to join them again, and wait till another day."

Never destroy a bee; this is the first great principle in their treatment. Bees only live one year, therefore by killing them in September you destroy the young vigorous ones ready to work the following spring: the year-old bees die in August. When a hive is to be taken, smoke the bees as directed for joining hives; replace them in a fresh hive, taking care to ascertain that the queen is safe among them, and feed them through the autumn and spring; they will be ready to work with the rest, and a hive is thus added to the general stock. The queen is easily known from the working bees, as the size is larger.

By fumigating the bees with tobacco smoke while operating upon a hive, they are rendered perfectly harmless. It is well to protect the face, neck, and hands, to prevent alarm or the chance of accident. When stung, extract the sting, and apply Goulard water immediately, or laudanum, or sweet oil. In February bees first begin their labours. May is their busiest month. In November their labours end, and they remain torpid for the winter. For more particular instructions, see *Huish on Bees; The Conservative Bee Keeper's Letter to Cottagers; Wildman's Treatise on Bees; The Honey Bee, by Dr. Bevan; Penny Cyclo.; Quart. Journ. of Agr.* vol. ii. p. 184; *Baxter's Agr. Lib.* pp. 46—53.

BEE'S NEST. A provincial name for the wild carrot. (See Wild Carrot.) It is sometimes written *bird's nest.*

BEESTING or BIESTING, written also BEESTNING. (Flem. *biest, biestmelch.*) The first milk taken from cows after calving; it is thick and yellow. This milk is commonly in part taken away from the cow upon her first calving, lest, when taken in too large a quantity by the calf, it should prove purgative.

BEE-SUCKER. A term applied to the ash when its bark is in a black, cankerous, and tinged condition.

BEET. (Lat. *beta;* Celt. *bett*, red; also said to be so named from the Greek character *beta*, which its seeds resemble when they begin to swell.) The sweet succulent root of *beta vulgaris*, a chenopodiaceous plant of biennial duration. It is used, in the winter, as a salad, for which purpose the red and yellow beets of Castelnandari are the best; for the food of cattle, that which is named mangel wurzel being most used; and for the extraction of sugar, a white-rooted variety with a purple crown is the most esteemed. Sea beet (*beta maritima*) is a well known and excellent substitute for spinach. (*Brande's Dict. of Science*, p. 139.)

The genus *beta* comprehends several biennial species. Miller enumerates 5. 1. The common white beet. 2. The common green beet. 3. The common red beet. 4. The turnip-rooted red beet. 5. The great red beet. 6. The yellow beet, 7. The Swiss, or chard beet. We have now nine varieties of this esculent, which are described with considerable discrimination by Mr. Morgan, gardener to H. Browne, Esq. Mimms Place, Herts. (*Hort. Trans.* vol. iii.) Of the red beet, Mr. Morgan enumerates seven varieties; of these, the three following are generally chosen for cultivation: 1. The long-rooted, which should be sown in a deep sandy soil. 2. The short or turnip-rooted, better adapted to a shallow soil. 3. The green-leaved, red-rooted, requiring a depth of soil equal to that of the long-rooted. There are two distinct species of beet commonly cultivated, each containing several varieties; the one called the *Cicla* or *Hortensis*, or white beet, producing succulent leaves only, the other the red beet (*Beta vulgaris*), distinguished by its large fleshy roots.

The white beet is chiefly cultivated in gardens as a culinary vegetable, and forms one of the principal vegetables used by agricultural labourers, and small occupiers of land in many parts of Germany, France, and Switzerland. A variety known by the name of Swiss *chard* produces numerous large succulent leaves, which have a very solid rib running along the middle. The leafy part being stripped off and boiled is used as a substitute for greens and spinach, and the rib and stalk are dressed like asparagus or scorzenera; they have a pleasant, sweet taste, and are more wholesome than the cabbage tribe. In a good soil the produce is very abundant; and if cultivated on a large scale in the field, this species would prove a valuable addition to the plants raised for cattle. By cultivating it in rows, and frequently hoeing and stirring the intervals, it would be an excellent substitute for a fallow on good light loams. All cattle are fond of the leaves of this beet, which add much to the milk of cows, without giving it that bad taste which is unavoidable when they are fed with turnips or cabbages, and which is chiefly owing to the greater rapidity with which the latter undergoes the putrefactive fermentation. If sown in May, in drills two feet wide, and thinned out to the distance of a foot from plant to plant in the rows, they will produce an abundance of leaves, which may be gathered in August and September, and will grow again rapidly, provided a bunch of the centre leaves be left on each plant. They do not sensibly exhaust the soil. These leaves when boiled or steamed with bran, cut with chaff or refuse grain, are an excellent food for pigs or bullocks put up to fatten. (*Penny Cyclo.* vol. iv. p. 158.)

The white beet is an excellent root, and is preferred by many to the larger and more common intermediate varieties. It has lately been in great repute in France and Belgium, and indeed all over the continent of Europe, for the manufacture of sugar. The process is given in detail by Mr. Samuel Taylor in the sixth vol. of the *Gardener's Magazine;* and there are some able articles, entering extensively into detail on the subject, in the *Quart. Journ. Agr.* vol. i. p. 624., and vol. ii. pp. 892. and 907. (For an account of the common field beet for cattle, see MANGEL WURZEL.)

BEET, WHITE. (*Beta cicla.*) This is also known as the *chard*, or *carde*. We have two species in common cultivation, the green and the white. They receive their names from the colour of their footstalks; but the variation is considered by some as fugitive, and that both are produced from seed obtained of the same plant; but this the experience of Mr. Sinclair denies. The French have three varieties of the white — the white, the red, and the yellow — which only differ from ours in having a larger foliage, and thicker, fleshier stalks, but they are less capable of enduring frost. They are cultivated for their stalks, which are cooked as asparagus. Mangel wurzel is sometimes grown for the same purposes; but as it is much inferior, the notice that it may be thus employed is sufficient. Beets require a rich, mouldy, deep soil; it should, however, be retentive of moisture, rathe than light, without being tenacious, or havin its aluminous constituent too much pre dominating. Its richness should preferabl arise from previous application, than fro the addition of manure at the time of sow ing; and to effect this the compartment in tended for the growth of these vegetables advantageously prepared as directed fo celery. On the soil depends the sweetne and tenderness of the red and yellow bee for which they are estimated; and it ma be remarked that on poor, light soils, heavy ones, the best sorts will taste earth Again, on some soils the better varieti will not attain any useful size, or even tolerable flavour, whilst in the same com partment inferior ones will attain a ver good taste. The situation should be ope and as free from the influence of trees possible; but it is of advantage to have th bed shaded from the meridian sun in sum mer. I have always found it beneficial dig the ground two spades deep for the deep-rooting vegetables, and to turn in th whole or part of the manure intended to applied, according to the richness of the near the surface, with the bottom spit, so to bury it ten or twelve inches within th ground. Salt is a beneficial application this crop, one reason for which undoubted is their being natives of the sea shor Both species are propagated by seed, a may be sown from the close of Februa until the beginning of April: it being bor in mind that they must not be inserted un the severe frosts are over, which inevitabl destroys them when in a young stage growth. The best time for inserting th main crop of the beet root for winter su ply is early in March; at the beginning July or August, a successional crop of th white beet may be sown for supply in th winter and following spring.

It is best sown in drills a foot asunde and an inch deep, or by dibble, at the sam distance each way, and at a similar depth two or three seeds being put in each hole it may, however, be sown broadcast an well raked in.

During the early stages of its growth the beds, which, for the convenience of cultivation, should not be more than four fe wide, must be looked over occasionally, and the largest of the weeds cleared away by hand. In the course of May, according t the advanced state of their growth, the bed must be cleared thoroughly of weeds, both by hand and small hoeing; the beet roo thinned to ten or twelve inches apart, an the white beet to eight or ten. The plant of this last species which are removed may be transplanted into rows at a similar dis

l then often produce a finer
culent folinge than those re-
e seed bed. Moist weather
red for performing this oper-
se, the plants must be watered
ntil they take root: they must
hoed and kept clear of weeds
e summer.

t improvement to earth up
the white beet in the same
ery, when they are intended
ad eaten as asparagus.

the beet root may be taken
wanted, but not entirely for
luring the winter until No-
beginning of December, then
sand in alternate rows, under
some gardeners recommend,
is season, and the remainder
by this means they may be
ct state for use until May or
ented running to seed, they
eaves during the succeeding
is second year's production is
tender, an annual sowing is
For the production of seed
t be left where grown, giving
ction of litter in very severe
ccompanied with snow; or if
l, some of the finest roots that
d in sand, and have not had
way close, may be planted in
March. Each species and
e kept as far away from the
le, and the plants set at least
each other. They flower in
pen their seed at the close of
eed of the previous year is
preferred for sowing, but it
f carefully preserved, when

ne, the seed of the beet is diu-
e of beet root snuffed up into
omotes sneezing, and is bene-
he and toothache.

A term applied in planting
p the vacancies produced by
destruction of such trees as
planted out. (See PLANTING
ONS.)

(*Scarabæideæ*; Sax. býtel.)
ame of a class of insects, of
e a great many species, all of
ytra or sheaths over their wings
from hard bodies, which they
th in digging holes in the
awing rotten wood with their
themselves houses or nests.
are extremely destructive to
crops. The beetles most de-
getables and animals are the
e *turnip-flea beetle*, the *wood-*
and some others, which are

described at length by Mr. J. Duncan in the *Quart. Journ. of Agr.* vol. ix. p. 394.

BEETLE. A large wooden instrument in the form of a mallet, with one, two, or three handles for as many persons, used in driving piles, wedges, hedge-stakes, and in splitting wood, &c.

BEETLE, CLODDING. A sort of implement made use of in reducing the clods of tillage-lands, in clayey and other stiff tenacious soils, to a fine powdery condition. This business may be much sooner performed, and at less expense, by means of rollers constructed for the purpose. (See ROLLER.)

BEEVES. The plural of beef. A general name employed by farmers for oxen or black cattle.

BEGGAR'S NEEDLE. The vulgar name for the weed, also called *Shepherd's needle*; which see.

BEHEN, RED. (*Statice limonum.*) Common sea lavender, or blue-spiked thrift. This plant grows wild on muddy sea-shores and about the mouths of large rivers, a foot high. It flowers in a branched panicle. The calyx is tinged with red; the petal, of a fine blue, paler internally. From the spikes which form the branches of the panicles, the plant is known by the familiar appellation of sea lavender. It is a perennial, flowering in July and August. Its stalks are tough, branched, and of a pale-green colour. Towards the bottom of these stalks are clusters of large broad leaves, usually two or three inches long, of a deep green, rounded at their ends. The root is woody and tough, long, and somewhat red. The seed is very astringent. As a medicine, the plant is almost forgotten, and certainly neglected, though its effects are still appreciated by the humble inhabitants of the Essex coast. If grown in gardens, salt should be cautiously administered to the red behen. All sea-coast plants love salt, or they do not thrive when removed inland. The matted thrift, or sea lavender (*S. reticulata*), is found chiefly on the eastern coast of England, and in salt marshes, all along the northern coast of Norfolk, very abundant. Its leaves are smaller than the before-mentioned variety, and it bears a few purplish-blue flowers. (*Smith's Eng. Flora.*)

BEHEN, WHITE. (*Behen album.*) Sometimes written Been. A species of chickweed, frequently called *spattling-poppy*. This is common in our corn fields and pastures, by way-sides, &c. flowering from May till the end of August. It stands two feet high, and the stalk is thick, round, and of a whitish colour. The leaves are broad, oblong, and of a blue-green colour, growing two at each joint of the stalk, and not dented at their edges: they grow directly from the joints, which are large, and have no stalk of their own. The flowers are white, of a moderate size, and prickly, standing upon a disk. The root is long, white, and woody: this should be gathered up before the stalks rise, and dried for use.

BELLADONNA. (*Atropa belladonna.*) In botany, the Deadly Nightshade. It is an acro-narcotic poison. This name, *belladonna*, (signifying Handsome Lady), according to Ray, was given to it by the Italians, because the Italian ladies make a cosmetic of the juice.

The belladonna, although perennial in reference to the root, is annual in its herbage, which is of quick growth, branching, and shrub-like. The leaves are lateral, generally two together, ovate, acute, entire, smooth, and clammy. The flowers are solitary, stalked, rising in the axillæ of the leaves, bell shaped, and of a lurid purple colour. The fruit is a shining, black, sweetish berry, seated in the permanent calyx, about the size of a cherry. The plant is poisonous, having a peculiar alkali, named *atropia*, which, in combination with malic acid is found in every part of the plant. Its influence is chiefly exerted on the brain and nervous system, causing delirium, movements of the body resembling intoxication, confused speech, uttered with pain, and other symptoms of narcotic poisoning. Buchanan, the Scottish historian, informs us, that the Scots under Macbeth intoxicated the Danes under Sweno by mixing their wine with the juice of the berries of belladonna during a truce, which enabled Macbeth readily to overcome them. Shakespeare alludes to it in the interview between Macbeth and the witches, when the former says —

> Or have we drank
> Of the insane root which takes the reason prisoner?
> *Macbeth*, Act 1.

The beauty of the berries frequently entices children to eat them; and, although not often fatal, they cause very distressing effects to the little sufferers. In such cases, the stomach should be quickly emptied by an emetic, and, afterwards, vegetable acids and decoction of nut-galls should be given. Belladonna is an excellent medicine; but it should not be intrusted to the ignorant.

BELL-FLOWER. (*Campanula.*) Sir James Smith, in his *English Flora*, enumerates 10 varieties of this little wild herb or flower: — 1. round-leaved bell-flower, or harebell; 2. spreading bell-flower; 3. rampion bell-flower; 4. peach-leaved bell-flower; 5. giant bell-flower; 6. creeping bell-flower; 7. nettle-leaved bell-flower; 8. clustered bell-flower; 9. corn bell-flower; 10. ivy-leaved bell-flower. The bell-flower is a milky herb, which is seldom shrubby.
first variety is a perennial, found ver
monly on heaths, walls, banks, and
the borders of fields. The root is so
creeping, and rather woody; th
smooth and dark green: stems more
crowded, upright, round, sometimes
downy; about a span high; slightly,
branched, each terminating in a loose
of a few drooping blue flowers, o
slender, tremulous stalks. The lea
numerous, some heart-shaped and
shaped, and others ovate. They all
wither very soon; so that the plan
in flower, is found with stem-leave
Sometimes, though rarely, the flow
white. It is sometimes called the
thimble. There is hardly a plan
indicates more the extreme barren
a soil than this. It flowers in J
August. In our gardens it is usually
and grows luxuriantly under a fram
the open border, being, doubtless,
stant and very distinct species, chara
by the numerous serrated stem-le
say nothing of its smaller size and
green hue. The other varieties
little further notice. They are foun
sionally in pastures, on banks, the
of fields and hedges, in moist wo
thickets, by the side of rivulets. T
of the rampion bell-flower is spindle-
white, milky, and sweet, with a
pungency, which is rendered milder
tivation. It was formerly eaten raw
riously dressed. In the peach-leav
flower the stem is round, very smo
there are but few flowers, the flowe
often solitary in wild specimens, b
are very large, above an inch wi
fine blue. In gardens, where t
generally double, and often of a
white, there are always several
stem. In the nettle-leaved vari
leaves much resemble the common p
nettle, and the bristles of the le
often as pungent as those of the
though not venomous. The Lati
Trachelium, from τραχηλος the n
ludes to the reputed virtues of this
disorders of the throat, to which t
appellations of old authors allude.
coction of the herb, which is bit
somewhat acrid, was used as a gargle
Flora, vol. i. pp. 287—294.)

BELL-WETHER. A sheep whi
the flock, with a bell on his neck.

BELT. To *belt*, in some distri
nifies to shear the buttocks and tails

BELT. In planting, a strip or p
land planted with trees for the pu
ornament, or warmth and shelter.
advantage may be derived in this

the climate of the district. (See
ox.)

ET, HERB. See Avens.

ET, WAY. See Hordeum.

or STARR. See Arundo Are-

GRASS. A species of Agrostis
non in pasture grounds, the bent
ng stems of which are very diffi-
dicate. (See Agrostis.)

s. The withered stalks of grass
a a pasture after the seeds have
It also sometimes signifies a spe-
ish (*Juncus squarrosus*), which
noorland hills.

IN and BENZOIC ACID. See

REN. A yellow bitter prin-
ined in the alcoholic extract of
the barberry tree.

RRY. (*Berberis.*) See Bar-

Goth. *bar*, Sax. bepe.) The com-
for a species of barley, which is
ntly termed big, bear, and square
hus, in Huloet, an old writer, we
r-corn, barley-bygge, or mon-

MOT. (Fr. *bergamotte.*) A kind
Menage (*Dict. Etymolog.*) says,
amot is derived from Turkish
ich give it the signification of
ars: the fruit is vulgarly called
There is, also, a species of citron,
he name of bergamot is given, the
e *Citrus bergamia* (Risso). This
ltivated in the south of Europe.
oderate sized tree with oblong,
btuse leaves, with a pale under-
supported on winged footstalks.
rs are small and white; the fruit
a, of a pale yellow colour, and the
led with oil vesicles; the pulp is
idulous. The oil, which is pro-
a the rind, is imported from the
urope, under the name of *oil or
bergamot.* It is of a pale greenish
hter than water, and used merely
eable perfume.

. (*Bacca.*) A succulent pulpy
ch contains one or more seeds,
s, imbedded in the juice.

-BEARING ALDER, or AL-
CKTHORN. (*Rhamnus fran-*
hrub found in woods and thickets
, but rather rare in Scotland. It
a stem of 3 or 4 feet high, with
alternate, leafy, round, smooth,
ranches. The leaves are alternate,
ite, of a deep green, with many
ansverse ribs. It bears its fruit,
le berries, each with two large
uly. (*Smith's Eng. Flor.*)

BERRY, HENRY. An able and distinguished English farmer and breeder of live stock; was originally educated for the law, but leaving that profession for the church, he became rector of Acton Beauchamp, in Herefordshire, where he farmed largely. He resigned his living, however, in 1829, and took "a fine old pasture farm" at Pensham, near Penshore, whence he removed, in 1832, to Dinham near Chepstow. He died at Liverpool (where he had been presented by the corporation with the rectory of St. Michael's), August 24. 1836, in the 44th year of his age. Berry was the originator and editor of the *British Farmer's Magazine*, and published several Prize Essays and other works on the excellent Short-horned Breed of Cattle, of which he was a warm advocate, and successful breeder. To his valuable labours as a cattle breeder and experimental farmer, says the excellent editor of the *Farmer's Magazine*, during a short but active life, posterity will not fail to do justice; they are such, indeed, as will at all times command the tribute of public gratitude. In his agricultural writings — the diction of which is always polished, and sometimes elegant — the most determined disputant found in Mr. Berry an honourable, a high-minded, and a gentlemanly opponent. Diffident, almost to injustice, of a knowledge he was known to possess in an eminent degree, he ever kept in view, as a golden rule of life, that while "grievous words stir up anger," it is the virtue of a "soft answer to turn away wrath." "I am resolved (he would say to a querulous casuist) to take nothing which has been written on this occasion in a personal sense; because I have reason to believe it is not so intended; or, if intended, written under misapprehension," Again, of his attainments he would thus modestly speak — "The little knowledge I may possess on the subject of breeding, has been to me difficult of attainment, and has been laboriously toiled after."

BET. See Wager.

BETHLEHEM, STAR OF. (*Ornithogalum.*) Smith points out four varieties of this flower: — the yellow star of Bethlehem, *O. luteum;* the common star of Bethlehem, *O. umbellatum;* the tall star of Bethlehem, *O. pyrenaicum;* and the drooping star of Bethlehem, *O. nutans.* The first is met with sometimes, but not very frequently, in grove pastures. The second is found in meadows, pastures, and groves in various parts of England. The last is found mostly in fields and orchards, probably naturalised. All are elegant spring flowers. The last is common in country gardens, whence it may have escaped into the fields. Yet the plant may as well be a native of England as of

Denmark, Austria, or other parts of Europe, where it is found in similar situations. The bulb of the drooping star of Bethlehem is ovate, commonly deep in the ground; leaves few, 12 to 18 inches long, flaccid bright green; stalk central, erect, round and smooth, bearing a simple, nearly upright cluster of several large flowers, all pendulous towards one side. (*Smith's Eng. Flora*, vol. ii. p. 141—145.)

BETONY WOOD. (*Betonica officinalis.*) This is a common perennial herb, growing in all woods, thickets, and shady places. It flowers in June. The flowers are crimson, purplish, or yellowish, growing on almost naked stalks a foot high. They are small, and shaped like mint flowers. Many leaves grow from the root, and they are broad, an inch long, dark green, hairy, blunt at their points, and indented about the edges. The long stalks on which the flowers grow are dark-coloured and hairy, with leaves on them standing two at a joint, but very distant from each other, giving the stalk a naked look. Betony must be gathered just previous to flowering; it dries very well. The "water betony" is not really a betony, as it does not possess the qualities of this plant. It belongs to the figwort tribe, and is classed as a figwort. Betony tea, taken for a length of time, will cure inveterate headachs, by strengthening the seat of all disorders, the stomach. Betony formerly ranked high among "the simples" for its sovereign virtues. The root is rather woody. This herb is scarcely aromatic, but the fine rigid hairs which cover the surface, cause it, when powdered, to produce sneezing. Hence betony is generally made use of in herb snuffs. (*Smith's Eng. Flora.*)

BETTING. See GAMING.

BEVER. (Ital. *bevere;* old French, *beivre.*) To drink: a word now almost obsolete, but from which we derive beverage. The provincial term amongst labourers for the meal between dinner and tea.

BIENNIAL. (Lat. *biennis.*) Any thing that continues or endures two years. This term is usually applied to plants which grow one year and flower the next, after which they perish. They only differ from annuals in requiring a longer period to fruit in. Most biennials, if sown early in the spring, will flower in the autumn and then perish, thus actually becoming annuals. (*Brande's Dict. of Science.*)

BIER-BALK. The church road for burials, along which the corpse is carried. Our ancestors, before roads and highways were so common, were wont to leave untilled of their land, a broad and sufficient "bier-balk" to carry the corpse to Christian sepulture.

BIESTINGS. See BEESTINGS.

BIGG. A term sometimes applied t
or square barley. (See BERE and BA
Also the vulgar name in some parts
country for the pap or teat of an anin

BILBERRY, or BLEABERRY.
WHORTLEBERRY.

BILL. (*Bille;* Sax. tibile, a two-
axe.) A kind of hatchet with a h
point, and a handle shorter or longe
cording to the particular uses for w
is intended. It is mostly employe
husbandmen for cutting hedges and
underwood; and Johnson tells us it
its name from its resemblance, in fo
the beak of a bird of prey.

BILLET. (Fr. *bilot.*) A small
wood for the chimney.

BIN. (Sax. binne.) A small box or
contrivance in which grain of any k
kept. It is sometimes written binn.
also signifies a sort of crib for cont
straw or other bulky fodder in farm-y

BIN, CORN-. A sort of convenie
or chest fixed in the stable for the p
of containing grain or other provend
horses. We have also hop-bins,
bins, &c.

BIND-WEED. (Lat. *convolvulus*
troublesome genus of weeds, of which
are three species, the smaller, the grea
the sea bind-weed. The climbing
wheat (*Polygonum convolvulus*) i
known by the name of black bind-
The first, or smaller bind-weed (*C.*
sis), frequently called gravel bind-
is very common in hedges, fields, an
dens, and upon dry banks and gr
ground in most districts, and is an
unconquerable weed. Its presence
nerally a sign of gravel lying near th
face. Its branching creeping roots pen
to a great depth in the soil. The f
are fragrant like the heliotrope, but f
very beautiful, of every shade of pink
paler or yellowish plaits, and stains of
son in the lower part; sometimes th
nearly white. They close before
The second kind, or great bind-we
sepium), is also an equally troubleson
injurious weed to the husbandman
grows luxuriantly in moist hedges,
holts, and thickets. In an open, clea
of ground, when the plants are kep
stantly hoed down for three or four m
it may sometimes be effectually dest
as when the stalks are broken or
milky juice exudes, by which the ro
exhausted, and decay. Every port
the root will grow. The roots of th
cies are long, creeping extensivel
rather fleshy; the stems twining,
feet long, leafy, smooth, and

hed. Flowers solitary, large, purely
for the most part, occasionally of an
n flesh or rose colour. It is a peren-
owering in July and August.
sea bind-weed (*C. soldanella*) is found
on the sandy sea-shore, flowering in
and July. This herb is smooth and
succulent, and has white roots ex-
ly creeping; stems one to two feet
reak, round, and purplish green in
The flowers are bell-shaped, very
a proportion, and remarkably hand-
on long solitary stalks, their four
bordered, and purplish; of a deli-
rplish pink, with pale yellow plaits.
owers expand in the sunshine only,
e of short duration.
y part of the plant or root is crushed
y juice issues from the fracture.
the whole plant fresh, just when it
g to flower, and boil it in ale or beer,
clove or two. This acts as a pur-
but it is so strong, that only robust
should drink it. It is as good as
er brisk purgative for rheumatism
opsy. The juice oozing from the
nd root should be preserved, and
harden into a substance for keeping,
mmony.
k *bind-weed*, or climbing buck-wheat,
mmon *convolvulus*) is in some places
bear-bind; but in the fens simply
eed, because such land produces none
erennial rooted species. It is found
lly in corn-fields, gardens, hedges,
er-grounds. An annual, flowering
e and September. Root small and
g; stem twining, from left to right,
very thing in its way to the height
or six feet. Leaves alternate,
bright green, generally with a red
, wavy, smooth, arrow-shaped, a
proaching to a heart-shape. Flowers
g, greenish white or reddish.
ral of the convolvulaceæ have medi-
roperties, and strong purgative roots.
ony is obtained from *C. scammonia*,
ap from a species of *Ipomœa*. Occa-
the purgative principle is so much
l among the fæcula of the root,
be almost inappreciable, as is the
the *C. batatas*, or sweet potato of
America. The root of the great
eed is a strong purgative, fresh ga-
and boiled in a little warm liquid,
near akin to the acrid and violent
ony. The humbler classes boil it in
ale, and find it a never-failing re-
Among delicate constitutions it
be taken with caution, as its effects
ry powerful. In Northamptonshire
s most abundantly A decoction of
ts also causes perspiration.

BINK. A provincial term, applied to a sort of raised bench or seat at the doors of cottages, mostly formed of stones; but sometimes of earth, planted on the top with chamomile, or some other similar plant.

BIRCH. (Sax. birc; Lat. *betula*.) The English word birch seems, however, to be derived from the German *birke*, or the Dutch *berk*. All the European languages are similar in the pronunciation of the name of this tree. A very hardy, ornamental, and, in some respects, a useful tree, inhabiting the north of Europe, Asia, and America. There are many species of birch, but that best known, and most generally cultivated in this country, is the common birch (*Betula alba*). The common birch is valuable for its capability of resisting extremes of both heat and cold: its timber is chiefly employed for fire-wood. Its bark is extremely durable: its consists of an accumulation of ten or twelve skins, which are white and thin like paper, the use of which it supplied to the ancients; and as a proof of its imperishable nature, we are told that the books which Numa composed, about 700 years before Christ, which were written on the bark of the birch tree, were found in a perfect state of preservation in the tomb of that great king, where they had remained 400 years. Although this species is not much valued for its timber, it is extremely useful for many other purposes. Russia skins are said to be tanned with its bark, from which the peculiar odour of such leather is derived; and it is said to be useful in dyeing wool yellow, and fixing fugacious colours. The Highlanders weave it into ropes for their well-buckets. The poor people of Sweden were formerly accustomed to grind the bark to mingle with their bread corn. And in Denmark, Christopher III. received the unjust surname of *Berka Kanung* (king of bark), because in his reign there was such a scarcity, that the peasants were obliged to mix the bark of this tree with their flour. Cordage is obtained from it by the Laplanders, who also prepare a red dye from it; the young shoots serve to nourish their cattle, and the leaves are said to afford good fodder for horses, kine, sheep, and goats. The vernal sap of these trees is well known to have a saccharine quality, and from it the forest housewife makes an agreeable and wholesome wine. During the siege of Hamburgh, in 1814, by the Russians, almost all the birch trees of the neighbourhood were destroyed by the Bashkirs and other barbarian soldiers in the Russian service, by being tapped for their juice. Vinegar is obtained from the fermented sap. The inhabitants of Finland use the leaves for tea; and both in Lapland and Greenland, strips of the young and tender bark are used for food. From the timber are manufactured gates and rails, packing-cases, hoops, yokes for cattle, turners' ware, such as bowls, wooden spoons, wooden shoes and clogs, and other articles in which lightness, without much durability, is sufficient. Baskets, hurdles, and brooms, are often made of part of its shoots. The broom-makers are constant customers for birch in all places in the vicinity of London, or where it is near water-carriage; but in most other parts the hoop-benders are the purchasers. The larger trees are often bought by the turners. In some of the northern parts of Europe, the wood of this tree is likewise greatly used for making of carriages and wheels, being hard, and of long duration. The most general and the most profitable use to which birch at present can be turned is, unquestionably, the manufacture of small casks, as herring barrels, butter tubs, &c. For the latter purpose it is admirably suited, because it is stout, clean, and easily wrought, and communicates no peculiar taste or smell to the butter. The timber of the birch was more used and more valued in former times. It was not so strong as the ash for harrows and other farming implements, but it was not so ready to split, and for roofing cottages it is still held in estimation. In Russia, Poland, and other northern countries, the twigs of this tree cover the dwellings of the peasant, instead of tile or thatch. It afforded our ancestors arrows, bolts, and shafts, for their war implements. The whole tree is adapted for burning into charcoal of the best quality, and suited for the manufacture of gunpowder.

The birch will grow in any soil, but best in shady places. It may, therefore, in some situations, be turned to good account, since it will grow to advantage upon land where other timber will not thrive. Miller says, it loves a dry barren soil, where scarcely any thing else will grow; and will thrive on any sort of land, dry or wet, gravelly, sandy, rocky, or boggy, and those barren, heathy lands which will scarcely bear grass. It is said to attain sometimes the height of 70 feet, with a diameter of 2 feet; in England it does not acquire such considerable dimensions. The birch is propagated by seeds, which are easily taken from bearing trees, by cutting the branches in August, before they are quite ripe. The seed may be thrashed out like corn, as soon as the branches dry a little; they should be then kept in dry cool sand until they are sown, either in the autumn or spring. A great deal of nicety and attention is required in
rearing the birch from the seed; the
be sown in the shade, and covere
lightly with soil made as fine as p
and watered according to the wetn
dryness of the season. The planting
this tree is performed in the same
as in the ash. If planted for underw
should be felled before March to pre
bleeding. The tree bears removin
safety, after it has attained the heigh
or seven feet; and is ready to pl
hedges in four years after planting.
old they are transplanted with consi
difficulty.

The other European birches a
weeping birch (*Betula pendula*), w
very common in different parts of
along with the last, in the proper
which it appears to participate, an
which it is often improperly conf
It differs from the common birch n
in its weeping habit, but also in its
shoots being quite smooth, bright c
brown when ripe, and then covere
little white warts. The *Betula po*
the nurseries is a slight variety, o
drooping habit.

The third species is the down
(*Betula pubescens*), a smaller spec
the first, found in the bogs of Germ
variety of it is called *Betula urtici*
gardens.

The fourth and last European sp
the Dwarf birch (*Betula nana*), a sm
found in Lapland and the mountaino
of other northern countries. To the
of the south this plant has no value,
the Laplanders it affords a large part
fuel, and its winged fruits are repo
be the favourite food of the ptarmiga
Asiatic species are the Indian pape
(*B. Bhojpattra*); tapering-leaved bi
acuminata); shining birch (*B. nitid*
lindrical spiked birch (*B. cylindros*
The principal American birches are,
poplar-leaved or white American bi
populifolia). It is very like the Eu
B. pendula. 2. The red birch (*B.*
In this country it is generally cal
angulata, and by some, *B. rubra*
Messrs. Loddiges, of Hackney, were
importers of this fine but little
species. 3. The yellow birch (*B. e*
4. The paper or canoe birch (*B. pap*
which is employed by the North A
Indians for a variety of useful purpo
The soft black or cherry birch (*B.*
None of the American birches
timber so valuable as this, whence
its American names is mountain ma
Its wood is hard, close-grained, a
reddish brown; it is imported in
country in considerable quantity, un

merican birch, for forming the
ning tables, and for similar pur-
is rarely seen in this country,
is perhaps one of the best suited
ate. All the species of birches,
common and weeping, are mul-
ayers in the usual way.

e of the birch tree, produced
ures in the spring of the year,
The wine made from this sap
aperitive, and detersive. Old
ters tell us that the wood was
he best to burn in times of pes-
contagious distempers; but,
old medical saws, that opinion
ue. (*Phillips's Syl. Flor.* vol. i.
. *Cyc.* vol. iv. p. 348.; *Baxter's*

OLT. A short arrow, having a
l at the end of it, and sometimes
nt, formerly used for shooting

HERRY. (*Prunus Padus.*) The
for this tree was derived, ac-
Parkinson, from the offensive
wood; but we are more dis-
Phillips, to think that the
amed it after their celebrated
now called the Po. The berries
sought after by birds, and as
fruit resemble that of the cherry
the name of bird-cherry. In
is called hogberry. This abori-
r woods possesses beauties that
ner secure it a situation in the
and more frequently a place in
hedge-rows. The bird-cherry
ten to fifteen feet in height,
to a considerable distance its
hich are covered with a purplish
owers in April and May, and the
fruit, which hangs in bunches
ugust. Although the fruit is
d bitter to the taste, it gives
le flavour to brandy, and many
ld it, for the same reason, to
wines. Birds soon devour the
is nauseous and probably dan-
ough perhaps, like that of the
el, not of so deadly a quality as
al oil, or distilled water of the
ch is highly dangerous from con-
ch Prussic acid. The wood is
ose-grained, and is used for whip
handles. Linnæus says, that
goats, and swine eat the leaves,
rses refuse them. The scent of
when bruised, resembles rue.
with red fruit, commonly called
cherry, flowers two or three
er, and is therefore not so de-
he shrubbery. The bird-cherry
pagated by layers, which should be performed in autumn, but the handsomest trees are raised from seed, which may be sown at the same season. A wet soil is not congenial to this tree. (*Phillips's Syl. Flor.* vol. i. p. 134.; *Smith's Eng. Flor.* vol. ii. p. 354.)

BIRD'S EYE. (*Veronica Chamædrys.*) The Germander Speedwell, or wild germander. A troublesome weed in fields. It is found very commonly in groves, meadows, pastures, and hedges. It is a perennial, flowering in May and June. Herbage light green. Flowers numerous, transient, but very beautiful, bright blue with dark streaks and a white centre; their outside pale and flesh-coloured. The flowers expand in fine weather only. Some take this for the German "Forget-me-not." It vies in beauty with the true one, *Myosotis palustris.* (*Smith's Eng. Flor.* vol. i. p. 23.)

BIRD'S FOOT, COMMON. (*Ornithopus perpusillus.*) A weed found most generally in sandy or gravelly pastures. Root fibrous, annual, though it is sometimes propagated by subterraneous lateral knobs in the manner of a potato, in which case the seeds are abortive. The stems, often numerous, are procumbent, from 3 to 10 or 12 inches long. Leaves alternate, of from 5 to 10 or 12 pair, of small uniform elliptical leaflets. Flowers 3 or 4 in each little head or tuft.

The species of bird's foot are curious on account of their jointed pods, but not worth culture as plants of ornament. (*O. sativus* is, however, a most valuable agricultural plant.

BIRD'S-FOOT TREFOIL, or CLOVER. (*Lotus.*) The common name of a genus of plants that flourishes in a singular manner the most exposed and dry situations. On bowling-greens and mown lawns it forms a fine green close herbage, even in hot seasons; and in meadow and pasture grounds it is frequently abundant. Its very strong deep tap root is the cause of its resisting drought. Smith describes four species:— 1. Common bird's-foot trefoil (*L. corniculatus*), a perennial, flowering in the second week of June, and ripening the seed about the end of July, and successively to the end of autumn; common in open grassy pastures. Some botanists have considered the following species (*L. major*) to be a variety of the *Carniculatus*, but the difference between them is obvious at first sight; and this difference remains permanent when the plant is raised from seed, and cultivated on different soils. What renders a specific distinction here of most importance to the farmer, is the difference which exists between them in an agricultural point of view. Heads depressed, of few flowers, root branching, somewhat woody; the fibres beset with small granulations; stems several, spreading on the ground in every direction, varying in length from 3 to 10 inches, simple or branched. Flower stalks erect or recumbent, five times as long as the leaves, each bearing from 2 to 5 bright yellow flowers, dark green when dried, and they change to orange when verging towards decay. This species is recommended for cultivation, though under the erroneous names of milk-vetch and *Astragalus glycyphyllos*, by the late Dr. Anderson, in his *Agricultural Essays*, as being excellent for fodder as well as for hay. Mr. Curtis and Mr. Wood also recommended it. Linnæus says that cows, goats, and horses eat it; and that sheep and swine are not fond of it. With regard to sheep, (says the late Mr. G. Sinclair, *Hort. Gram. Wob.* p. 310.) as far as my observations have extended, they eat it in common with the herbage with which it is usually combined; the flowers, it is true, appeared always untouched, and in dry pastures little of the plant is seen or presented to cattle, except the flowers, on account of its diminutive growth in such situations. This, however, is nearly the case with white or Dutch clover; sheep seldom touch the flowers while any foliage is to be found. Mr. Woodward informs us that it makes extremely good hay in moist meadows, where it grows to a greater height than the trefoils, and seems to be of a quality equal, if not superior, to most of them. Professor Martyn observes, that, in common with several other leguminous plants, it gives a substance to hay, and perhaps renders it more palatable and wholesome to cattle. The clovers contain more bitter extractive and saline matters than the proper natural grasses, and the bird's-foot trefoils contain more of these vegetable principles than the clovers. In pastures and meadows, therefore, where the clovers happen to be in small quantities, a portion of the trefoil (*L. corniculatus*) would doubtless be of advantage; but it appears to contain too much of the bitter extractive and saline matters to be cultivated by itself, or without a large intermixture of other plants. It does not spring early in the season, but continues to vegetate late in the autumn. In irrigated meadows, where the produce is generally more succulent than in dry pastures, this plant cannot with safety be recommended, at least in any considerable quantity. It is more partial to dry soils than the next species (*L. major*); it attains to a considerable height when growing among shrubs, and seems to lose its prostrate or trailing habit of growth entirely in such situations. 2. The greater bird's-foot trefoil (*L. major*) flourishes in wet bushy places, osier holts and hedges; very different from the foregoing species in general habit, and now technically distinguished by several clear and sufficient characters. The stems are from 1 to 2 or 3 feet high, upright, clothed more or less with long loosely-spreading hairs. Leaves fringed with similar hairs; flowers from 6 to 12 in each head, of a duller orange than the former. The weight of green food or hay is triple that of the foregoing species, and its nutritive powers are very little inferior, being only as 9 to 8. These two species of bird's-foot trefoil may be compared to each other with respect to habits in the same manner as the white clover and perennial red clover; and were the latter unknown, there appear to be no plants of the leguminous order, that, in point of habits, would so well supply their place as the common and greater bird's-foot trefoil. They are, however, greatly inferior to the clovers. The white clover is superior to the common bird's-foot trefoil in the quantity of nutritive matter it affords, in the proportion of 5 to 4. It is much less productive of herbage, and is much more difficult of cultivation, the seed being afforded in much smaller quantities. The produce of the greater bird's-foot trefoil is superior to that of the perennial red clover on tenacious or moist soils, and on drier and on richer soils of the first quality; but the produce is inferior in the proportion of nutritive matter it contains as 5 to 4. The nutritive matter is extremely bitter to the taste. It does not appear to be eaten by any cattle when in a green state, but when made into hay, sheep, oxen, and deer, all eat it without reluctance, and rather with desire. It does not seem to perfect so much seed as the former species, but this is abundantly remedied in its propagation by the creeping or stoloniferous roots which it spreads out in all directions. In moist clayey soils it would doubtless be a most profitable substitute for red clover; but the excess of bitter extractive and saline matters it contains seems to forbid its adoption without a considerable admixture of other plants. It flowers about the third week of June, and the seed is ripe about the end of the following month. The following analysis will show the comparative value of the two species:—

	Green Prod. per Acre.	Dry Prod. per Acre.	Nutritive per Acre.
	lbs.	lbs.	lbs.
Lotus corniculatus	10,209 6 0	3,190 6 0	358 4 [illegible]
L. major	21,780 0 0	8,142 8 [illegible]	[illegible] 10 [illegible]

3. Spreading bird's-foot trefoil (*L. decumbens*) is, like the two preceding species, a

flowering in July. It is found in
meadows. The flower-stalks are
ve times the length of the leaves,
stout, and firm, each bearing an
from three to six bright yellow
4. Slender bird's-foot trefoil (*L.*
nus) is an annual flowering in May
, found in meadows towards the
south and western coasts of Eng-
is smaller, in general, than any of
oing species. A species of tri-
T. ornithopodioides) also bears the
ird's-foot trefoil; but Sir J. Smith
ly observes (*Eng. Flor.* vol. iii.
can scarcely, without violence, be
n the genus *Trifolium;* yet no one
ght fit to make it a distinct one,
plausible might be the reasons for
easure. It is an annual plant,
in June and July, found in barren,
grassy pastures; root fibrous, stems
preading flat on the ground, flowers
ree, long, pale, reddish. (*Smith's*
r. vol. iii. pp. 298. 312.; *Sinclair's*
m. *Wob.*)

LIME. This glutinous vegetable
procured either by boiling mistle-
s in water until they break, pound-
in a mortar, and washing away the
fuse with other portions of water;
is the chief mode in which it is
iefly in Scotland) for the purposes
atching, &c. from the middle bark
lly. The bark is stripped in June
nd boiled for six or eight hours in
til it becomes tender; the water
eparated from it, and it is left to
or two or three weeks, until it be-
mucilage, which is pounded in a
nto a mass, and then thoroughly
y the hands in running water till
anny matters and other impurities
ed away; the birdlime is then suf-
remain fermenting by itself in an
essel for some weeks. (The bird-
when they make their own, place
l in a dunghill.) The bark of
aring tree is sometimes employed.
Supplement, p. 226.; *Nich. Journ.*
145.; *Thomson*, vol. iv. p. 119.)

'S NEST LISTERA. See TWAY-

'S-NEST, YELLOW. (*Mono-*
opitys.) A weed occasionally met
poor and gravelly soils. It is also
metimes about the roots of beeches
in woods, frequent in all the mid-
ties. Root fibrous, much branched,
ewhat creeping, growing among
ves, or in half decayed vegetable
Stem solitary, 5 or 6 inches high,
in a drooping cluster. (*Smith's*
r. vol. ii. p. 249.)

BIRD PEPPER. A species of small *capsicum*, which affords the best Cayenne pepper. (See CAPSICUM.)

BIRD'S-TONGUE. See RAGWORT.

BIRTH-WORT. (*Aristolochia clematitis.*) A perennial plant growing two feet high, with pale yellow flowers, blooming from July to August. Propagate by parting its roots in autumn. The *long Birth-wort* (*Aristolochia longa*) blooms from June till October. It is a perennial, and a native of the south of France. Its flower is reddish-brown at the top, and bluish-violet below. Propagate as above. The bitter acrid roots of this genus have, from remote antiquity, been celebrated for their stimulating effects on the human constitution; and the present species, though dangerously emetic, seems to have been greatly in use in this country. It is found occasionally wild in woods and thickets, and it grows in our gardens when cultivated: it also grows wild in Italy and France. An opinion prevails, that if abundant in vineyards, it spoils the wines. The flowers of this birth-wort are long, hollow, and inflated at the base. The root is round and large, and is the medicinal part. There are three sorts of birth-wort — the *long*, the *climbing*, and the *round*. The last is the best.

BISCUIT. (Lat. *bis*, twice; Fr. *cuit*, baked; Ital. *biscoto.*) A kind of hard dry bread cake. Biscuits are more easily kept than other kinds of bread, and as they contain no ferment, they are better fitted than loaf bread for persons of weak stomachs, and for the pap of infants, who are under the misfortune of being brought up by hand.

The best biscuits, and the most wholesome, are those prepared for the use of the navy They are of two kinds, *captains'* and *seamen's* biscuits. The latter are composed of wheaten flour from which the bran only has been taken; consequently, they are more nutritive than the finer sort. In the government bake-houses at Weevil and Deptford, the biscuits are preferable to those baked by ordinary bakers, owing to the extent of the operations, and the purity of the wheat-meal: 102 lbs. of perfectly dry biscuits are procured from 112 lbs. of meal.

BISHOPING. A cant term made use of among horse-jockeys, implying the practices employed to conceal the age of an old horse, or the ill properties of a bad one. (See AGE OF HORSES.)

BISHOP'S WEED. (*Ammi majus.*) The common bishop's weed grows by hedge sides, and flowers in June and July, ripening its seeds in August. It somewhat resembles parsley when in flower. It grows about two feet high, the stalk being firm, round, and striated. The flowers are white and small, and stand in large tufts at the top of the stalks. Each flower is succeeded by two seeds, which are warm and aromatic, therefore easily discovered by their taste.

BISON. The buffalo or bonasus of America.

BISSLINGS. A provincial word applied like biestings, to the first milk of the newly-calved cow. (See BEESTINGS.)

BISTORT, GREAT, or SNAKEWEED. (*Polygonum Bistorta.*) Bistort loves shady and moist places, but grows freely in our fertile meadows and pastures, flowering in May and June. It grows a foot and a half or two feet high. Its leaves are broad and handsome, and the flowers grow on the top of the stalks of a bright red colour. A number of large and beautiful long broad leaves spring from the root, of a fine green, standing upon round, erect stems. The spike or ear of the flowers is long and thick. The root is creeping, thick, and contorted, rather blackish outside, but red within. The root is medicinal, being a good and powerful astringent. Held in the mouth for some minutes repeatedly, it strengthens the gums and fastens the teeth. It is useful in diarrhœa.

The *Alpine Bistort* (*P. viviparum*) is another species, having the same astringent properties in the root. It is found in pastures, or moist fissures of rock in alpine situations. Like the last in habit, but much smaller, and essentially distinct. The stem is from 3 to 6 inches high. Flowers stalked, pale red. (*Smith's Eng. Flor.* ii. 237.)

BITCH. See DOG.

BITE. (Sax. bitan, Sued. *bita.*) In farriery, a kind of wound mostly inflicted by one animal biting another. The separation of the fleshy parts thus produced is, in general, to be considered and managed as a lacerated wound; since the teeth, though more or less capable of incision, are not adapted to produce such a wound as can readily be united by what is termed the first intention. The proper treatment consists in approximating the sides of the wound, and confining them moderately with adhesive plaster, or by a bandage, or by both, but not by ligature until the sore begins to discharge; after which it should be dressed daily with any simple ointment spread on tow.

Where the bite is of the venomous kind, as from the viper, the wound must be well washed to remove the poison, and then treated as above; when it has been inflicted by a hydrophobic animal, a mad dog, for example, the only safe mode is immediately to extirpate all the parts that may have come in contact with the poison. (See HYDROPHOBIA.)

BITER, a provincial term applied to the black-cap bird. (See BLACK-CAP.)

BITTERN. (Lat. *Ardea stellaris*; Fr. *butour*; Ital. *bittore*, sometimes written *bittour*.) Of this genus of birds, Yarrell describes three kinds, the little bittern, the common bittern, and the American bittern. The little bittern is a summer visiter to this country. It inhabits marshes by the sides of rivers, plantations of osiers, and other moist situations, in which reeds and aquatic herbage grow luxuriantly. It feeds upon the fry of fish, frogs, and other small reptiles, mollusca, and insects. The nest is formed of flag leaves and bits of grass, attached to upright reeds; eggs four or five, one inch in length, by one inch and half a line in breadth, of a uniform dull white; whole length of bird about thirteen inches. Colour of adult bird,—beak, lore, and irides yellow; top of head, occiput, shoulders, wing primaries, and tail feathers of a shining bluish black; wing-coverts, breast, belly, thighs, and side of neck, buff-coloured; legs, toes and claws greenish yellow.

The *common bittern* was formerly very frequently met with in this country, but since extensive marshes and waste lands have been brought into cultivation, and its haunts disturbed, this bird now rarely breeds in the British islands. The bittern was also held in some estimation as an article of food for the table: the flesh is said to resemble that of the leveret in colour and taste, with some of the flavour of wildfowl. The nest is composed of sticks, reeds, &c. placed on the ground near the water's edge, among the thickest herbage; eggs 4 or 5, of an uniform pale brown, same shape at both ends; 2 inches 2 lines in length by 1 inch 6 lines in breadth. In choice of food not particular, feeding on small mammalia, birds, fishes, warty lizards, and frogs, &c., which are usually swallowed whole. Colour,—beak greenish-yellow; lore green; irides yellow; top of head black, tinged with bronze green; all upper surface of body pale brownish buff, irregularly marked with black and dark reddish brown; cheeks, side of neck, and under surface of body, buff; legs and feet grass-green; claws pale horn colour. Whole length of an adult bird from 28 to 30 inches.

The *American bittern* is not often met with in this country. Nest in swamps among long grass; eggs four, cinereous green, two inches in length by one inch and a half, of a broadly oval shape, pointed at the smaller end. Food, fish, frogs, &c.; beak brownish yellow; lore green; irides yellow; crown of head brown tinged with red; chin and front of neck mixture of white, buff, and dark brown in streaks; breast and belly

T; legs and toes greenish brown. (*Yar-* *'s Brit. Birds*, vol. ii. pp. 469—484.)

BITTER PRINCIPLE. This term has n applied to certain products of the ac- of nitric acid upon animal and vegetable ters of an intensely bitter taste. (*Brande's* *. of Science.*) The most important of plants cultivated with us for their bitter ciple are the hop, the common broom, wort, ground ivy, marsh trefoil or buck- n, and the gentian family of plants. ssia, the wood of a tree, is also a very nse bitter, and is used in medicine, and destinely in the brewing of beer. The f combinations of the bitter principle l in medicine are narcotic, aromatic, as- gent, acid, and purgative bitters. (*Lowe's* *of Ag.* pp. 371—373.)

ITTERS. A spirituous liquor in which r herbs or roots are steeped. An ex- ive habit of taking bitters may finally e detrimental to the stomach, by over- itement, or by inducing a kind of artificial and for food in greater quantity than is tary to the general health.

BITTER-SWEET, or WOODY GHTSHADE. (*Solanum dulcamara.*) s wild plant loves moist places, therefore ws most freely in hedges and thickets, ar ditches, rivers, and damp situations. It wers in June and July, and ripens its ries in August, which are of a red colour, cy, bitter, and poisonous. Its flowers are elegant purple, with yellow threads in ir middle, and the berries are oval or ob- g in shape. The stalks are shrubby, and , when supported, to ten feet in length; a bluish colour, and when bruised or ken have an odour not very fragrant or irable, savouring of rotten eggs. A de- tion of its wood, and the young shoots ed, is a valuable medicine, but not to trifled with. (*Eng. Flor.* vol. i. p. 317.)

BITTERWORT. The old English name the yellow gentian. See GENTIAN.

BIXA. See ANNOTTA.

BLACK. (Sax.) A common colour in ses. Horses of this colour are most es- med when they are of a shining jet black, d well marked, without having white on ir legs. The English black horses have erally more white about them than the ck horses of other countries. Those that take most of the brown are said to be strongest in constitution; for the English ck cart horses are found not to be so dy as the bays or chestnuts.

BLACKBERRY. See BRAMBLE.

BLACK BINDWEED. See BINDWEED.

BLACKBIRD. This is a species of bird generally known, that but little need be of its habits or its haunts. Numbers bred in this country every season, and those thus reared, it is believed, do not migrate. Its food varies considerably with the season. In spring and early summer, larvæ of insects, worms, and snails; as the season advances, fruit of various sorts. When the enormous number of insects and their larvæ, with the abundance of snails and slugs, all injurious to vegetation, be duly considered, it may fairly be doubted whether the value of the fruit is not counterbalanced by the services performed. Nest, of coarse roots and strong bents of grass, plastered with dirt, and lined with finer grass. Eggs, four or five, light, speckled with pale reddish brown, occasionally uniform blue without any spots, one inch two lines long, ten lines broad, length of bird about ten inches: beak and edges of eyelids in adult male, gamboge yellow; whole plumage black, under surface, of wings shining greyish black; legs, toes, and claws, brownish black. (*Yarrell's Brit. Birds*, vol. i. p. 202.)

BLACK CANKER. A disease in turnip and other crops, produced by a species of caterpillar. (See BONE DUST.)

BLACK-CAP. (*Sylvia Atricapilla.*) This bird is a true sylvan warbler, visiting this country from the south and east every spring, arriving about the middle of April, sometimes rather earlier, depending on the state of the season, but never, according to Mr. Selby, till the larch trees are visibly green; and it leaves us again, with an occasional exception, in September. Like the nightingale, the males of this species, which are readily distinguishable by their jet black head, arrive some days before the females, and their song soon betrays their retreat. They are inferior only to the nightingale in the quality of their song. The nest is usually fixed on a bush two or three feet from the ground, constructed of bents and dried herbage lined with fibrous roots mixed with hair. Eggs, generally five, nine lines in length by seven lines in breadth, of a pale greenish white, matted with light brown and ash colour, a few spots and streaks of dark brown. Food, berries, insects, and fruit, particularly raspberries and red currants. In adult male, beak is a dark horn colour; irides dark brown; all upper part of head above the eyes jet black; nape of neck, chin, throat, and breast, ash grey; back, wings, and tail, ash brown; belly and under wing-coverts white; legs and toes lead colour; claws brown; length five inches and three quarters. The female is larger than the male, measuring six inches and one quarter; top of the head chestnut; other parts of plumage more tinged with brown than that of male. (*Yarrell's Brit. Birds*, vol. i. p. 280.) The term "black-cap." is generally applied and understood to signify this warbler; but it is also occasionally given to the great titmouse (*Parus fringillago*); the marsh titmouse (*Parus palustris*); the black-headed bunting (*Emberiza Schœniculus*); the stone chat (*Rubetra Rubecola*); and even to the black-headed gull. (*Brande's Dict. of Science.*)

BLACK CATTLE. See Cattle.

BLACK COCK. (*Tetrao Tetrix.*) The name of a native species of grouse, which inhabits in small numbers a few particularly wild localities in some of the southern counties of England, but is much more numerous in the north; and from Northumberland, throughout the greater part of Scotland, is found in considerable quantities, where well wooded and mountainous districts afford shelter and winter food. Nest on the ground, under shelter of some low thick bush; eggs six to eight, yellowish-white, spotted with orange brown, two inches in length by one inch five lines in breadth. Food; in summer, seeds, the tender shoots of heath, leaves, and some insects. In autumn, berries of various sorts, and the loose grain to be found in corn fields and stubbles. Adult male, colour, beak black; irides, dark brown; semilunar patch of naked skin over the eye, bright scarlet; head, neck, back, breast-belt, rump, tail, and wing coverts, black; vent, thighs, and legs, mixed black and white; toes and claws blackish brown. Whole length, 22 inches. Female, usually called the grey hen, has the beak brown, irides hazel, general colour of the plumage pale chestnut brown, barred and freckled with black. Length, 17 to 18 inches. Several instances have occurred of hybrids between the pheasant and black grouse. (*Yarrell's Brit. Birds*, vol. ii. p. 304.)

BLACK COUCH GRASS. A provincial name for the marsh bent grass, or *Agrostis alba*. (See Agrostis.)

BLACK DOLPHIN. A term applied to a small insect which is frequently very destructive to bean, turnip, and some other green crops.

BLACK FLY. An insect of the beetle tribe, very injurious to turnips in their early stage. (See Fly.) For angling, the early small black fly and black gnat (*Culex reptans*) are artificially imitated for use in the month of March.

BLACK-HEADED BUNTING, or REED BUNTING. This bird is a well known inhabitant of marshy places, the sides of lakes and large ponds, banks of rivers or canals, rush-grown water, meadows, and beds of osiers, and though local from the partiality the bird exhibits to live in the vicinity of water, it is not a rare species in situations which accord with its habits, and it remains in this country throughout the
year. The contrast afforded by th
head of this bird as opposed to th
collar on the neck, and the varied
of the back, give it an agreeable and
appearance; and it is accordingly a
ite with many. Nest generally
ground among coarse long grass or
composed of moss with coarse gras
with finer grass and hairs. Eggs
five, pale purple brown, streaked wit
brown; length nine lines and a half
lines in breadth. Food; grain, seeds,
and their larvæ. Male bird, beak
brown; irides, hazel; head, cheeks,
coverts, velvet black, bounded by
of white, which descends to the breas
and throat, black; sides of the ches
each wing, breast, belly, and under
verts, white; legs, toes, and claws,
whole length six inches. The fema
ther smaller thant he male; head a
coverts reddish brown, varied with
shade; under surface of the bod
clouded with brown than in the mal
and toes pale brown. (*Yarrell's Bri*
vol. i. p. 438.)

BLACK LEGS. A provincial nan
in some places to a disease frequent
calves and sheep. In Staffordshi
called the *wood evil*. It is a blood
tinous humour, settling in their le
often in the neck between the skin
flesh, making them carry their neck

BLACK MUZZLE. See Shee
eases of.

BLACK-NEBBED CROW. A
cial term applied to the carrion crow
Crow.)

BLACK OATS. A species of oa
cultivated in some parts of Englan
oats of this habit have the corolla ve
are awned, and the seeds are small.
are rather an inferior class of oats,
hardy and ripen early, and it is this p
which suits them for cultivation in
elevated climates. (*Prof. Low. E*
p. 256.) (See Oats.)

BLACK REDSTART. This bi
once distinguished from the well kno
common redstart, by being sooty b
the breast and belly, where the oth
reddish brown. Its manners and ha
somewhat similar to those of the r
but it prefers stony places, and is rar
on the plains. Its food consists of
insects in their various stages, the
fruits and berries. It makes its nes
clefts of rocks, and when it frequent
or villages, it chooses holes in walls,
houses, and sometimes the elevated
churches. Nest formed of grass, lin
hair; eggs five or six, ten lines in le
seven in breadth; white, smooth, an

dult male beak black; irides blackish
top of head, neck, and back dark
grey; wing-coverts greyish black;
nd tail-coverts chestnut; cheeks,
breast, and sides, dark sooty grey,
g slate grey on the belly; legs, toes,
s black. Whole length of bird five
nd three quarters. (*Yarrell's Brit.*
ol. i. p. 241.)

CK TAIL. (*Perca cornua*, Linn.)
of perch, by some called ruffs, or
It is known as the sub-olivaceous
peckled with black, with fifteen
the dorsal fin. It is about the size
nnow, and found in shoals in the
and other tributary rivers. Bait,
ns, or ground bait. Ruffs form a
le treat, broiled in buttered paper.
s Ency. Rur. Sports, p. 1071.)

CK THORN, or SLOE. (*Prunus*
) This rigid bushy shrub is well
growing commonly in hedges and
. It is frequently used in making
specially in exposed situations. But
reckoned so good for this purpose
hite thorn, because it is apt to run
to the ground, and is not so certain
ing; however, when cut, the bushes
h the best, and most lasting of any
d hedges, or to mend gaps: cattle are
pt to crop fences of this kind as those
hite thorn.

fruit is well known in the country,
n its acid, astringent, and very aus-
vour, it is not eatable except when
or boiled with a large proportion of
and it is then not good. The juice,
nspissated over a slow fire, is a sub-
for the Egyptian acacia, or Indian
. In some form or other this juice
in adulterating port wine. The
also are reckoned among the adul-
substitutes for tea in England. A
istilled from the blossoms of the sloe
to be used medicinally in Switzerland
rmany.

juice of sloes checks purgings when
mmation is present. (*Smith's Eng.*
ol. ii. p. 357.)

CK TWITCH. (*Agrostis alba.*) A
weed of the sub-aquatic marsh-bent
It chokes up drains and underwood,
urishes even in extremely dry situa-
roving very injurious to many crops.
so known under the name of *black*
nd *black wrack*. (See Marsh Bent
)

CK WASH. A lotion composed of
and lime water.

CK WATER. See Sheep, Dis-
r.

DDER. (Sax. blaððne, Dutch,
) The viscus or bag destined for the temporary reception of the urine in animals.

BLADDER-FERN. (*Cystea.*) These ferns, of which Smith enumerates four species, are all perennials, and are found for the most part abundantly on wet, shady rocks, on the walls of old buildings, and in mountainous woods, or other elevated positions. They are too well known to need description; and as they will be treated of more fully under the head Ferns, I shall content myself with setting out the known species of bladder ferns. They are, 1. brittle bladder fern (*Cystea fragilis*); 2. toothed bladder fern (*C. dentata*); 3. deep cut mountain bladder fern (*C. angustata*); 4. laciniated bladder fern (*C. regia*). (*Smith's Eng. Flor.* vol. iv. pp. 297—304.)

BLADDER-NUT. (*Staphylea pinnata.*) The common bladder nut is a smooth, branching, hardy, indigenous shrub, which grows from fifteen to twenty feet high, with foliage resembling some kind of ash, and throwing up many suckers. It blows pale greenish yellow, or sometimes white flower; bell-shaped, pendulous; inodorous from May to July; seeds pale brown, appearing as if varnished. It thrives in any situation and soil, and is propagated by suckers. Haller says, children eat the kernels; but, according to Gerarde, their first sweetness is succeeded by a nauseous taste, and an emetic effect. Singularity rather than beauty procures this plant a place in gardens. (*Smith's Engl. Flor.* vol. ii. p. 110.)

The three-leaved *bladder nut* (*Staphylea trifolia*) is equally hardy, but does not grow so high; it blows a white flower in May and June. It is a native of Virginia. Propagate by suckers.

BLADDER-SENNA. (*Colutea arborescens.*) A shrub from the south of France, Italy, and the Levant. It grows from ten to fifteen feet high, blowing its yellow flowers through the whole summer. The flowers and fruit appear at the same time, which has a curious effect. It loves a chalky soil. It appears from Turner's *Herbal*, that this plant was common in his time (1568). In the neighbourhood of Athens it was used in ancient times to fatten sheep.

Oriental bladder-senna, or Pocock's bladder-senna (*Colutea cruenta*), blows dark red flowers marked with yellow in June and July, and grows six or seven feet high.

The *scarlet-flowered bladder-senna* (*Colutea frutescens*) is a hardy African shrub, growing four feet high, and blooms in July. The three varieties love chalk, and are propagated by layers; but those raised from suckers are never so fine as those produced from seed. If raised from seed, sow it in a rich soil in a shady place, and plant them out the following spring. Parkinson tells us, that the leaves of bladder senna are a violent purgative; but later writers affirm, that they do not answer the purposes of senna. The seeds in the quantity of a drachm or two excite vomiting. (*Phillips's Sylv. Flor.* vol. i. p. 138.)

BLADDERWORT, or HOODED MILFOIL. (*Utricularia.*) Aquatic perennial herbs, floating by means of bladders attached to thin stems or leaves, which latter are finely divided. The yellow flowers are raised on a central stalk above the water. They are found wild in ditches, deep standing pools, and spongy bogs, flowering in June and July. There are three species, the greater bladderwort, intermediate bladderwort, and the lesser bladderwort. (*Smith's Engl Flor.* vol. i. p. 29.)

BLADE. (Sax. blæð, bleð; Fr. *bled;* Low Lat. *bladus.*) The spire of grass before it grows to seed; the green shoots of corn which rise from the seed. (*Todd.*)

BLADE-BONE. In farriery, the popular name for the shoulder-blade (*scapula*) of an animal.

BLAIN. (Sax. bleȝene; Dutch, *bleyne,* from the Iceland. *blina,* a pustule.) In farriery, inflammation of the tongue, a disease in cattle, which frequently affects them in the spring of the year or beginning of summer. The disease (says Clater) is neither so frequent nor so fatal in the horse as it is in cattle; but it does sometimes occur, and the nature of it is frequently misunderstood. The horse will refuse his food, hang his head, and a considerable quantity of ropy fluid will be discharged from the mouth. On examining the mouth, the tongue will be found considerably enlarged, and, running along the side of it, there will be a reddish or darkish purple bladder, and which sometimes protudes between the teeth. The neighbouring salivary glands are enlarged, and the discharge of saliva is very great, while the soreness of the swelled and blistered part causes the horse obstinately to resist every motion of the jaws. The cure is very simple: the bladder must be deeply lanced from end to end: there will not be any great flow of blood. This will relieve or cure the horse in twenty-four hours. If he can be spared from his work, a dose of physic will remove the stomach affection and any slight degree of fever that might have existed. If the disease is neglected, the swelling will at length burst, and corroding ulcers will eat deeply into the tongue, and prove very difficult to heal. (*Clater's Farriery,* p. 64.)

BLAKE. (Teut. *bleech,* pale.) A provincial term sometimes applied to the colour which has a yellow similar to bee's wax.

BLANKET PEAR. A kind o
sometimes written *blanquet.* (See P

BLAST. A vegetable disease, th
as blight. In farriery, it is also a
name for any circumscribed swelling
flammation in the body of an animal.
Mildew.)

BLASTING OF STONES. Th
ation of tearing asunder large sto
rocks, which are in the way of the p
or other instruments employed in br
up ground, by means of gunpowder.
of wood, the roots of trees, and oth
structions, are removed by the same
In stone quarries, blasting is a ne
business. Perhaps one of the great
most successful blasts ever effected
Craigleith quarry, Scotland, on the
October, 1834, when, by 500 lbs.
Henry Bridge's double-strong blastin
der, a mass of upwards of 20,000
solid rock was displaced. (*Quart. Jo
Agr.* vol. v. p. 463.)

BLAY. (*Cyprinus alburnus.*)
vulgar name for the small white riv
the bleak, properly the silvery carp;
also the blea, or bley, and whiting.
fish (says Mr. Daniel) is ever in
and is by some termed the fresh-wate
it is frequently substituted for the a
The bleak is seldom more than six
long, head small, skull transparen
silvery, body slender, greatly com
sideways, back green, sides and belly
found in almost every river in the ki
They spawn early in the spring. A
for bleak is practised both by float-
and whipping. Black gnat and
house-fly are good baits. (*Blaine's
Rur. Sports,* p. 1044.)

BLAZE. A white mark or star
face of a horse.

BLEA. A provincial word applie
dusky blue or lead colour.

BLEA-BERRY. One of the na
the bilberry (*Vaccinium myrtillus*).
Whortleberry.

BLEA FISH and BLEAK. The
water sprat, or silvery carp. (See B

BLEB, or BLOB. A provincial
for a blister or bubble.

BLEE. (Sax. bleo.) A country
for colour or complexion.

BLEEDING. (Sax. bleðan.) An
tion frequently necessary in the di
of different kinds of cattle, parti
horses. Such horses as stand much
stable, and are full-fed, require bl
more than those which are in consta
ercise; but especially when their ey
heavy and dull, or red and inflame
when they look yellow, and the hors
flamed in his lips and the inside

r when he seems hotter than usual,
gles his hay. These indications
show that bleeding is required,
ise the lowering of the diet. The
the common season for bleeding
ut periodical bleeding, without its
being indicated, should never be
In summer, it is often necessary
t fevers, always choosing the cool
rning for the operation, and keep-
cool the remaining part of the
me farriers bleed horses three or
s a year, or even oftener, by way
tion, taking only a very small
at a time, as a pint or a pint and
There is, however, this inconveni-
frequent bleeding, that it grows
bit, which, in some cases, cannot
broken off without hazard; and,
orses become weak from frequent

ISH. In farriery, any kind of
ion in a horse, or other animal.
es, they consist of broken knees,
r in the cutting places, mallenders
ders, cracked heels, false quarters,
r excrescences which do not occa-
ness; and wind-galls and bog-spa-
re they prevail to any great degree.
ating, the knots on the outside of
d shakes internally, are termed

DINGS. A provincial word ap-
ixed crops, such as peas and beans
wn together.

D-WATER. In farriery, the name
emper incident to neat or black
which the liver is affected.

HT. The general name for various
eceived by, and diseases incident
fruit-trees, plants, &c. See Mil-
t, and Smut.

D, MOON-. In farriery, a disease
es of horses, which is commonly
unner of cataract, and generally
lindness.

DNESS. A deprivation or want
originating from various causes; a
more frequent in horses than in
le or sheep.

ess in horses may be discerned by
or step being uncertain and un-
that they dare not set down their
y; but when they are mounted by
horseman, the fear of the spurs
uently make them go resolutely
ly, so that their blindness can
e perceived. Another mark by
rses that have lost their sight may
, is, that when they hear any body
stable, they prick up their ears,
them backwards and forwards in
lar manner.

Blindness in sheep. A complaint that sometimes occurs in these animals, from their being much exposed to either great dampness or long continued snows.

BLIND NETTLE. A provincial term for the wild hemp plant.

BLINDWORM. A term sometimes applied to the slow-worm (*Anguis fragilis*). See Slow Worm.

BLINKERS. Expansions of the sides of the bridle of a horse, intended to prevent him from seeing objects on either side, but at the same time not to obstruct his vision in front.

BLINKS, WATER, or WATER CHICKWEED. (*Montea fontana.*) An annual herb found in watery places by the sides of little clean rills, especially on a gravelly soil. Root fibrous; herb smooth, rather succulent; stem two or three inches high, much branched; flowers small white; seeds black. (*Engl. Flora*, vol. i. p. 186.)

BLISTERING. (Dutch, *bluyster.*) In farriery, the operation of stimulating the surface of some part of the body of an animal, by means of acrid applications, so as to raise small vesications upon it. It is frequently employed for the purpose of removing local affections of different kinds, such as hard indolent tumours.

BLISTER FLY. The *Cantharis*, or Spanish fly.

BLISTER LIQUID is composed, of powdered alkanet two ounces, and a gallon of spirit of turpentine; adding, on the fourth day, a pound of powdered Spanish flies; and macerating the whole for a month, when the clear fluid will form a strong liquid blister. If so powerful an external stimulant be not required, this liquid may be diluted with an equal part of spermaceti oil. (*Clater's Farriery.*)

BLISTER OINTMENT. One ounce of powdered Spanish flies; half an ounce of powdered euphorbium; four ounces of lard. One ounce of this well rubbed in is sufficient to blister a horse's leg. That commonly sold by farriers generally contains oil of vitriol (sulphuric acid), to make it raise the blister without the trouble of rubbing in the ointment; and, in consequence, a blemish is produced.

BLITE. (*Blitum.*) See Goosefoot.

BLOOD. (Sax. bloð; old French, *bloed.*) The fluid which circulates in the bodies of all animals. Blood, when drawn from the body, and allowed to rest, speedily separates into two portions, viz. the fluid, or serum, and the solid clot, crassamentum, or cruor.

These have been examined by M. Berzelius, who found in 1000 parts of the serum of the blood of the bullock —

	Parts.
Water - - -	- 905·
Albumen - - -	- 79·999
Lactate of soda, and extractive matter - -	- 6·175
Muriate of soda and potash	- 2·556
Soda and animal matter	- 1·52
Loss - - -	- 4·75
	1000

The clot, or cruor, was examined by the same chemist: he found it to be composed of—

Colouring matter (*hæmatosine*)	- 64
Fibrin and albumen - -	- 36
	100

In the ashes of the colouring matter of the blood has been found—

Oxide of iron - -	- 50·
Sub-phosphate of iron -	- 7·5
Phosphate of lime and magnesia	- 6·
Lime - - -	- 20·
Carbonic acid and loss -	- 16·5
	100

In quadrupeds, as well as in man, the blood is of two kinds, namely *arterial* and *venous;* the former is lighter, warmer, of a richer red colour than the latter, and affords the nutriment of the body; the latter possesses neither nutritious nor stimulant properties. In quadrupeds, in general, the temperature of the blood is higher than in man. In the sheep, it ranges from 102° to 103°; in man it is 98° in a state of health. The equal distribution of the blood in the animal system is as essential to the health of quadrupeds as of man. When it is irregularly circulated, and more sent to any organ than it should share, that part becomes oppressed, diseased action is set up in it; and if the organ be a vital one, life is endangered or destroyed.

Blood is an excellent manure for fruit trees; and, mixed with earth, forms a very rich compost. (*Ann. of Phil.* vol. ii. p. 202.)

BLOOD-FLOWER. See HÆMANTHUS.

BLOOD-HORSE. See HORSE.

BLOOD-HOUND. A hound celebrated for its exquisite scent and unwearied perseverance, qualities which were taken advantage of, by training it not only to the pursuit of game, but to the chase of man. The blood-hound of the olden breed was a dog somewhat taller than our full-sized fox-hound, and withal stronger in his build. His colour was a reddish brown, here and there shaded with darker tintings. His muzzle and jaws were wide, his ears deep and pendulous, and he altogether exhibited a frame in which great strength and some speed were united. This dog, without doubt, was originally used in the pursuit of large
as the bear, wild boar, and the stag a
and as his scent is acute in the extr
strength great, and his determinatio
cible, so he must have been a valuabl
ing agent; but when hunting bega
sume a different character, and the
was made after beasts of rapid flig
other varieties of hound were cu
as the stag-hound, fox-hound, har
The blood-hound was held in high
with our ancestors; especially on
fines of England and Scotland, w
borderers were continually preying
herds and flocks of their nei
(*Blaine's Encyc. Rural Sports,*
The use of the blood-hound, in th
try, is now almost extinct; he is so
used to track sheep-stealers, but is
used as an object of curiosity or o
The use which was made of him in
roon war, in which the Cuban bloo
was employed, is a matter of his
recent to demand particular notice.

BLOOD-ROOT. See BLOODW

BLOOD-SHOT. In farriery, a
term for that red appearance whic
exhibits when inflamed. The best t
is to bathe the eye with a lotion
of one drachm of white vitriol (su
zinc) dissolved in half a pint of wa

BLOOD-SPAVIN or BOG-S
In farriery, a swelling of the vein
along the inside of the hock of t
forming a little soft tumour in th
part, often attended with weakness
ness of the hock. Clater (*Farriery*
says, a blister is the proper applica

BLOODWORT. (*Sanguinari*
densis.) A hardy American
flowering in April. It loves a
tuation and bog soil; and may
gated by parting the roots in
autumn. The root of bloodwor
out a bright red juice, when press
the Indians paint themselves
operates as an emetic and narcotic

BLOODWORT. (*Rumex sa*
This is a beautiful dock, growin
many parts of England, but i
lately into gardens, for its fine dee
pearance. It grows from two to
high, and the stalks are firm, stif
and branched. The leaves are
narrow, heart-shaped at the base,
gradually towards their point. S
the leaves are a deep green, only
veined with red; sometimes they a
a deep blood colour, which giv
beautiful appearance. The flow
terminal clusters, small, and
They blow in June and July, an
ripens in August. The dried r

ler or in decoction, is astringent;
y be used in spitting of blood, and
purgings.
OM or BLOSSOM. A general
r the flowers of plants, but more
y of fruit-trees. The office of the
is partly to afford protection, and
draw or supply nourishment to the
g organs of the plant, for the per-
f the embryo, fruit, or seed.
SSOM. A colour in horses, formed
termixture of white hairs with sorrel
ones.
V-BALL. A local name for the
f the dandelion.
V-FLY. The large flesh-fly (*Musca*
), which is artificially imitated for
It is used in the month of July.
V-MILK. The milk from which
m has been blown off.
WN. In farriery, a diseased state
omach and bowels of cattle, caused
sudden extrication of air in large
es from some of the grosser kinds of
od. See Hoven.
WS. A provincial term used to sig-
blossoms of beans, &c.
BBER. See Fish.
E-BELLS. (*Scilla nutans.*) A com-
ne given to a bulbous-rooted plant
hyacinth kind, frequently met with
s and other places. Its bulb is glo-
hite, and coated; its leaves linear,
d, shining, and drooping in their
alf; the flowers form a cluster on an
stalk, drooping in the upper half;
blue, pendulous, nearly an inch long,
ted. The bulb is acrid, but loses its
y in drying, in which state it answers
stitute for gum-arabic in the art of
by being simply dried and powdered.
E-BOTTLE. (*Centaurea.*) This
ge herbaceous genus, which con-
veral species known as weeds;
wever, which is peculiar to corn
the corn blue-bottle (*Centaurea*
It grows amongst corn, and its
indicates careless farming. It is
al, ripening its seeds in autumn.
so known by the names of knap-
atfellon, centaury, corn-flower, and
kle. The expressed juice of its blue
when mixed with cold alum-water,
used as a water colour for painting,
permanent colour. See Centaury.
pretty wild flower has been intro-
nto our gardens for its elegance.
e-bottle grows a foot high; the stalk
nd white, and the leaves are narrow,
a whitish-green. The root is hard
ous. A decoction of the flowers with
d copperas affords a good writing ink.
ant is sometimes known among the common people by the name of "wound herb." Any reliance on the styptic properties of the leaves might prove dangerous by losing time, and a consequent waste of blood, before proper assistance can be procured in extensive wounds. Small wounds can unite without its aid. An infusion of the flowers is slightly diuretic.

BLUE-BOTTLE FLY. The common fly with a large blue belly, suited for angling in April and May, for trout, grayling, dace, and chub. It is most frequently seen in May, and will in warm evenings, and during warm breezes on a cloudy day, answer as bait for killing trout and grayling. Dace and chub, but particularly dace, will take it readily whenever offered, except in the middle of a very bright day.

BLUE BREAST. The English name for the pretty bird, which, as Bechstein observes, may be considered as the link between the redstart and common wagtail, having strong points of resemblance to both. In England it is very rarely seen. (*Penny Cyclo.*) See Blue-throated Warbler.

BLUE-CAP. See Blue-tit.

BLUE DUN. (*Ephemera.*) A fly for fishing, generally used in the earliest part of the angling season. It is the blue fox of Taylor and the bloa watchel of Cotton. It comes in early in March, and continues through April, when it is succeeded by a race of flies in which the blue dun tinge predominates in various proportions. In favourable days, the blue dun will kill in all the fishing hours, particularly in April, but best towards mid-day.

BLUE MILK. Milk that has been skimmed, or had the cream taken off. In large dairies it is chiefly used for feeding hogs.

BLUE STONE. The common name for blue vitriol, or sulphate of copper.

BLUE-THROATED WARBLER. (*Phœnicura Suecica*, Selby.) Very rarely seen in England, although described by Yarrell among the British birds. Food, earthworms, insects, and berries. Nest on the ground, composed of dead grass and a little moss, lined with finer grass. Eggs from 4 to 6 in number, greenish blue, 8 lines long, and 5½ in breadth. The top of head, upper surface of body and wings, clove brown; chin, throat, fore part of neck and upper part of breast, ultra-marine blue, with a spot in the centre sometimes pure white, but in very old males red; belly, dirty white; legs, toes, and claws, brown. Whole length of bird 6 inches.

BLUE-TIT. This, like the great tit, is very generally distributed in this country; and although a very pretty bird both as to colour and markings, as well as active and lively, it is but little noticed, and not at all appreciated, probably only because it is exceedingly common. Frequents small woods, orchards, and gardens; and is said to do injury to fruit trees when searching for food, by destroying the buds as well as the insects. Experienced observers, however, believe it does more good than harm. Builds in a hole of a wall or tree; nest made of profusion of moss, hair, and feathers. Eggs variable; from 8 to 10, however, is the more common number; white, spotted with pale red, 7½ lines in length, 6 in diameter; goes by the name of "billy biter" among the bird-nesting boys of several counties. Male has beak of a dusky horn colour, almost black; forehead bluish white; crown of the head azure blue; from nostril to eye, and ear-coverts to nape of neck a stripe of Prussian blue; irides dark hazel; above the eye and under blue of crown of head is a white band, which isolating the blue colour above it has given rise to the term "blue-cap," another name by which this bird is known. Under surface of body sulphur yellow, with a central longitudinal patch of dark blue; legs, toes, and claws, bluish black; length, 4½ inches. (*Yarrell's Brit. Birds*, vol. i. p. 330.)

BLUNT-LEAVED SPHAGNUM. See Sphagnum.

BLYTHE, WALTER; was an officer in the army of Oliver Cromwell. Dr. Beale calls him "Honest Captain Blythe." He was instrumental in introducing many improvements into Ireland and Scotland. He wrote,

1. The English Improver improved; or the Survey of Husbandry surveyed. 4to. 1649. 3d edit. 1653. Professor Martyn terms it "an original and incomparable work for the time." 2. Survey of Husbandry, discovering the best Methods of improving all Sorts of Lands. 1649. folio. *G. W. Johnson's Hist. Eng. Gard.* p. 96.

BOAR. (Sax. baꞃ; Dutch, *beer*.) The male of the swine-tribe of animals. See Hog and Swine.

In *horsemanship*, a horse is said to boar when he shoots out his nose level with his ears, and tosses his nose in the wind.

BOARD OF AGRICULTURE. A society established in London in 1794, under the patronage of his Majesty Geo. III., "For the Encouragement of Agriculture, and Internal Improvement," consisting of a president, and 30 ordinary members, with proper officers for conducting the business of the institution. The plan and design of this highly useful establishment, though previously suggested by several writers on rural improvements, was chiefly brought forward, and carried into execution by the unwearied efforts and persevering industry of Sir John Sinclair, to whom the nation is certainly under much obligation. It was discontinued about the year 1812, in consequence of the withdrawal by government of the annual parliamentary grant of 3000*l.* for its support, chiefly owing to the society's interference
with political themes, foreign to the
provement of agriculture. A full acco
of the nature, origin, and plan, with
charter of incorporation of this excellent
stitution, may be seen in the first volum
the "Communications" published by
Board, which extended to 7 vols.; and t
contain some excellent papers on va
important matters connected with husba
and agriculture in general.

BOAR-THISTLE. A provincial t
applied to the spear-thistle.

BOG, and BOG GRASSES. See F
Soils.

BOG-ASPHODEL, LANCASHI
(*Narthecium ossifragum.*) Found in t
black bogs. Root tuberous, herb smo
rather fine and rigid stem, roundish, lea
or 8 inches high. The flowers in our Br
species are bright yellow, spreading wi
with scarlet anthers. Seeds brown. M
has formerly been written about the p
of this herb to soften the bones of c
feeding upon it, and it has been supp
to cause the rot in sheep. Linnæus, i
Fl. Lapp., combats both these opin
(*Smith's Engl. Flor.* vol. ii. p. 151.)

BOG-BEAN. See Buck-bean.

BOG-ORCHIS. (*Malaxis.*) There
two species of bog-orchis, both peren
1. The least bog-orchis. (*M. palud*
2. The two-leaved bog-orchis. (*M. Loe*
The first is found in spongy, turfy b
Root bulbous, increasing by offsets, c
stalked, and throwing out radicals from
base. Herb, the smallest of our n
Orchideæ, and probably of the whole t
Leaves, three or four, ovate, variou
length, often somewhat fringed. Stalk,
2 to 4 inches high, angular, smooth, be
a dense cluster of very small pale gree
versed flowers. The second species is f
in sandy bogs, among rushes, and is 3
times as large as the preceding, espec
the leaves, which are almost univer
two, bright green, with one central rib
many smaller ones. Bulb, ovate gree
Stalk from between the leaves, and a
twice their height; triangular, smooth; n
cluster of from 3 or 4 to 8 flowers, n
larger than those of *M. paludosa.* C
leaves of a pale lemon colour. Petal n
the same hue. Lip of a deeper ye
(*Smith's Engl. Flor.* vol. iv. p. 47.)

BOG-RUSH, BLACK. (*Schœnus n*
cans.) Is found on turfy bogs. Root sca
creeping, of very long, strong fibres, crow
with black, shining, erect, folded sheat
few of which bear very narrow, acute,
right leaves, and embrace the bottom o
otherwise naked stem, which is from 8
inches high. Head black. Anth. long,
low. Stigm. 3, dark purple. Seed

d polished. (*Smith's Engl. Flor.* vol. i. 50.)

BOG-SPAVIN. See Blood-Spavin.

BOHEMIAN WAX-WING. This is of the most beautiful of the birds that t this country, combining as it does a ceful form with a plumage of brilliant l varied colours. It is, however, only a ter visiter, and comes to us in flocks from north. Food, fruit of the juniper, and er berries; breeds among rocks. Colour, k almost black, irides dark red, forehead ldish chestnut, feathers on top of head ht broccoli brown, forming a crest; on lore, nd the eye, and passing backward round occiput, under the back part of the crest, elongated circle of black; nape of neck t broccoli brown, darker on back, scaas, &c.; some of wing feathers black and w colour; tertials purple brown, tipped h pure white; four of secondary quill thers, and from one to four of the tertials, ending on size and age of bird, termie in a small flat, oblong, coloured, horny pendage, resembling red sealing-wax. der chin is a patch of velvet black; der surface of body, pale broccoli brown; plumage silky and soft to the touch; gs, toes, and claws black. Whole length bird rather more than eight inches. (*Yarl's Brit. Birds*, vol. i. p. 356.)

BOIL. (Sax. bile.) In farriery, an inmmatory suppurating tumour affecting tle or sheep. In order to cure this sort tumour, it will be necessary to bring it a head by the application of plasters comsed of wheat-flour and tar; and when the l feels soft under the finger, to open it th a lancet, and let out the matter or s.

BOKE-LOAD. A provincial term aped to a top-heavy load.

BOLE. A term signifying the body or nk of a tree, and sometimes the stalk or m of corn. This word is written and onounced in the north of England *boll*, d "bollings" is the name for pollards, es whose tops and branches are lopped off.

BOLE, or BOLL. (Lat. *bolla.*) In Scotd, a common measure of grain, containing r bushels. In the old measure of Scotd, for oats and barley,

4 lippies = 1 peck.
4 pecks = 1 firlot.
4 firlots = 1 boll.
16 bolls = 1 chalder.

e boll of oatmeal weighs 140 lbs. For eat, peas, and rye, 3 oat firlots make oll. (*Brit. Husb.* vol. ii. p. 500.)

BOLE OF SALT. A measure that conns two bushels.

BOLETUS. See Mushroom.

BOLSTERS. In horsemanship, those parts of a great saddle which are raised on the bows both before and behind, to rest the rider's thighs, and keep him in a posture to withstand the irregular motions of the horse.

BOLT and BOLTING. Terms provincially applied to the trussing of straw.

BOLTER. A sort of framed sieve, having its bottom made of linen stuff, hair, or wire, according to circumstances. The bakers employ bolters that may be worked by the hand, but millers have larger ones that move by the machinery of the mill. It is sometimes called *boulter*.

BOLTING, or BOULTING. The operation of separating flour or meal of any kind from the husks or bran, by means of a bolter.

BOLTING CLOTH. Linen or haircloth made for the purpose of sifting meal or flour through. They are made of different degrees of fineness, and numbered accordingly; hence we have cloths of No. 2., No. 3, &c.

BOLTING FOOD. This is a very common vice in greedy horses, especially when they feed out of the same manger. The only remedy is not to let them fast too long, and to mix chaff in their corn. The teeth of such horses should be examined to see whether the bolting of the corn arises from any unevenness of the grinders.

BOLTING MILL. A mill or machine having much lateral or circular motion, by which means the business of sifting meal or flour can be performed with great facility and expedition. The framed sieve that moves within it is termed a bolter.

BOLUS. See Ball.

BONASUS. A kind of buffalo, or wild bull.

BON CHRETIEN. (Fr.) A species of the pear.

BONES. (Sax. ban; Su. Goth. *been*; Germ. *bein.*) The more solid parts of the body of animals. When crushed, a valuable manure.

The introduction of bones as a fertiliser is perhaps one of the most important and successful agricultural efforts of modern days, and has been certainly one great means of sufficiently increasing the national production of corn to keep pace with an annually enlarging population. It required, however, like all other agricultural improvements, much perseverance and unshaken energy in the promoters of this manure, to induce its general adoption; many a long and stubborn argument had to be answered; many hundred loads of the bone refuse of Sheffield and Birmingham had to be given away, before the cautious and suspicious Yorkshire farmers could be generally persuaded of the fallacy of the assertion, that "there is no good in bones." To this tardy conviction the erroneous mode of employing them originally adopted mainly contributed, for they were at first used without even roughly breaking them, and in consequence, they decomposed so very slowly in the soil that the farmer's patience was naturally exhausted: he sought in vain for immediate and striking results.*

The introduction of machinery, however, by enabling the cultivator to procure them in a crushed state, did away with this objection, for when crushed they decompose with much greater rapidity; and this has long since induced a consumption of this manure more than adequate to the national produce of bones. It has been necessary, in consequence, to search in other countries for a supply; and for the last fifteen years the quantity of bones imported from abroad has been steadily increasing. Thus the declared value of all the bones imported into England—

		£	s.	d.
In the year	1821 was	15,898	12	11
—	1824 —	43,940	17	11
—	1827 —	77,956	6	8
—	1830 —	58,223	16	8
—	1833 —	97,900	6	4
—	1835 —	127,131	14	10
—	1836 —	171,806	0	0
—	1837 —	254,600	0	0

Into the port of Hull alone, in 1815, were imported about 8000 tons: this had increased to 17,500 tons in 1833, and to 25,700 tons in 1835. These came principally from the Netherlands, Denmark, and the Baltic, but they have been imported from much more distant places, such as Buenos Ayres and the Mediterranean; and I am confident that if the seal fishermen of North America and other distant stations were aware of the fact that the bones of fish are nearly, if not quite, as valuable for the farmer, as those of other animals, they would not suffer any falling off in the supply. By the 3 & 4 W. 4. c. 56. a duty of one pound per cent. on the declared value is payable on all bones imported for farming or other purposes.

The following table, extracted from one by Richard Tottie, Esq., of Hull, will show to the farmer from whence the great supply of foreign bones is derived. This table contains the imports during 1827, in which year the following number of vessels entered the port of Hull loaded with bones:—

	Vessels.		Tons of Bones.
From Russia -	- 6	carrying	822
— Prussia -	- 9	—	1174
— Sweden and Norway	6	—	362
— Denmark -	- 57	—	3778
— Hanseatic towns	- 61	—	3760
— Netherlands	- 76	—	6110
— Mecklenberg — Hanover - — Oldenberg	- 33	—	1702
Total -	248		17,718

The import of bones into Hull has since been regularly increasing: it was, according to a letter with which Mr. Tottie favoured me, equal to 23,900 tons in 1834, and to 25,700 in 1835. It would certainly be well to look to other quarters, besides the Continent, for a future supply, since in some of the German states a duty on their export has been recently imposed. So considerable, indeed, has the demand become, that by many unprincipled dealers several kinds of adulterations are used. These, according to Mr. Halkett (*Quar. Journ. of Agric.* vol. ii. p. 181.), are the lime that has been used in tan-works to take off the wool and hair, old plaster lime, soap boilers' waste, saw-dust, rotten wood, oyster shells, &c. The best remedy for these frauds is for the farmer to deal with only respectable crushers, and to pay a fair price for the bones.

There is, perhaps, no manure of whose powers the chemical explanation is more easy; for of the earthy and purely animal matters of which bones are composed, there is not a single particle which is not a direct constituent or food of vegetables; thus if carbon, hydrogen, and oxygen, are found in the abounding oil and cartilage of bones, they are equally common, nay, ever present, in all vegetable matters; and if carbonate and phosphate of lime are almost equally common in plants, they are still more universally present in all bones.

The bones of animals do not vary much in composition: they all contain phosphate and carbonate of lime, with a portion of cartilage or animal matter, with other minor ingredients. The bone of the ox has been analysed by M. Berzelius: he found, that by calcining these bones, every 100 lbs. lost 38 lbs. in weight. 100 parts of these bones, before calcination, consisted of—

	Parts.
Cartilage - - -	33·3
Phosphate of lime - -	55·35
Fluate of lime (Derbyshire spar)	3·
Carbonate of lime (chalk) -	3·85
Phosphate of magnesia -	2·05
Soda, with a little common salt	2·45
	100·

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* It is said, in the Doncaster Agricultural Society's Report, upon the use of bones, "Colonel St. Leger, then residing at Warmsworth, was the first person who is known to have used them, and his introduction of them was in 1775: the early progress does not seem to have been rapid, from the practice of laying them on, almost unbroken, and in very large quantities."

s, however, vary slightly in compo- according to the age and condition nimal, for MM. Fourcroy and Vau- found some ox bones, which they d, to be composed of —

		Parts.
elatine and oil	-	51
hosphate of lime	-	37·7
arbonate of lime	-	10
hosphate of magnesia	-	1·3
		100·

enamel of teeth is the only portion s, hitherto analysed, which is entirely e of cartilage. It is true that fossil ontain none; but these have pro- n a former state of the earth, been pon by fire; for Mr. Hatchett found, bones from Hythe in Kent, taken Saxon tomb, the same proportion ilage as in a recent bone. Teeth en analysed by Mr. Pepys: he found be composed of —

	Adults'.	Children's.
sphate of lime	64	62
bonate of lime	6	6
tilage	- 20	20
s -	- 10	12
	100	100

erat Guillot has furnished us with a nt of the earthy constituents of 100 the bones of different animals; from he farmer will perceive that the tion of the bones of all animals is ilar.

es.	Phosphate of Lime.	Carbonate of Lime.	Animal Matter.
-	54	—	46
-	67·5	1·25	31·25
-	70	5	25
-	90	1	9
-	52	1	47
-	85	1	14
-	72	1·5	26·5
-	64	1	35
-	45	5	50
of the e -	85·5	20·5	—
-	64	1	·35

er shells, egg shells, &c., are all d of the same ingredients as bone. r of Dublin are often employed for pose of pounding oyster shells for of the cultivator of the soil; and a plan might, I should imagine, be antageously adopted in some of the s districts in this country: for, such shells do not contain the same on of phosphate of lime as bone, yet tain a sufficient quantity to render them highly valuable as fertilising substances. 100 parts of lobster shells yield —

	Parts.
Carbonate of lime (chalk)	60
Phosphate of lime -	14
Cartilage - -	26
	100

100 parts of cray-fish shells contain —

Carbonate of lime -	60
Phosphate of lime -	12
Cartilage - -	28
	100

100 parts of hens' egg-shells contain —

Carbonate of lime -	89·6
Phosphate of lime -	5·7
Animal matter - -	4·7
	100·

There is yet another source from whence the phosphate of lime might be obtained in large quantities for the use of the farmer, viz. the fossil bones or native phosphate of lime, which is found in various districts of this country, in very considerable quantities, and would only require crushing or powdering to render it nearly as useful to the farmer as the recent bones. That the cartilage or oily matter of the bone does not constitute the chief fertilising quality is shown by the fact, that the farmers who use bone-dust will as readily employ that which has first been steamed, and all its fatty portion extracted by the preparers of cart grease, as they will the unused fresh bones. It is acknowledged, says the *Doncaster Agr. Soc.* in their Report, to be a prevalent opinion amongst intelligent farmers that manufactured bones are equal, in their effects, to the raw bones. Mr. Short, in the year 1812, "boned twenty-four acres, at the rate of fifty bushels an acre. On one part of the field he put London bones, which had the oil stewed out of them; and another part was tilled with bones collected from Nottingham, which were full of marrow, and a third part with horses' bones, having much flesh upon them. He could not see any difference in the turnips produced from these: they all produced a good crop. But the next crop was not so good where the fleshy bones had been laid." And Mr. Horncastle adds, "A strong fermentation takes place in the boiled bones: when thrown in a heap they become extremely offensive, and when they obtain this bad smell, I consider they are in a state to break up for manure." — And, says Mr. Halkett of New Scone, in Perthshire, "After numerous trials between what we call green bones with all the marrow and fat in them, and dry ones free from it, I have always found that the latter raised by far the best crops. Therefore I have arrived at the conclusion that the less animal fat in them the better, and that the boiling of them before crushing, instead of impairing them, is a benefit." (*Quar. Journ. of Agric.* vol. ii. p. 180.)

The mineral substance, called the Apatite, found in the Cornish tin mines, is nothing but phosphate of lime; 100 parts being composed of—

	Parts.
Phosphoric acid -	- 45
Lime - -	- 55
	100

The phosphate of lime is also found in many parts of the north of England, in Hungary, and, in immense beds, in Spanish Estremadura, where it is said to be so common in many places, that the peasants make their walls and fences of it. 100 parts of this substance, called by mineralogists the phosphorite, contain—

	Parts.
Phosphoric acid and lime -	93
Carbonate acid -	- 1
Muriatic acid -	- 0·5
Fluoric acid -	- 2·5
Silica - -	- 2
Oxide of iron -	- 1
	100·

The horns of the deer are similar in composition to bones; but those of black cattle are totally different; they approach nearer in composition to animal muscle, as may be seen by the following analysis of Dr. John; 100 parts of the horns of black cattle yielding this chemist—

	Parts.
Albumen -	- 90
Ditto with gelatine	- 8
Fat - -	- 1
Various salts, &c. &c.	- 1
	100

100 parts, however, of a fossil horn, analysed by M. Braconnot, yielded—

	Parts.
Phosphate of lime	- 69·3
Water -	- 11
Gelatine -	- 4·6
Carbonate of lime	- 4·5
Bitumen -	- 4·4
Silica - -	- 4
Phosphate of magnesia	- 1
Alumina -	- 0·7
Oxide of iron -	- 0·5
	100·

The excrements of those birds and animals which feed upon animal matters approach very nearly to bone in chemical composition; and I have little doubt but that the dung of sea birds might be profitably collected from some of the rocky islands on our coasts. This is actually done among the South Sea Islands by the Peruvian farmers, and to such an extent, that, according to M. Humboldt, fifty vessels, each carrying from fifteen hundred to two thousand cubic feet, are annually loaded with this manure at the island of Chinche alone. This manure is known in South America under the name of Guano, and is too powerful to be used in large quantities. It abounds in phosphate of lime. (A quantity has recently been imported into this country: it contains 36 per cent. of phosphate of lime.) Some of the dung of sea-fowl, collected on a rock on the coast of Merionethshire, was tried at the request of Sir H. Davy, at Nannau, by Sir Robert Vaughan, and produced a very powerful, though transient effect, on some grass land. The very soil of some of the rocks which have been for so many ages tenanted by these water-fowl must be completely impregnated with the earthy matters of bones. See GUANO.

All the constituent parts of bones are found in vegetable substances. The cartilage of bones is composed, according to the examination of Mr. Hatchett, of a substance nearly identical in all its properties with solid albumen. Now, 100 parts of albumen are composed of—

	Parts.
Carbon -	- 52·888
Oxygen -	- 23·872
Hydrogen -	- 7·54
Azote -	- 15·705
	100·

It is perfectly needless to specify any vegetable substances into which the three first of these substances enter, for the vegetable world is almost entirely composed of them, and occasionally a portion of azote is also found in vegetable substances, but the three first are invariably present. The flour of wheat, the poison of the deadly night-shade, the oxalic acid of the wild sorrel, the narcotic milk of the lettuce, the stinking odour of the garlic, and the perfume of the violet, are, by the contrivance of their divine architect, only *some* of the results of the mixture of carbon, oxygen, and hydrogen.

But the chief constituent present in all bones we have already seen is the phosphate of lime; and how absolutely necessary this substance is for the healthy vegetation of plants will be apparent from the following hich contains the results of the ex- on by MM. Saussure, Vauquelin, w other distinguished chemists, of es or solid contents of a number of le substances: —

	Parts.
s of the ashes of the grain of the oat yielded of phosphate of lime - -	39·3
s of straw of wheat yielded of phosphates of lime and magnesia -	6·2
seeds of wheat -	44·5
bran - -	46·5
seeds of vetches -	27·92
golden rod (*Solidago virgaurea*) - -	11·
plants of turnsole (*Helianthus annus*), bearing ripe seeds - -	22·5
chaff of barley -	7·75
seeds of barley -	32·5
seeds of oats -	24
leaves of oak -	24
wood of oak -	4·5
bark of oak -	4·5
leaves of poplar -	13
wood of ditto -	16·75
leaves of hazel -	23
wood of hazel -	35
bark of hazel -	5·5
wood of mulberry -	2·25
bark of mulberry -	8·5
wood of hornbeam -	23
bark of hornbeam -	4·5
seeds of peas -	17·5
bulbs of garlic -	8·9

phate of lime has also been found in sh bean (*Vicia Faba*), and in the pea- husk, by Einhof; in rice, by Bra- in the Scotch fir, by Dr. John; in inquina of St. Domingo, by Four- in the fuci, by Gaultier de Claubry, many others; in short, as Dr. on remarks (*System of Chem.* vol. iv.), "phosphate of lime is a constant ent in plants."

cultivator of the soil will not be in- us as to the power of vegetables to e and feed upon the hard substance crushed bones of animals, when he is ed that the ashes of the straw of are composed of 61½ per cent of (flint), a still harder substance than dest bone. And this is not a solitary e; for the same earth abounds in a eater proportion in the straw of other Vauquelin found 60¾ per cent. of e ashes of the seeds of the oat; and tch rush contains it in such abund- hat it is employed by the turner to wood and even brass.

he mode and effect of applying bones anure, either whole, broken, or in a state of powder, the Doncaster Agricultural Association paid considerable attention, and they have made a very valuable report of the result of their inquiries, in which they say:—"The returns received by the Association satisfactorily establish the great value of bones as a manure. Our correspondents, with only two exceptions, all concur in stating them to be a highly valuable manure, and on light dry soils superior to farm-yard dung and all other manures. In copying the language of one of them, in reference to dry sandy soils, we express the opinions repeated in a far greater number —'I consider bone tillage one of the most useful manures which has ever been discovered for the farmer's benefit. The lightness of carriage, its suitableness for the drill, and its general fertilizing properties, render it peculiarly valuable in those parts where distance from towns renders it impossible to procure manures of a heavier and more bulky description.' For, as stated by another farmer, the carting of six, eight, or ten loads of manure per acre is no trifling expense. The use of bones diminishes labour at a season of the year when time is of the first importance; for one waggon load, or 120 bushels of small drill bone-dust, is equal to forty or fifty loads of fold manure. Upon very thin sand land its value is not to be estimated; it not only is found to benefit the particular crop to which it is applied, but extends through the whole course of crops." The report adds that bones have been found highly beneficial on the limestone soils near Doncaster, on peaty soils, and on light loams; but that on the heavy soils and on clay they produce no benefit. The late Mr. George Sinclair, of New Cross, has given (*Transact. High. Soc.* vol. i. p. 78.) the analysis of two soils on which bone manure produced very opposite results. 400 parts of the soil on which the bone manure had very beneficial effects consisted of—

	Parts.
Silicious sand - - -	167
Calcareous sand - -	43
Water of absorption - -	99
Animal and vegetable matter -	24
Carbonate of lime - -	25
Silica (flint) - - -	23
Alumina (clay) - -	9
Oxide of iron - - -	3
Soluble vegetable and animal matter - - -	5
Moisture and loss - -	2
	400

The soil on which the bone manure had such beneficial effect contained, in 400 parts,

	Parts.
Calcareous sand and gravel (nearly pure carbonate of lime)	217
Animal and vegetable matters	17
Carbonate of lime	39
Silica	85
Alumina	20
Oxide of iron	5
Soluble matter with gypsum	4
Moisture or loss	13
	400

The mode of applying them, adds the *Doncaster Report*, is either by sowing broadcast or by the drill; either by themselves, or, what is much better, previously mixed with earth and fermented. Bones which have been thus fermented are decidedly superior to those which have not done so. Mr. Turner, of Tring, adopted the practice of mixing with his bone-dust an equal quantity of the dung of the sheep, collected for the express purpose, at an expense of 2½*d.* per bushel for labour. He prepared the mixture in winter, by laying the sheep-dung in heaps with the crushed bones, and allowing them to ferment together for some months. By this plan the two manures are thoroughly incorporated, and he considers that thirty-five bushels of the mixture are fully equal in effect to twenty-five bushels of the bones. (My *Essay on Crushed Bones*, p. 14.) The quantity applied per acre is about twenty-five bushels of bone-dust, and forty bushels of large broken bones. The dust is best for immediate profit; the broken half-inch bones for more continued improvement. Mr. Birks say, "If I were to till for early profit, I would use bones powdered as small as sawdust; if I wished to keep my land in good heart, I would use principally half-inch bones, and in breaking these I should prefer some remaining considerably larger." The reason for this is very obvious; the larger the pieces of bone, the more gradually will a given bulk dissolve in the soil.

Crushed bones are employed with decided success for turnips. The ease with which they are applied by the drill, the ample nourishment they afford the young plants, on the very poorest soils, and the avidity with which the roots of the turnip encircle and mat themselves around the fragments of crushed bone, clearly evinces how grateful the manure is to this valuable crop. The evidence in its favour is copious, and decisive of its merits. In a recent report of the East Lothian Agricultural Society, Mr. John Brodie, of Aimsfield Mains, has given the result of his experiments upon the comparative cost of crushed bones and other commonly employed manure for which are worthy of attention: —

1st exp. — 20 cart loads of street dun
per Scotch acre, at 5*s.* 6*d.* per load
2d exp. — ½ ton of rape dust,
at 110*s.* - - 2
3 quarters crushed bones, at 19*s.* 2

3d exp. — 16 loads of farm-yard dun
at 7*s.* - - -

"The whole turnips," says Mr
"brairded beautifully, and from th
the time of lifting, it was impossib
cide which was the weightiest
therefore determined in the last
November to take up alternate row
whole, and weigh each separately
roots and tops were taken off, and t
was found to be as follows: —

1st exp. — The portion examined of a Scotch acre, manured with the street dung, produced of common globe turnip - - -
2d exp. — The same quantity of ground manured with the rape and bone-dust, produced - -
3d exp. — Ditto with farm-yard dung - - - -

"Mr. Watson of Keilor," says t
Capt. Ogilvy of Airlie (*Trans. Hi*
vol. iv. p. 238.) "introduced the use
manure in Strathmore. The great d
of farm-yard dung in 1827 (consec
the almost failure of the crop of the
year) first induced me to try four
turnip without other manure, so
fifteen bushels of bone-dust per
costs 3*s.* per bushel, or 2*l.* 5*s.* per ac
crop of turnips on these four acres
least, equal to the rest raised with fa
manure; but as the whole of the
were pulled, and the land received so
before the succeeding crop, muc
cannot be laid on the circumstanc
following white crop and grass bein

"Next year, 1828, eight acres we
with turnip, solely with bone-dust;
a light sandy loam; the subsoil gra
sand, coming in some places nearl
surface, which is very irregular, bu
eral has a south exposure. This f
been broken up with a crop of oats
after having been depastured six ye
cipally by sheep. The quantity of b
applied was twenty bushels per acre,
2*s.* 6*d.* per bushel, or 2*l.* 10*s.* per ac
turnip crop was so heavy that,
standing the very light nature of th
was judged advisable to pull one-
the feeding cattle, two drills pulled,
left to be eaten on the ground b

ing year, 1829, these eight acres
with barley and grass-seeds; and
e was 57 bolls 1 bushel, or 7 bolls
arly per acre, of grain equal in
he best in the Dundee market,
ight and colour. Next year, a
hay for that description of land
bout 150 stones an acre; and
m now convinced that the field
er have been depastured the first
e pasture was better than it had
known before for the two fol-
ons, 1831 and 1832. It is worthy
as a proof of the efficacy of the
re, that in a small angle of this
ich I had permitted a cottager
tatoes, well dunged, and which,
removal, was included in one of
of sheep, and had (one might
sed) thereby had at least equal
with the adjacent bone-dust tur-
oth the barley and grass crops
tly inferior, and this continued
rvable until the field was again
p. A very bulky crop of oats has
this season, probably upwards
lls per acre, but no part of it is
d.

detailed what may be considered
iment, during the whole rotation
e eight acres, I may add, that
d with bone manure and fed off
has now become a regular part
em on this farm. Fifteen, twenty,
ar twenty-five acres were fed off,
ably with the same favourable
h the prospect of being able to
e-shift rotation, and to continue
injury to the land. Every person
acquainted with the management
of which a considerable portion
light, dry, sandy loam, at a dis-
town manure, must be aware of
tance of this, from knowing the
which such land was formerly
fair state of cultivation: indeed,
of corn, for some years past, would
t the necessary outlay; and large
and, capable of producing barley
rior to that of Norfolk, must
ve been converted into sheep pas-
r the introduction of bone manure."

valuable experiments of Mr. Ro-
r, of Tring in Hertfordshire, the
ich they were made, hitherto a
producing only furze, is sandy,
stratum of clay, and then chalk.
the use of bone manure in 1831 on
and has continued its employment
three years on a very bold scale,
nvaried success. The quantity ge-
ployed was from twenty-four to
els per acre, of the description of half-inch and dust, and the bones were invariably applied to the turnip crop. The bones were usually drilled with the seed at a distance of eighteen inches, and the turnips were always horse-hoed. The year 1831 was a peculiarly good season for this crop generally. The turnips manured with bone-dust, like most others in the district, were very luxuriant. About 2000 bushels of bone manure were this year used by Mr. Turner. In 1832 the turnips were in general a very bad plant, the fly committing general devastation; many cultivators unsuccessfully sowing four or five times. On the turnip land of Mr. Turner, seventy-four acres were manured with bones, and of this breadth only the last sown four acres were a failure, and there was, in no instance, any necessity to repeat the sowing. The turnips were a much better crop than in 1831. In 1833 the turnips in the neighbourhood of Tring were a very partial crop. On the farm of Mr. Turner, about fifty acres were manured with bones. The effect, with the exception of the very last sown turnips, was again most excellent, the crop being very heavy, and that too on land now first cultivated. In 1835 and 1836, Mr. Turner continued the use of bones for his turnips, to the same extent, and with equal success. These experiments the cultivator will deem of the very first importance. The soil was not manured with any other fertilizer except bones, and in drilling, every now and then, for the drill's breadth, the bones were omitted.

On the soil not boned, the failure of the turnips was general and complete: they vegetated, it is true, and came up, but they were wretchedly small, and of no use. The turnips being fed off, and the sheep folded on the soil without any distinction between boned and unboned land, the comparative experiments upon the succeeding crop were rendered uncertain. The experience of two more years, Mr. Turner informs me (1836-7), has confirmed all his former experiments: he continues the use of this valuable fertilizer, with the most satisfactory results; his plot of turnips drilled with bones having been, in that dry season, most excellent.

In no part of England is the use of bone-dust more extensive, and more absolutely essential to the growth of turnips, than in Lincolnshire. A brief account of its introduction will be found in the following extract from a letter with which I was favoured in the spring of 1836, from Thomas Brailsford, Esq., of Barkwith.

"The use of bones crushed small enough to pass the drill, began in Lincolnshire about twenty or twenty-five years ago, and may now be considered as *general* over the greatest part of the county, and *universal* over the great natural divisions—the heath, and (the corn brash and upper oolite) the cliff, and the wolds (the chalk and green sand-stone measures of geologists). The effect produced has been wonderful; it has converted large tracts of thin-skinned and weak lands into the most fertile districts. The quantity now drilled varies from twenty strikes of half-inch bone, *with the dust in it*, per acre; and it is used almost exclusively for turnips, experience having proved that it is more profitably adapted to the cultivation of that crop than any other. It may be right to add, that, in this county, it is considered that the feeding quality of turnips raised from bones exceeds that produced by dung. Last year," adds Mr. Brailsford, "I used sulphur with my crushed bones, mixing 7 lbs. of the former with 100 lbs. of the latter: a few days before I drilled them with the turnip seed, a moderate fermentation took place, which rendered the sulphur active, and produced a pretty considerable smell of brimstone, and had the effect of *most effectually* defending the young turnip plants from the fly."

An opinion has been sometimes entertained, that the black grub or caterpillar, which has for the last two or three years been so destructive of the turnip crop, has been introduced in the bones imported from abroad for manure; and many equally idle and learned papers have appeared to warn the farmer of the dangers he was incurring by their use. A more absurd supposition, perhaps, was never entertained; for, saying nothing of the total absence of every thing like proof of a single black grub being discovered in an imported bone, all the accurate experiments, and long experience of those who have used bones, render the supposition laughable.

In the numerous experiments at which I have assisted and witnessed, it has been always found that the black grub appeared equally numerous among the boned and unboned turnips: that in those portions of the field, or in the entire field, where bones were drilled with the turnips, the grubs were not more numerous than on those lands which were manured with common manure, or drilled without any manure at all.

Again, the very habits of this black grub betray the fact that he is not of animal origin; he lives, he feeds upon, he is composed of vegetable matter. The farmer well knows that the grub or caterpillar which is bred on a cabbage or turnip cannot sustain life, nay, cannot eat animal matters; it would perish if placed on the most dainty bone. And on the contrary, if a grub bred in a bone is placed, however
cautiously and skilfully, on a turni
bage, he dies of absolute starvatio
getable matters are not food for
habits, his very nature, make hi
from the novel food presented to h

And again, if he really be impo
Belgium in the bones, he must b
resist a very considerable tempera
it has been clearly established,
turnip fields which are manured
refuse *boiled* bones of the size
grease makers have been just as
vered with the black caterpillars
which have been manured with fr
He can live, therefore, even in b
water: or if he come in the shape
pillar eggs, then the believers in th
doctrine must be convinced that
eggs can be hatched even after
been boiled for hours in a tempe
212°.

But grubs and black caterpilla
the first living substances which
supposed to have been importe
foreign bones. Thus, the Nottin
Lincolnshire farmers, many yea
found that, by the use of bones, th
of white clover was surprisingl
raged; and that, in fact, wherever
crushed bones was spread, in that
clover sprung up as if by magic.
appeared," says his Grace the Duk
land, in a letter with which he
me in February 1836, "so muc
courage the growth of white clov
had almost formed the opinion th
superfluous to sow the seed." T
farmers of that fine district natu
many a puzzling learned cogitat
this strange yet regular appearan
white clover, wherever bones were
but then, they recollected that
came from the very land of fine wh
seed; and that the seed must, the
a natural consequence, come hi
bones. The Lancasterian and Che
mers, however, did not fall into
take, since they found that the wh
sprung up just as copiously after
the boiled bones, as upon the lands
with those in a fresh or green stat

The chemical explanation will
every scientific farmer. The whi
abounds in phosphate of lime;
therefore, grow vigorously in soils
not contain it. Bones supply this
food, or constituent; and enable
clover to contend successfully in
with other and coarser grasses,
extirpate them. There are few
England which do not contain th
this plant; it has been noticed to
in the most unlikely situations,

after a fire; and for precisely the
son—the ashes of wood abound in
e of lime. Bones have been hitherto
lly employed upon the turnip crop,
e is another, the potatoe plant, to
ey seem admirably adapted; and of
ion was Mr. Knight, the late Pre-
the Horticultural Society: he ob-
o me, in a communication dated
26, 1836, written with his usual
solicitude to assist on every occasion
esearches which tended to the im-
ultivation of the earth,—"I have
e farm, upon which rises a sufficient
of spring water to work a thrashing
and a bone mill, at all seasons; and
at I have erected a machine for
bones, which my tenant has used
The soil is generally strong and
ous, but upon this the bone manure
well, and it is applied by a drill to
ip ground. My tenant finds that it
ording to the quantity of oleaginous
hich it contains; and I cannot help
, that taking away that part must
to a very great extent the operation
manure during at least one year;
larly if the bones be crushed nearly
before boiling. I have tried other
substances, such as hair, feathers,
e parings and dust of white leather,
ne of these have operated till they
ad some weeks to decompose. The
ather parings, being almost entirely
ed of gelatine, I expect operate very
ut I found that turnips drilled in
very sufficient quantity of it did not
o grow kindly till September; and I
entertain a shadow of a doubt but
bones, after being crushed, were
with four or five times their weight
h, their operation as a manure, im-
ly, would be greatly increased. It
not, however, then be conveniently
in with the seed, and that process,
er the soil is poor, is very important,
by being placed close to the seedling
hat gets well nourished while young.
t doubt but the bone manure must
e to operate as long as decomposition
original substance continues, and
this impression I am willing to find
to purchase it, upon the tenant's
a fair amount of increased rent.
would, of course, depend upon the
being more or less crushed; but I
think that a good manuring of bone-
n, under any circumstances, be soon
expended. I have seen bone-dust
in considerable quantities in planting
ruit trees, as peaches and plums, with
fect, though such are almost always
injured or destroyed by the application of stable-yard dung in the same way. My tenant applies his bone manure wholly to his turnips, and the stable-yard manure to the wheat field, in opposition certainly to my opinion; as I think wheat crops yield best when the soil is firm, and turnip crops best when it is hollow, and he purposes to try the effect of reversing the process. If the turnip plant is capable of deriving nourishment from fragments of bones, which have been boiled, after being crushed, their roots must, I conceive, have a power of decomposing the substance of the bone; which appears very improbable, though many plants appear to exercise such power on silicious earth. I have somewhere read an account of experiments, which appeared to prove that the silex found in the epidermis of the different species of Equisetum, grapes, &c. is really dissolved and taken up from the soil, and subsequently deposited in an organic form; but as the plants which were subjected to experiment might, owing to having been feeble and sickly, not have deposited any, or the usual portion of silex, I am not satisfied, that the remaining half of flint, after its oxygen has been driven off, is a simple substance. The number of simple elements (admitting the existence of matter) I suspect to be very small; such was the opinion of my late lamented friend, Sir H. Davy. I think it probable that quicklime, if applied to bones containing much oily matter, would operate powerfully by reducing such oil to the state of soap, readily soluble in water; but a part of the ammonia might by this process be dissipated and lost. Valuable as bone-dust certainly is as a manure to the turnips, I doubt whether it may not be employed with more advantage as manure for the potato; and my tenant is inclined to think that the potato crop, though wholly consumed upon the farm, will best repay him. The bone manure, when employed to nourish the potato plant, might be buried in the soil two months before it would be materially wanted; and the crops of barley and oats, upon all except light soils, are much better after potatoes than after turnips, both being carted off the ground. Early varieties which do not blossom are the most valuable, as they afford the most certain crops, and will be quite ready to be taken up in August, after which the ground may be well prepared for wheat. Of such potatoes I have obtained a produce equivalent to 963½ bushels of 80 lbs., and 1248⅔ bushels of 60 lbs. But early potatoes vegetate again late in autumn, and they then become much better food, without being steamed, than previously."

The way in which bone-dust is usually employed as a manure for potatoes is decidedly wrong; it is used in much too fresh a state. This error long deceived and perplexed the turnip growers of the east of England, who now invariably let the bone-dust ferment, either by itself or mixed with earth, for some weeks before it is applied to the soil. And all my experiments have concurred in their result with those of my neighbours in Essex, that if the bones are mixed with five or six times their bulk of earth, and are turned over, and mixed together some weeks before they are spread on the potato ground, the more valuable is the application. And this remark is not confined to its use for potatoes; oats and barley are proportionally benefited by the previous fermentation, and partial dissolution of the bones in the mixed earth.

It is impossible, in any agricultural experiment, to give very minute directions for the farmer's guidance, since soil, climate, and situation, as regards temperature and easy access to the proposed fertilizer, must be of necessity taken into the agriculturist's consideration; and these observations particularly apply to those manures of a purely animal nature, whose value I have been endeavouring to illustrate. Thus, with regard to bones, the quantity applied per acre must of necessity vary with circumstances; but, by many carefully conducted experiments, at some of which I have personally assisted, it has been found that the bones remain in the soil for a length of time proportionate to the size of the pieces,—the dust producing the most immediate effect, the larger description showing the longest advantage; thus, on arable lands, the good effects of the half-inch or inch bones are observable for four or five years; while, on pasture land, the advantage derived from their application is observable for eight or nine. But, as practical experience is alone the substitute for our want of general scientific knowledge founded on experiments, the farmer should, in experimenting upon all manures, for the sake of correct information, apply them in varying quantities per acre, and on no account omit to leave, by way of comparison, a fair portion of the field without any manure.

There is no delusion more common than that a correct agricultural experiment is easily accomplished — that it may be taken up as a mere amusement, carried on without care, and concluded without any laborious attempts at accuracy. Some experience in these delightful pursuits, amongst some of the most talented farmers of the east of England, has long convinced me of the folly of such a conclusion, and of the extreme care and caution necessary for such valuable researches; for, otherwise,

all kinds of errors are almost
arise. In applying weight and
also, to the crop, there is no need
farmer to weigh and measure large
square rod or two, carefully examin
nishes results nearly as accurate an
able as the examination of acres.

The application of bones to grass
very common in Cheshire and Lan
I have already noticed its effect in
duction of white clover, a phenomen
known to the farmers in the neighb
of Manchester, who are also fully
the amazingly increased produce
grass lands by the application of th
bones of the size makers. The
which they employ is very large,
from forty-five to eighty bushels
The result, however, is fully comm
with the outlay, for they calculate
produce of their grass fields is nearly
by the application.

I cannot give a better account o
plication for grass than that very
communicated to me in March
Dr. Stanley, the present Bishop of
"Bone-dust has been used in Ch
said his lordship, "as a manure, to
considerable extent, for the last seve
but partially for a much longer
Formerly, it was laid on pasture
only, and in large quantities, and
pieces, which rendered it very ex
and the advantage comparatively sl
some pastures that were bone-dusted
years ago now show, almost to
where this manure was applied.
are now used on every description o
this county with the best results, p
the wet sands are first effectually
Some thousands of tons are annual
sumed, and the demand is daily inc
The quantity per statute acre vari
the average may be, on pasture, fro
40 cwt. of Manchester or calcined
20 cwt. of raw or ground bones,
statute acre. For turnips, from 2
cwt. of calcined bones. For oats or
(of this latter, however, the quantity
in Cheshire is very trifling), with clo
grass seeds, 20 to 30 cwt. of calcine
or one ton of raw or ground bones.
ground should be well scarified or h
previous to sowing the bones, and i
ately afterward rolled with a heavy
for turnips. The bones should be
or ground very small, and drilled
the seed. With spring corn rolled
clover and seeds, it should be here re
that raw bones particularly shoul
lowed to remain for some days in
ferment before they are applied.
have been used for potatoes; but

rsons say they prefer dung. I am
rmed, though my informant states
rvations to be limited, that on old
the result has not been found to
isfactory as on pastures. On clover,
ve a most extraordinary effect. On
res that have been boned, although
ly the clover was not to be seen,
crops have soon shown themselves.
proof, indeed, of their beneficial
the fact, that the farmers, six
, in this immediate neighbourhood,
rong a prejudice against bones, that
ith some difficulty they were in-
use them, although given by way
tion of rent; but, for the last three
ey have been most anxious to ob-
n, and are now quite willing to be
e expense. The rents have latterly
paid, and there is good reason for
that it is in a great measure owing
vantage they are deriving from the
nd. On some estates in the county,
rictors have boned a considerable
of the pasture land, the tenants
agreeing to pay, as an increased
m 8 to 10 per cent. on the cost of
There is some difference of opinion
most advantageous sorts of bones
, some preferring the dust to the
bones. The dust, or calcined bones,
per ton, and the ground bones 7*l.*

For turnips, the dust is generally
d, as being more immediate in its
On a very poor peat soil, about
f bone-dust was applied to a statute
Swedish turnips. The crop was a
rage one. The turnips were carted
the ground sown with wheat, which
d near 25 measures (of 75 lbs. per
) to the statute acre. Oats suc-
ith seed, principally red clover, a
cellent crop of oats ensuing. The
lso, proved a very heavy full crop,
mown twice. No manure was ap-
this course, except the first set of
r the turnips. The remainder of
, of exactly the same description of
well manured with farm-yard dung,
toes, mangel wurzel, and vetches,
d for soiling. This was then sown
eat; but, being first well set over
ompost of lime and soil, the wheat
this part during winter and spring
uch better than the boned part of
, but did not prove so good a crop;
difference in favour of the bones
much. Oats succeeded here, also,
ds, but the oat crop did not prove
roductive any where as on the part
and the clover was still more in-
nd mowed only once, the second
being considered worth mowing, while the part boned, along side of it, was as much as could be well mown."

There appears to be on many grass soils some care requisite to ensure the greatest advantage from the application of the bones; and this observation is not confined to any particular district, since it is strongly alluded to in the following extract from a letter of Mr. William Lewis, of Trentham in Staffordshire, transmitted to me in September last, in an obliging communication of his Grace the Duke of Sutherland: —

"I have never," says this intelligent farmer, "applied less than one ton of crushed bones per acre for turnips drilled in, and have been generally successful in growing that crop; and their good effects (I mean the bones) are most conspicuously shown and felt on the grass crop that follows the turnips, showing to an inch how far the ground has been manured with them. I have no genuine fertile land, it being nearly all of a light, dry, sandy, hungry nature; but I have now excellent pastures for sheep, which I greatly ascribe to the use of bones; for the pastures following barley which have been manured with dung I find very inferior to that manured with bones — (the difference in the barley crop not being perceivable) — so much so, that I am upon the eve of breaking up some of my pasture fields which have lain three years, and were intended for permanent pasture; for those manured at the same time with bones are still looking beautiful, with a close, fine, even bottom. I have also applied bones to pastures, and they have generally improved the herbage and verdure very greatly. The top-dressing with the bones I would recommend to be done in moist weather, when the ground is pretty well covered with grass. I consider from one and a half to two tons per acre to be a fair dressing. After sowing them, the ground should be well brushed, harrowed length and breadthways, then heavily rolled, and all stock taken from the field for at least ten days. I have seen bones applied to bare pastures, with little or no covering, done in hot, dry weather, showing no beneficial effects whatever afterwards." There is no doubt of the superior advantage of rolling the bones into the soil; for fresh, or *green* bones, as they are called in Cheshire, when they are exposed to the atmosphere for some time, lose from one fifth to one fourth of their weight; and even boiled bones, under similar circumstances, are reduced one third in weight. A bushel of crushed green bones, of the three-quarter inch size, weighs about 45 lbs. — the same bulk of bone-*dust* 54 lbs.: 75 bushels of crushed green bones weigh about one ton and a half, the same bulk of boiled bones about two tons. The average weight of the bones of an ox is about 2 cwt., or about one fourth of the carcase free from offal; the bones of a sheep, about 21 lbs., supposing the carcase to average 84 lbs. So that, according to this calculation, allowing twenty bushels of crushed bones to manure an acre, the bones of five bullocks or horses, or of fifty sheep, are requisite to supply the necessary dressing.

In manuring the light lands, cultivated on the four-course system, with bones and with bones only, for a long series of years, I would advise the farmer, whenever he finds any symptoms of his ground failing to produce clover so well as it was once used to do, to add in that case a dressing of gypsum, either with the bones or with the grass seeds. The value of this latter manure, which is amply sufficient, when applied in quantities of not exceeding 2 cwt. per acre, being in most situations trifling. There is every reason to believe, that in those cases which have puzzled the Nottinghamshire farmers, where the land, after a long course of successful bone-dressing, has at last refused to produce clover, that the gradual exhaustion of the soil of the sulphate of lime, so essential to the growth of clover, has been the sole cause of the failure; and that the following facts, published by his Grace the Duke of Portland, in April 1838 (to whom I have on more than one occasion been obliged for valuable agricultural information), are readily to be explained in this way — the farm-yard dung, with which a portion of the overboned clover field was dressed in these experiments would return to that section of the field a portion of the sulphate of lime, and hence the superior product of clover on the soil to which it was applied.

"In 1834, two fields of sand land adjacent to Clumber Park, the one at right angles to the other, each containing about twenty acres, were sown with seeds among barley; whenever these fields had been sown with turnips, for twenty years before 1825, they had always been manured with bones; in that year they were largely so manured. The seeds sown with barley in 1826 having been burnt up in that dry summer, in 1828 the land in both those fields was again broken up. In 1829 it was again fallowed with turnips, and manured with bones. In 1833 both these fields were again sown with turnips, parts of each of which were manured with bones, and the remainder with farm-yard dung. (*The Times Newspaper*, April 18th, 1838.)

"In 1834, when the corn was cut, it was found that the seeds had failed in each of these fields where the bones had been applied, and that they were very good they had been manured with dung. of these fields the failure exactly f the line of the difference of the m with two exceptions, that the seeds quite fail in two spots where formerl had been dung-heaps. In the oth the failure did not so exactly follow of demarcation, but the exceptior very few. Generally speaking, *the* *land is better than the boned land,* difference of quality is not great; t of barley on the manured land had the rate of five quarters per acre, other four.

"Immediately after harvest, fres were sown on the boned land; the up very thick, but in six weeks d disappeared. During the winter t was again fallowed, and fresh see again sown in the spring of 1835. cannot be said to have failed, but th a very inferior crop; and notwithsta manuring of farm-yard dung appli top-dressing the following spring, th not yet recovered a parity with the the fields. In this case it seems im to attribute the failure of these seed they have failed, to any other cau the bones, which had certainly been with unusual abundance; and it is t surprising, that such a cause shou produced such an effect; because, early periods of the use of that ma appeared to be in no respect more tageous than in its tendency to en the growth of the clovers. Of t dency, the most remarkable instanc been repeatedly seen on very poo and none more so than one which o on a very poor piece of land prepar plantation by a crop of turnips, n for with forty bushels per acre, on between the trees, a great deal of cl spontaneously sprung up. Previo this land having been broken up for scarcely a plant of clover was to l Now, the fields on which the see failed had (as above stated) receive more frequently than usual, complet ings of bones.

"If the preceding statement requi confirmation, it has received it in 18 this year a field, which had been tu 1836, had been laid down to gras north side of this field is very inferi land, and as, till lately, it was suppo such land would not pay for the ex bones, they had never been applie For the first time, in 1836, bones we for the turnip fallow. The south this field, which for many years has been manured with bones, when i r turnips, was divided into four divisions; e western side was manured with farm-rd dung; that next to it with bones; the o eastern divisions were manured, the e with rape dust, and the other with malt lms. After harvest, the seeds on the rth side appeared to be best; then those the western side of the field; then those the two eastern divisions, which were ther inferior; and those on that where e bones had been applied were visibly the orst. The frost has been so injurious to e seeds, that this difference between the ree eastern divisions is not now so marked it was before the frost; but the supe-ority of the northern side and the western vision is very apparent."

Bone manure presents to the cottager, or ltivator of small plots of poor ground, as der the allotment system, a ready and eap mode of permanently improving the nd. It would be well, perhaps, in some stances, if the managers, under this ex-llent plan, were to apply the manure for e holder; and that, too, if they even ought it necessary to add, in consequence, the amount of the rent. For ornamental lantations of trees there can be no manure ore advantageous than bones. There is a onsiderable portion of phosphate of lime all timber trees, and there is no manure a mixed animal, earthy, and saline ature which remains so long in the soil, ixed with earth; and thus previously fer-ented bones are an excellent dressing for ines, and have been used with decided ad-antage. As a manure for the use of the nservatory and the flower-garden, there is e fertilizer more useful than bone-dust; r, what is a still more elegant application, e turnings and chippings of the bone urners. Those of Birmingham have long en employed by my friend, Maund, of romsgrove, the able author of *The Bo-nic Garden.* He finds that their use not nly promotes the luxuriance of the plant, t the beauty of the flowers. The Shef-ld florists are well aware of the value of ne turnings. It is hardly necessary to dd more authorities in favour of bone ma-ure. The reader may refer, however, to e experiments of Captain Ogilvy, of Airlie astle (*Trans. of High. Soc.* vol. iv. p. 238.); Mr. Watson, of Keillor, Cupar-Angus (*Quart. Journ. of Agr.* vol. vi. p. 41—43.); nd of Mr. Boswell, of Kingcaussie (*Trans. High. Soc.* vol. i. p. 73.; Comparative rial of Bones, Farm-yard Manure, and ape Cake): to those of Mr. Billyse on their e for the pastures of Cheshire (*Journn. of oy. Agr. Soc. of Eng.* vol. ii. p. 91.). See lso Johnson, *On Fertilizers*, p. 125. (*Brit. arm. Mag.* vol. vi. p. 308.). The bone mill is described by Mr. Anderson of Dundee (*Trans. of High. Soc.* vol. i. p. 401.), and again in the *Penny Cyclopædia.*

BONE SPAVIN (Fr. *Espavent;* Ital. *Spavano*) in horses, is a disease of the hock joint usually brought on by over-exertion, accelerated by bad shoeing. When this is forming there is commonly lameness, but this diminishes or ceases when the bony matter, whose deposit causes the spavin, is completely formed, at least when the horse is warm with exercise. It impedes his rising when down, and in consequence spavined horses lie down with reluctance. A spavined horse generally does slow work well enough, and when used in the farm his disease is commonly ameliorated or cured. Repeated blisters will either entirely remove or ameliorate the symptoms. It is only as a last resort that the hot iron should be used.

BOOK-KEEPING. As the merchant, the manufacturer, and the tradesman all find it necessary to keep a set of account books which shall shew them the amount of capital employed, the debts owing to and by them, and the profit or loss arising from their different transactions, so to the farmer is this good practice equally essential. The Dutch have a proverb, that no one ever goes to ruin who keeps a correct set of accounts. There is great truth in this sagacious observation of the plodding Dutchmen; for by consulting correct accounts the farmer will be either warned to retrace his steps, or to persevere in the path he is pursuing. The time required for keeping these books is always to be found of an evening after the labours of the day are over. The necessary books to give him this information are, first, a cash book, in which shall be entered on one side all moneys received, and from whom; and, on the other side, all payments, and to whom made; secondly, a journal, in which should be entered all deliveries, and articles received; and thirdly, a stock book, in which should be every week entered all addition to or substraction from the stock of the farm; fourthly, an invoice book, to receive all bills of account; fifthly, a wages book, to keep each labourer's time and wages; and sixthly, a ledger, which should contain every person's account with whom the farmer has transactions. With these statements carefully kept, and an account and valuation of his stock in trade made annually, as if he were about to quit the farm, no farmer's affairs can reasonably go wrong; for not only by good booking is fraud prevented, and economy promoted, but by this means the farmer always knows his real position. I am supported in these opinions by a very considerable farmer and land-agent, Mr. Hewitt Davis, of Spring Park in Surrey.

BOOSE. (Sax. popıȝ: Su. *baas.*) A stall for cattle to stand in; thus, an ox or cow-boose signifies an ox or cow-stall, &c.

BOOSE-STAKE. A provincial term applied to the stake to which stalled cattle are fastened. It is in some districts called boosing-stake.

BOOSINGS. A provincial word used to signify the stalls of cattle.

BORAGE. (*Borago officinalis.*) Supposed to be derived from *corago;* or *cor, the* heart, and *ago*, to give, alluding to the renovating power of which it was supposed to be possessed. This is a well-known plant in all gardens, growing two feet high, with large leaves, and bright blue flowers. The stalks are round, juicy, and thick, and so hairy that it is almost prickly to touch. The leaves are broad, rough, wrinkled, and hairy. The flowers have five bright blue petals or parts, with a black centre; they blow all through the summer, and continue till late in autumn. For the spring and summer sowing any mouldy soil and open situation may be allotted, provided the first is not particularly rich; but for those which have to withstand the winter, a light dry soil, and the shelter of a south fence, is most suitable. A very fertile soil renders it super-luxuriant, and injures the intensity of its flavour. It is propagated by seed, which is sown in March or April, and at the close of July for production in summer and autumn, and again in August or September, for the supply of winter and succeeding spring. These sowings may be performed broadcast, and regularly raked in, but preferably in shallow drills, six inches asunder. When of about six weeks' growth the plants are to be thinned to six inches apart; and the plants thus removed of the spring and autumn sowings may be transplanted at similar distances, but those of the summer will seldom endure the removal, and at all times those left unmoved prosper most. At the time of transplanting, if at all dry weather, they must be occasionally watered moderately until established; water must also be frequently applied to the seed-bed of the summer sowings, otherwise the vegetation will be slow and weak. They must be kept perfectly clear of weeds. To save seed, some of those plants which have survived the winter must be left ungathered from. They will begin to flower about June, and when their seed is perfectly ripe, the stalks must be gathered and dried completely before it is rubbed out. (*G. W. Johnson's Kitch. Gard.*) Borage was formerly considered cordial. The leaves and flowers tied in a bundle, and warmed up in beer, is a great remedy among the poor.
They consider them cordial, opening
cooling; and in many parts of Eng
they make Borage one of their materi
brewing. The whole plant, says
(*Eng. Flor.* vol. i. p. 265.), has an
approaching to cucumber and burnet,
gives a flavour to a cool tankard; b
supposed exhilarating qualities, which c
Borage to be reckoned one of the
cordial flowers along with alkanet,
and violets, may justly be doubted.
flavour is nauseous in any other bever

BORAGE of Constantinople. (*B*
orientalis.) A hardy perennial, blowi
pretty blue flowers in April and May
loves a light soil, and a dry situation.
propagated by parting its roots in spri
autumn.

BORDER. (Germ. and Fr. *bord;*
bopð.) A term which signifies the p
of land next the hedges in fields; b
ploughed grounds is mostly applied t
parts at the ends on which the teams

BORD-LANDS. The lands or dem
which, under the feudal system, lords
in their own hands, for the maintenan
their boards or tables,

BORD-SERVICE. The tenur
board-lands, by which, under the
system, the tenants were to procure
sions for their lord's tables. There a
some remains of this tenure existing
the tenants pay only a small rent per
instead of finding the provisions for
required.

BORECOLE. (*Brassica oleracea*
briata.) A species of winter cabba
which the following are the principal
eties commonly cultivated in the gard
1. Brussels borecole. 2. Green bo
(*Brassica oleracea selenisia*). 3. Purp
recole (*B. o. laciniata*). 4. Variegated
cole. 5. German, or curled kale or c
6. Scotch, or Siberian kale (*B. o. sabe*
7. Chou de Milan. 8. Egyptian or
kale. 9. Ragged Jack. 10. Jerusalem
11. Buda, Russian, Prussian, or Manc
kale. 12. Anjou kale. Like the other
bers of the cabbage tribe, it is prop
by seed. The first crop to be sown
the close of March, or early in April
seedlings of which are fit for prickin
towards the end of April, and for final
ing at the close of May, for production
autumn and at the commencement o
ter; the sowing must be repeated abo
middle of May; for final planting,
July, and lastly in August, for use
winter and early spring. If transpl
is adopted, their fitness for pricking
known when their leaves are abou
inches in breadth; they must be set six
apart each way, and watered freq

lished. In four or five weeks they
sufficient growth for final removal.
ted, they must be set in rows two
half apart each way; the last
may be six inches closer. They
tered and weeded, as directed for
ops; as they are of large spreading
earth can only be drawn about
, during their early growth. If
ny weather any of those which
all growth are blown down, they
pported in their erect posture by
n they will soon firmly re-es-
nselves. For the production of
plants of each variety as are of
rowth, and are true to the cha-
primarily given, must be selected,
left where grown, or removed
n weather in November or before
February, the earlier the better,
three feet apart each way, and
n to their heads. The seed
t the beginning of August. (*G.*
's Kitch. Gard.)

. See Auger.

G. A practice sometimes em-
rder to ascertain the nature of
t strata that lie beneath the soil;
for the purpose of discovering
d tapping them, so as to draw off
that injures the grounds below or
hbourhood. See Draining.

The generic name for quadrupeds
s are in the form of a crescent.
E.

GE. A word we have borrowed
rench, signifying a woody grove,
ds.

Y (from the Gr. βοτάνvη, an
the most confined sense of the
he science which teaches us the
nt of the members of the vege-
dom in a certain order or system,
we are enabled to ascertain the
ny individual plant with facility
ion. Such arrangement is only
dered as useful in proportion as
s the acquirement of a knowledge
onomical and medicinal qualities,
not be perfectly ascertained with-
quaintance with vegetable phy-
e parts of plants, their functions,
Botany, in its most comprehen-
teaches us the names, arrange-
s, functions, qualities, and uses of

ence may be consulted by the
st with considerable benefit. For
nd several other advantages will
gest themselves to the intelligent
he plants growing wild on a soil
l some tolerable indication of the
the soil and its subsoil. Thus,

the heath on elevations indicates a dry soil; the fern that it is deep as well as dry. The deer hair (*Scirpus cæspitosus*) grows commonly over bogs, resting on clay. In the lower situations the broom (*Spartium scoparium*) tenants the deep light gravels. The whin, coarser gravels upon a clay subsoil. The rush (*Juncus conglomeratus*) tells the negligent farmer that good land is rendered useless for want of drainage. The common sprit (*Juncus articulatus*), that the land is not fertile. Sweet gale (*Myrica Gale*), that it is still worse. The rag weed (*Senecio jacobæa*) in arable land betrays an ill-cultivated loam. The marsh marigold (*Caltha palustris*) or the wild water-cress in water meadows, tells the owner that the land is fully irrigated. The common rattle (*Rhinanthus cristi*), that a meadow is exhausted. The pry (*Carex dioica*), that water is stagnating beneath its surface. And these are only a few of the truths which wild flowers teach the intelligent cultivator. Botanists have, indeed, long been at work for the farmer — a fact no one will be willing to dispute who remembers that the sloe, the blackberry, and the crab are nearly all the fruits indigenous to England; and that hardly a grass, a flower, or a vegetable that is now cultivated is a native of the island.

In 1825 and 1827 the Highland Society of Scotland offered as a prize theme, "The indications to be formed regarding the nature and qualities of soils and subsoils, according to the plants growing upon them, having regard to elevation, exposure, climate, &c." And in the first volume of their Transactions will be found several valuable essays on the subject, by Mr. Macgillivray, p. 81., Mr. Gorie, p. 113., Dr. Singer, p. 264., Mr. Hogg, p. 271., all ably illustrating the value of the study of plants to the cultivator.

The definition of a plant to a superficial observer may appear easy; but those who have studied natural history are aware of the difficulty of drawing a just line of distinction between the animal and the vegetable kingdoms. It is easy to distinguish a horse, or even a worm, from a rose tree or a fungus; but to distinguish a sensitive plant, &c. by descriptive marks from many zoophytes has hitherto baffled the acutest botanists. Many plants, as will be presently seen, are gifted with spontaneous motion; whilst many animals, as the corallines, are devoid of locomotion; so that neither of these qualities avails us in distinguishing the two kingdoms. In short, whilst the zoophytes, most of which take root, grow up into stems, and multiply by buds and slips, must still be considered as animals, no one can correctly define how plants differ from them. It is, however, fortunate, that the student is seldom placed in a situation where these nice distinctions are to be made. Where specimens are to be examined which admit of the doubt whether they belong to the lower classes of animals or to the vegetable tribes, chemistry may be called to our aid; if, when burnt, they emit an ammoniacal smell resembling that of feathers, similarly treated, we need not hesitate to consider them as animal products; if that of burning wood, we may consider them as fit objects for our botanical researches.

A few facts will demonstrate that it is impossible to deny that vegetables possess some degree of sensation. The Venus's fly-trap (*Dionæa muscipula*) has jointed appendages to the leaves, which are furnished on their edges with a row of strong prickles. Flies, attracted by honey, which is secreted in glands on their surface, venture to alight upon them; no sooner do their legs touch these parts than the sides of the leaves spring up, and, locking their rows of prickles together, squeeze the insects to death. The well known sensitive plant (*Mimosa sensitiva* and *pudica*) shrink from the slightest touch. *Oxalis sensitiva* and *Smithia sensitiva* are similarly irritable; as also are the stamens of the flower of the barberry. One of this tribe (*Hedysarum gyrans*) has a spontaneous motion — its leaves are frequently moving in various directions without order or co-operation. When an insect inserts its proboscis between the converging anthers of a kind of dog's bane (*Apocynum androsæmifolium*), they close with a power usually sufficient to detain the intruder until his death. If from these, and many other considerations which we shall notice as we pursue our study, we conclude that plants are endowed with a certain degree of sensation, or at least of irritability, we can pursue that path of the science no further. Such are the results of life; what constitutes the living principle no human eye can discover.

We gaze on a rose as it waves in the plenitude of its vigour, admire the tints of its petals, the verdure of its foliage, the gracefulness of its form, the delicacy of its fragrance. We may come on the morrow, and it has been blasted — those petals are scattered on the borders — those leaves are withered and sapless — and scarcely a vestige of its loveliness remains. Wherefore is this change? The same components remain — the same food was ready for its nourishment; but some invisible governing principle — some unknown agent — has silently departed, without one vacancy to point out where it had resided, but a total ruin, to show that it had pervaded the whole. Let a few more hours pass away, when the air, and moisture, and heat, external agents
which were subservient to its welfare,
concur in completing its destruction —
partly dissipated in pestilential exhala
partly reduced to a few earthy and
particles. Life, whilst it continued,
vented this ruin; but still, like its
Author, "no one hath seen it at any ti

To explore our path satisfactorily,
that one step may naturally explain the
to the succeeding, we had better first
sider the most obvious parts of plants
their functions.

The root and its uses.—A root u
consists of two parts, the *caudex* or
and the fibres or *radicula*. The last
are essential for the imbibing of nou
ment, but the whole serves to steady
the plant firmly in a commodious sit
and position. Roots are annual, bi
or perennial. The first belong to
plants whose term of existence is co
to a portion of a year, as barley; the
to such as, being raised during one
survive its winter, and produce
during a succeeding year, as wheat.
nial roots belong to such plants as
several years. All plants are conside
biennials that are raised from seed on
and flower during another, whethe
year is the next, or whether the flowe
deferred during several, provided the f
occur but once. This is often the cas
the tree mallow (*Lavatera arborea*),
Attention must be paid to these cir
stances, or we may often mistake the na
term of a plant's existence. Mignion
(*Reseda odorata*), in our borders, is an
nual; but in the shelter of a room or g
house, it may be made, by proper ma
ment, to blossom during several succe
seasons. The nasturtium (*Tropæol*
naturally a shrubby perennial, is an a
in our gardens.

Plants search for food by means of
roots, and to obtain it have been kn
by their aid, to overturn walls by pie
their foundations. A tree growing o
top of a wall has been observed to e
its roots down the sides, until they re
the earth at its bottom. If a flowe
divided by a perpendicular section,
one side filled with common earth, a
the other with similar earth mixed w
little potass, the roots of a geranium or
plant, growing in it, will, by degree
move into the alkaline portion. It ha
been proved that the root is gifted wit
power of rejecting what is hurtful, a
lecting what is beneficial to its parent
from any mixed solution of substance
corrosive or poisonous.

Botanists distinguish seven kinds of

1. The fibrous root (*radix fibrosa*),
sisting of fibres alone, either branch

undivided, as that of the *Poa annua*, that species of grass so troublesome in gravel walks, &c.

2. The creeping root (*r. repens*). This spreads and branches horizontally, throwing out fibres in its course, as some kinds of mint (*Mentha*), and the couch-grass, or twitch (*Triticum repens*).

3. Tapering root (*r. fusiformis*) as that of the carrot, &c.

4. Abrupt root (*r. præmorsa*) appears inclined to be a tapering one, but, from some natural decay or habit, becomes abrupt, or apparently bitten off, as in the devil's-bit, scabious (*Scabiosa succisa*), and several of the hawk-weeds.

5. Tuberous root (*r. tuberosa*) consists of fleshy tubers connected by fibres, as in the potato (*Solanum tuberosum*) It is the premature formation of the tubers which prevents the blooming of the Jerusalem artichoke, and some of the early varieties of the potato. If the tubers are removed as soon as they are formed, the plants blossom.

6. Bulbous root (*r. bulbosa*) is solid, as in the crocus; tunicate, composed of concentric layers, as in the onion (*Allium cepa*); or scaly, as in the lillies.

7. Jointed or granulated root (*r. articulata or granulata*) is a cluster of either little bulbs or scales, connected by a common fibre, as in the wood-sorrel (*Oxalis acetosella*), and white saxifrage (*Saxifraga granulata*).

The roots of plants sometimes change their form with the situation in which they grow. Those of some grasses are bulbous in a dry situation, and fibrous in a moist one. Thus we see the care of Providence is manifested even in providing for the welfare of a weed; bulbous roots being, as it were, reservoirs of moisture, enable such plants to perfect their seed in the driest season. Again, the fibrous roots of grasses growing in sandy sterile places are remarkably downy; by this means they retain firmly their hold in so yielding a medium, and their absorbing surfaces are likewise increased, not unnecessarily, where nourishment is so scanty.

Seven kinds of stalks or stems are distinguished by botanists:—1. A stem (*caulis*) is confined to such as bear both leaves and flowers, which is the case with the trunks of all trees. It is either simple as in the white lily, or branched as in most cases. In general it grows upright, but sometimes it is more or less recumbent. Some cling to other bodies, by fibres, for support, as the ivy (*Hedera helix*); or by tendrils, as the vine. Others twine round such plants as come in their way. A remarkable distinction is to be observed in twining plants. Honeysuckles, &c. twine from left to right; whilst others, as the kidney-bean, twine from right to left, nor can any art induce them to alter their course. Some trail along the ground; some are jointed, as in the samphire and Indian fig. They are of various forms, round, three-sided, square, &c. Their surfaces are smooth, viscid, rough, bristly, hairy, &c. Internally they are solid or hollow. Plants without stems are termed *acaules*.

2. A culm or straw (*culmus*) is only a variety of the caulis, but, being peculiar to the grasses, rushes, and other plants nearly allied to them, has been deemed worthy of a separate name. It is without joints, as in the common rushes; jointed, as in wheat, &c.; bent like a knee, as in *Alopecurus geniculatus*. It varies in being hollow, solid, hairy, &c.

3. A stalk (*scapus*) springing from the root bears only flowers and fruit, as that of the primrose (*Primula vulgaris*) and cowslip (*P. veris*). In the first it is simple, in the latter subdivided and many flowered. It is sometimes scaly; in which case the scales are apt to sport into leaves, and thus render it a proper caulis. It greatly varies as to length, manner of growth, &c.

4. A flower stalk (*pedunculus*) springing from the stem, bears only fruit and flowers. A partial flower stalk (*pedicellis*) is the ultimate division of a general one, as in the cowslip before instanced. Flowers without stalks are termed *sessile*, as the dodders, &c.

5. The leaf stalk (*petiolus*) signifies the stalk of a leaf only. It is solitary or simple, as in the lilac and all other simple leaves, It is common in the rose, &c. It is usually channelled on its upper side.

6. A frond (*frons*) is now used only in describing the class *Cryptogamia*, and signifies a leaf which produces both flowers and fruit, as in the ferns, lichens, &c.

7. A stipe (*stipes*) is the stem of a frond.

It will be better to defer the consideration of the functions of roots and stems until we take a connected view of the phenomena of vegetable life.

Leaves are a very general, but not an universal part of the vegetable body; they are wanting in the samphires, creeping cereus, &c. Such plants are called *plantæaphyllæ* (leafless plants). The situations, forms, insertions, and surfaces of leaves are of great use in botanic descriptions; a few must at present suffice:—

Folia radicalia spring from the root, as in the primrose.

Folia caulina and *ramea* spring respectively from the stem or branch.

Folia bina terna, &c. leaves in pairs, or three together, &c.

Folia verticillata, whorled, several opposite, or growing in a circle round the stem.

Folia peltata, peltate, having the footstalk in the centre, as the nasturtium.

Folia sessilia, sessile, having no footstalk.

Folia perfoliata, perfoliate, when the stem runs through their centre.

Leaves are nearly circular, roundish, egg-shaped or ovate, oblong, lanceolate, &c.; they terminate abruptly, or are sharp, jagged, pointed, cirrhose (*i. e.* tipped with a tendril), &c. Their margins are entire, spinous, toothed, wavy, &c. Their surfaces are dotted, rugged, veiny, coloured (*i. e.* tinted with any colour but green, white, or yellow; in the two latter cases they are termed variegated), &c. They are tubular, awl-shaped, three-edged, evergreen, &c. Compound leaves consist of two or more leaflets, combined by a common footstalk, as in the rose; they are binate when they consist of two leaflets; ternate, of three, &c.; pinnate, when several proceed sideways or laterally from the common footstalk, as in the rose. Leaves are sometimes twice and thrice compounded.

The *flower* is the most essential, yet the most transitory part of plants. By means of the seed, which it is the great agent in producing, plants may be indefinitely multiplied and perpetually renewed; whereas all other modes of propagation, by cuttings, grafts, &c. are but extensions of an individual, Hence, though many plants from unfavourable modes of cultivation, &c. are seldom known to blossom, yet Providence has wisely ordained that no plant is incapable of producing and perfecting seed. As our systems of botany are founded chiefly upon the flower, we will proceed to consider it at large. A flower is divided into seven parts:—

1. The *calyx* or outer covering, resembling leaves in texture; is not present in many flowers, as the tulip.

There are six kinds of calyx:—1. The *perianth* is close to, and forms part of, the flower, as in the rose, and is, in fact, the only true calyx. 2. The *involucre* is an appendage to the one form of inflorescence, namely, the umbel. It is remote from the corolla, as in all the umbelliferous plants, carrot, &c. 3. The *spathe* is a floral appendage which bursts longitudinally, being more or less remote from the flower, as in the snowdrop, narcissus, &c. 4. The *glume*, or *husk*, is the peculiar calyx or chaff of the grasses, as in wheat, &c. 5. *Perechætium*, a scaly sheath, enclosing the fertile flowers of some mosses. 6. *Volva* is the membrane that covers the parts of fructifibation, or gills of the fungi, as in the common mushroom; but it is also applied to
the fleshy covering which encloses
fungi when young.

2. The corolla, or more delicate colo
leaves or leaf, properly called petals, is
ated within the calyx. This is absen
many flowers. It comprehends both the
and the *nectary*. By petal is meant
are commonly called the coloured leave
a flower. By nectary is meant an appen
to the corolla, supposed to be for the
pose of secreting honey. The little
for example, at the bottom of the flowe
the crown imperial, each full of a
liquid, are called nectaries, but they va
form and situation in different flo
When a corolla is formed of one petal,
said to be *monopetalous*. It may be
shaped, as in the Canterbury bell; *f*
shaped, as in lung-wort (*Pulmon*
salver-shaped, as in the primrose;
shaped, the same as the preceding,
with a short tube, as in borage;
like the mouth of an animal, as in th
nettle; *personate*, like the mask of
mal, as in snap-dragon. Corollas o
than one petal are termed *polyp*
It is *cruciform*, as in the wall-flower
ceous, as in the rose; *papilionaceou*
the pea; *incomplete*, when some part
in kindred flowers, is wanting.

3. The stamen or stamens are
for the perfecting of the seed, and
absent in double flowers, in which t
changed into petals. They vary in
species, from a single one to sever
dreds, and surround the pistil or
which occupy the centre of the flow
stamen usually consists of two part
filament, or slender stem, which is
times absent, bearing otherwise on its
mit, the *anther*, a cellular organ of va
forms in different species of plants, bein
part for holding the pollen.

4. The pistil or pistils are in the cent
the flower, and usually fewer in nu
than the stamens. They are somet
situated in flowers distinct from the sta
and even on different plants. No seed
be perfected without the pistil, which
sists of the *germen*, or rudiment of the
and seed, and, of course, is never ab
The *style*, or little stem, proceeding
the germ, which is not essential, se
chiefly to elevate the *stigma* — this mu
ways be present: it varies in form and
being either scarcely more than a poi
forming an orbicular head, or being
ously lobed.

5. The seed-vessel is the germen enl
varying in form, texture, and size in
every species. What old botanists
naked seeds, are seed vessels or c
containing only one seed; and whi

n ripe; the strawberry, wheat,
amples. The only naked seeds
the fir cones, and the *Cycadeæ.*
seven kinds of seed-vessels:—1.
woody or membranous, contain-
ore cells, as in the poppy. 2. A
dry, and solitary, formed of two
led by a linear partition into two
the wall-flower. 3. A *legume* is
med of two oblong valves without
on, consequently is one-celled, as
. A *drupe* has a fleshy coat, closely
a hard nut, as the cherry, peach,
pome has a fleshy coat, enclosing a
the apple, pear, &c. 6. A *berry*
containing its seed or seeds within
without valves, as the currant. A
l berry is instanced in the black-
. 7. A *cone* is a catkin hardened
d-vessel, as in the fir, birch, &c.

seed. To the perfecting of this
e other parts of the fructification,
of the whole plant, are subservient;
erish immediately after it is per-
d, in our climate, even perennials
roop as soon as it is ripe. A seed
f several parts:—1. The *embryo*
the welfare of which all the other
te in promoting. It is the ru-
f the future plant. It is very ap-
the bean, pea, &c., and has the
heart in the walnut. It is usually
substance of the seed, as in the
ance; in the grasses, however, it
utside.

moving the skin of a pea or bean,
sily into two parts, these are the
this is the usual number. In
e they are four; in the grasses,
; hence the last are called *mo-*
The cotyledons, when the seed
, usually rise, in the course of
out of the ground, and perform
of leaves for awhile: this is
e in wheat, or any other of the
ns; their seeds consist chiefly
n or white, which is either fa-
rny, or fleshy, and remains in
ourishing the embryo, until its
ots are sufficiently perfected
se. Although the albumen is
distinct form in several tribes,
h compound and cruciform
yet the farinaceous matter
e cotyledons is evidently in-
ply the embryo with nourish-
the first efforts of germination.
ave it distinct from the coty-
llus, the yolk, like the albumen,
rish the embryo in the com-
germination. If the albumen,
gan, is present also, the vitellus
ween it and the embryo.

Testa, the skin, envelopes all the preceding parts, and gives them their form, being itself of a permanent shape, whilst they are in a liquid state. It is of various textures and substance; sometimes single, but usually lined with a finer membrane. *Hilum*, or scar, marks where the seed was connected with the seed-vessel, or receptacle. In describing the form or external parts of a seed, it is always to be considered as the base.

There are several occasional appendages to seeds, which may as well be considered in this place. The *pellicle* closely adheres to some seeds, so as to conceal their actual skin. It varies, being downy, membranous, and mucilaginous, or not perceptible until moistened. The *tunic* envelopes the seed more or less loosely, being attached only at the base. The *seed-down* is the chaffy, bristly, or feathery crown, originating from the partial calyx remaining attached to the summit of a seed, somewhat resembling a parachute, which we see bearing along the seed of the dandelion, thistle, &c. A *tail* is the permanent style, which remains as an elongated, feathery termination to some seeds, as clematis. A *wing*, a membranous appendage, serving, as the seed-down, to transport the seed it is attached to through the air. It is solitary, except in some umbelliferous plants.

We may now proceed to the last division of the flower, which is, 7thly, the *receptacle.* — This is the common base or point of connection of the other parts. In compound flowers it serves as a distinguishing mark, and therefore is of importance. In the daisy it is conical; in the chrysanthemum, convex; carduus has it hairy; chamomile scaly; picris naked; onopordum cellular.

A compound flower is formed by the union of several sessile florets, or lesser flowers, within a common calyx; each, however, must possess five stamens, their filaments divided, but their anthers united into a cylinder, through which passes the style of a solitary pistil, much longer than the stamens, and having a stigma divided into two parts, which roll backwards. There are various forms, as the thistle, daisy, sunflower, &c.

When the flowers are collected round a stem in a complete ring, or merely on two of its sides, it is denominated a *whorl*, as in the dead nettle (*Lamium*). Flowers on their own stalks, standing somewhat distant from each other on a common one, or axis, are denominated a *raceme*, as a bunch of currants. When they are placed close together on one common axis, they form a *spike*, as in lavender (*Lavandula*). If flowers standing on a common stalk have, in proportion as they stand on it lower down, longer foot-stalks, so that the flowers all stand nearly on a level, it is denominated a *corymb*, as in *Spiræa opulifolia*, common in our gardens; in the common cabbage, a corymb of flowers becomes a raceme of fruit. Flowers on partial stalks variously divided and inserted, collected closely together and level at top, is a *fascicle*, as in the Sweet William (*Dianthus barbatus*). Sessile flowers collected together in a globular figure form a *head* or *tuft*, as in *Statice armeria*. When several flowers on stalks of nearly equal length spring from a common centre on a general stalk, they form form an *umbel*, as in the parsley. This is either general or partial; the latter is termed an *umbellule*. When flowers on separate foot-stalks, springing from a common centre, have their foot-stalks variously subdivided, it is termed a *cyme*, as in the elder (*Sambucus*). Flowers growing on partial foot-stalks without any order, but loosely spread on a common one, form a *panicle*, as in the oat (*Avena*). When the flowers of a panicle grow closely together, somewhat approaching an ovate form, as a bunch of grapes, the lilac, &c. it is termed a *thyrsus*, or bunch. When the flowers are all barren and sessile upon a common axis, it forms the *amentum*.

The exterior covering of plants is called the *epidermis* or *cuticle*, answering the same purpose as the scarf-skin or cuticle of animals, viz. protecting the interior and more tender parts from the injuries that might arise from excessive heat, cold, &c. yet, being porous, it allows the absorption and emission of moisture and air, and the admission of light. It cannot but have been observed how the epidermis varies in different plants; how smooth it is over the petals of most flowers — how downy on the fruit of the peach — how rough on the oak — on the nettle, clothed with perforated poisonous hairs. The cuticle peels off in some plants, as in the cork tree. In some plants, especially the Dutch rush (*Equisetum hyemale*), it is so impregnated with silicious or flinty matter as to serve as a polish for the cabinet maker, &c.

Immediately beneath the epidermis is the *cellular integument;* this is usually the seat of colour, being red in the petals of the red rose, blue in the common violet, &c. Leaves appear to be little else than masses of cellular integument, enclosed in a case of epidermis, and traversed by numerous sap vessels. Next to the cellular integument occurs the *bark*. In stems and branches but one year old, this consists but of one layer; in older ones there are to be observed a layer for every year of age; these, however, are of little import to the plant, the vital functions for the time being are carried on in the layer immediately in contact with the wood. This innermost ring is termed the *liber*. The bark is very conspicuous in some roots, as the
rot, &c.; the thick outer ring
when these are cut transversely
The bark consists of woody f
running longitudinally, but be
terwoven. In one of the meze
native of Jamaica, and called t
it may be separated into eleg
lace-work. In the bark the
perties of the plant principally
ness the resin in the pine, the f
the cinnamon, &c.

Next to the liber occurs the
forms the chief bulk of trees.
more of this occurs in all exog
for in the portion of it which
liber, and is named the alburnu
vessels which convey the fluid
to the leaves, whence it descend
situated in the liber, as we shall
In trees, a fresh layer of wood
every year adjoining the liber.
it is formed or deposited; henc
tree may be known by counting
tric rings. In the middle of the
the *medulla* or *pith*, commonly a
yellowish, or greenish substan
hollow stems of the onion, &c.
a film of it. It seems to be
servoir of nourishment, requ
formation of the leaves and
parts of plants; at all events,
and branches it is usually oblit
tanists are not determined as t

When a seed is committed t
if moisture, air, and heat are n
in certain favourable proportio
to germinate. (See WATER, i
getation.) No seed will veg
earth, nor in a temperature at
freezing point; all require a f
of air. These circumstances
able, the seed swells — the skin
the radicle, or embryo root,
pearance, and sinks into the
cotyledons, if the seed has m
by degrees develope themsel
above the surface, affording n
the embryo stem, situated b
until the radicle has become
root to supply food for its g
thus rendered useless, they de

Animal and vegetable matt
soluble in water by putrefac
salts and earths, and water,
nourishment plants derive fr
but it is also certain, that the
air, which in part accounts f
afforded to them by loosening
them, and for planting them
face. When a plant has got
veloped, it possesses another
quiring nourishment from th
(See GASES, their use to veget

he atmosphere, which to our eyes aprs a simple uniform fluid, has been demonated by chemists to be composed of three erent gases or airs, with which is conatly mixed the vapour of water. The gases known as oxygen, carbonic acid, and ke or nitrogen. Carbonic acid gas is car- or charcoal combined with oxygen. ater is composed of hydrogen and oxygen es. These facts, by a little attention, will easily remembered, and render all that llows comprehensible. The nourishment hich is absorbed by the roots being in a uid state, proceeds along the sap vessels uated in the alburnum of the wood, and reads through the leaves, flowers, &c. ere, and during its course up the stem, by e varied absorption and decomposition of ater and carbonic acid, and the emission oxygen, the sap is converted into various bstances, varying in every species of nts; gum is formed in the cherry, resin the fir, &c.; these are deposited as the sap scends through the vessels of the liber. rom the sap likewise is derived the nourishent from whence is formed the wood, c.; in fact, it is the source of the growth of e parts. Our knowledge of chemistry and egetable physiology is yet too imperfect to nable us to mark the various shades of diference in the processes of each plant with y degree of precision. We know that in e light all plants absorb carbonic acid s, and emit oxygen whilst in the dark; on e contrary, they absorb the latter and e out the former by the same surfaces; t we are utterly unable to point out how e same organs secrete a poison in the ghtshade and a wholesome food in the tato, which so closely resembles the first form. A few very simple experiments l serve to fix the above facts upon our emories. We may prove that the sap es through the alburnum, and descends rough the bark, by placing the cut end of afy twig of the fig tree in an infusion of azil wood; after some hours cut off about lf an inch of the extremity, when a circle red dots will mark where the infusion cended, and an outer circle of white dots, ll show where the juices descend.

That leaves throw off moisture, or perire, is demonstrated by inverting a tumbler er two or three leaves placed in the light; e inside of the glass will soon be perceptly covered with dew.

That leaves throw off gas from their surces is demonstrated by plunging one in a sel of water; air bubbles will soon be rceived to be emitted by and attached it.

In due course of time the flowers of a ant open; the anthers of the stamens swell, burst, and scatter a dust, termed *pollen*, secreted by them, and which is caught immediately by the moist stigmas of the pistils, or is carried to them by the wind, or accidental contact of some insect. This contact of the pollen with the stigma is found to be absolutely necessary before the seed can be perfected. This course of vegetation is repeated for a series of years in perennials, but the plant decays as soon as the seed is perfected in annuals.

Botanists at present are acquainted with nearly 100,000 species of plants; and the care with which Providence has provided for the well-being of plants is an earnest of their importance. That they may never become extinct, the number of their seeds is often immense; Ray counted 32,000 in one poppy-head! Where the seeds are less numerous, their safety is secured by the extra strength of the seed-vessel, their nauseous poisonous nature, and other means. The various modes in which they are spread over the face of the country is equal evidence of a peculiar providential care. The seed-down bears some through the air to a distance; some cling by their rough appendages to the coats of animals; others are borne by neighbouring streams, or by the winds to an immense distance; cocoa nuts float from the tropics to the shores of Norway; African seeds are blown over the southern coasts of Spain; birds, animals, and even the seed-vessels themselves, by an ejective power, all perform a part in the office of dissemination. Then, again, the various kinds of defence with which they are endowed: cuticles, woolly, and thorny, and flinty, to preserve an equable temperature, and to prevent injurious wounds. The buds, which contain the embryo of leaves to appear the following year, how enveloped are they in scales, and often coated with resin or gum!

Independent of any general arrangement, plants are divided into species, genera, and varieties.

By species is to be understood a plant, which by certain permanent signs can be distinguished from all others; for instance, every one can determine that the damask rose differs from every other; and botanists, having shewn by what specific marks it may always be distinguished, have determined it to be a *species*: but there are many other roses which, though having specific points of difference, very closely resemble the damask rose; these botanists have therefore collected into one family, which they term a genus, under the general name of *Rosa*. Rosa, then, is the generic or family name; but, to distinguish the species, every one has a separate second or *specific* name—thus, the damask rose is *Rosa centifolia*; the dog-rose, *Rosa canina;* these second names are therefore termed the *specific names*. By variety is meant a plant varying in an established species, but which cannot produce an exact resemblance of itself by seed: thus, all our apples are varieties of one species, the crab (*Pyrus*), and all plants raised from their seed invariably differ from each other and their parent. The whole vegetable kingdom, then, is divided into families, or *genera*, composed of a greater or less number of species. In botany the varieties are little noticed. These genera are distributed by Linnæus into *classes*, in what, from him, is denominated the Linnæan System of Botany.

These classes are twenty-four in number, founded on the number, situation, or proportion of the stamens. In the eleven first classes the number of the stamens is exclusively considered:—

1. Monandria,	plants with	1 stamen.
2. Diandria	—	2 —
3. Triandria	—	3 —
4. Tetrandria	—	4 —
5. Pentandria	—	5 —
6. Hexandria	—	6 —
7. Heptandria	—	7 —
8. Octandria	—	8 —
9. Enneandria	—	9 —
10. Decandria	—	10 —
11. Dodecandria	—	12 to 19.

Insertion is considered in the two next classes:—

12. Icosandria -	Stamens 20 or more, inserted in the calyx.
13. Polyandria -	Stamens numerous, inserted into the receptacle.

The *length* of the stamens is characteristic in the two following classes:—

14. Didynamia -	2 long and 2 short stamens.
15. Tetradynamia	4 long and 2 short stamens.

In the three next classes, the *union of the filaments* of the stamens is characteristic:—

16. Monadelphia,	Stamens united into 1 tube.
17. Diadelphia	Stamens united into 2 parcels.
18. Polyadelphia	Stamens united into more than 2 parcels.
19. Syngenesia	Plants with anthers united into a tube.
20. Gynandria	Stamens attached to the pistil.
21. Monœcia -	Stamens and pistils in separate flowers, but growing on the same plant.
22. Diœcia -	Stamens and pistils in separate flowers, and also on separate plants.
23. Polygamia	Stamens and pistils separate in some flowers, united in others, either on the same plant, or on two or three separate ones.
24. Cryptogamia	Stamens and pistils pres or not ascertained to so.

The plants of the above classes are f ther arranged in subdivisions, denomina *orders*. The orders of the first thirt classes are founded on the number of pis the plants belonging to them contain:—

Monogynia,	plants with	1 pistil.
Digynia	—	2 —
Trigynia	—	3 —
Tetragynia	—	4 —
Pentagynia	—	5 —
Hexagynia	—	6 —
Heptagynia	—	7 —
Octagynia	—	8 —
Enneagynia	—	9 —
Decagynia	—	10 —
Dodecagynia	—	12 to 19
Polygamia	—	many pistils

The orders of the 14th class are dis guished by their *seed-vessels:*—

1. Gymnospermia	Seeds apparently na generally four.
2. Angiospermia -	Seeds in a capsule, m

The two orders of the 15th class are tinguished by the *form of the seed-vess*

1. Siliculosa -	Seed-vessel, a roundish
2. Siliquosa -	Seed-vessel, a long pod.

The orders of the 16th, 17th, and classes, are founded on the *number of stamens*, that is, on the characters of first 13 classes.

The orders of the 19th class (*Syngen* are marked by the *nature of the florets.*

1. Polygamia æqualis. Florets all per each having stamens, a pistil, and one
2. Polygamia superflua. Florets of the or centre of the flower, with stamens pistils, those of the rays with a pistil o but both kinds are capable of perfe seed.
3. Polygamia frustranea. Florets of the with stamens and pistil; those of the either with a pistil incapable of perfe seed, or without any pistil.
4. Polygamia necessaria. Florets of the with stamens alone, those of the rays pistils only.
5. Polygamia segregata. Several flo either simple or compound, but with u anthers, and separate calyx, included i general calyx.

The orders of the 20th, 21st, and classes are distinguished by the chara of some of the classes that preceded t that is, by the number or proportion of stamens, the union of the anthers not b attended to.

The orders of the 23rd class are di guished upon the principles of the preceding classes.

cia: has flowers with stamens and and others with pistils only, or stanly, or all three descriptions of flowers same plant.

a: has the two or three descriptions ers on two different plants.

ia: in this they are on three separate

4th class (*Cryptogamia*) is divided orders:—

. Ferns 3. Liverworts
. Mosses 4. Algæ
5. Mushrooms.

I conclude with an enumeration of us classes and orders, and by mena specimen plant of each.

Monandria has two orders.

nia;	to this belongs the Samphire (*Salicornia*).
	The Strasburgh blite (*Blitum*).

Diandria has three orders.

nia	The Lilac (*Syringa*).
	Sweet-scented vernal grass (*Anthoxanthum*).
a	Has only the Pepper (*Piper*).

Triandria has three orders.

nia	The Crocus.
	Wheat, and nearly all the grasses.
	Holosteum.

Tetrandria has three orders.

nia	Plantain (*Plantago*).
	Bastard Chickweed (*Buffonia tenuifolia*).
nia	Holly (*Ilex*).

Pentandria has six orders.

nia	Convolvulus.
	Parsnip (*Pastinaca*).
	Elder (*Sambucus*).
nia	Parnassia.
nia	Flax (*Linum*).
ia	Mouse-tail (*Myosurus*).

Hexandria has six orders.

nia	Lily.
	Rice (*Oryza*).
	Dock (*Rumex*).
nia	Petiveria alliacea.
nia	Stratiotes.
ia	Water plantain (*Alisma*).

Heptandria has four orders.

nia	Horse-chestnut (*Æsculus*).
	Limeum.
nia	Saururus.
nia	Septas.

Octandria has four orders.

nia	Heaths (*Erica*).
Digynia	Galenia Africana.
Trigynia	Polygonum
Tetragynia	Bulbous Fumitory (*Adoxa*).

Enneandria has three orders.

Monogynia	Bay tree (*Laurus*).
Trigynia	Rhubarb (*Rheum*).
Hexagynia	Flowering Rush (*Butomus*).

Decandria has five orders.

Monogynia	Rue (*Ruta*).
Digynia	Pinks (*Dianthus*).
Trigynia	Silene.
Pentagynia	Sorrel (*Oxalis*).
Decagynia	Phytolacca.

Dodecandria has six orders.

Monogynia	Willow herb (*Lythrum*).
Digynia	Agrimony (*Agrimonia*).
Trigynia	Mignionette (*Reseda*).
Tetragynia	Aponogeton.
Pentagynia	Glinus.
Decagynia	Houseleek (*Sempervivum*).

Icosandria has three orders.

Monogynia	Cherry, peach, &c.
Pentagynia	Apple, pear, &c.
Polygynia	Rose.

Polyandria has seven orders.

Monogynia	Poppy (*Papaver*).
Digynia	Peony.
Trigynia	Larkspur (*Delphinium*).
Tetragynia	Tetracera.
Pentagynia	Columbine (*Aquilegia*).
Hexagynia	Stratiotes.
Polygynia	Anemone.

Didynamia has two orders.

Gymnospermia	Lavender.
Angiospermia	Fox-glove (*Digitalis*).

Tetradinamia has two orders.

Siliculosa	Honesty (*Lunaria*).
Siliquosa	Mustard (*Sinapis*).

Monadelphia has eight orders.

Triandria	Tamarindus.
Pentandria	Crane's bill (*Exodium*).
Heptandria	Pelargonium.
Octandria	Aitonia.
Decandria	Geranium.
Endecandria	Brownea.
Dodecandria	Pentapetes.
Polyandria	Mallows (*Malva*).

Diadelphia has four orders.

Pentandria	Monnieria.
Hexandria	Fumaria.
Octandria	Polygala.
Decandria	Pea, broom, &c.

Polyadelphia has three orders.

Dodecandria	- Orange (*Citrus*).
Icosandria -	- Melaleuca.
Polyandria -	- Hypericum.

Syngenesia has five orders.

Polygamia æqualis -	Dandelion, &c.
Superflua -	- Daisy (*Bellis*).
Frustranea -	- Sun-flower (*Helianthus*).
Necessaria -	- Marigold (*Calendula*).
Segregata -	- Globe-thistle (*Echinops*).

Gynandria has seven orders.

Monandria -	- Orchis.
Diandria -	- Ladies-slipper (*Cypripedium*).
Triandria -	- Salacia.
Tetrandria -	- Nepenthes.
Pentandria -	- Pergularia.
Hexandria -	- Aristolochia.
Octandria -	- Cytinus.

Monœcia has eight orders.

Monandria -	- Bread Fruit (*Artocarpus*).
Diandria -	- Anguria.
Triandria -	- Sedge (*Carex*).
Tetrandria -	- Nettle (*Urtica*).
Pentandria -	- Amaranthus.
Hexandria -	- Zizania.
Polyandria -	- Oak (*Quercus*).
Monadelphia	- Fir (*Pinus*).

Diœcia has eight orders.

Monandria -	- Brosimum.
Diandria -	- Valisneria.
Triandria -	- Empetrum.
Tetrandria -	- Trophis.
Pentandria -	- Hop (*Humulus*).
Hexandria -	- Tamus.
Polyandria -	- Poplar (*Populus*).
Monodelphia	- Yew (*Taxus*).

Polygamia has three orders.

Monœcia -	- Orach (*Atriplex*).
Diœcia -	- Hippophæ.
Triœcia -	- Fig (*Ficus*).

Cryptogamia has five orders.

Filices -	- Ferns.
Musci -	- Mosses.
Hepaticæ -	- Liverworts.
Algæ -	- Flags.
Fungi -	- Mushrooms.

The natural system of M. Jussieu. Every person must have observed, that plants in many instances are arranged by nature in families; for instance, the grasses, liliaceous plants, the umbelliferous plants, mosses, sea-weeds, ferns, &c. are composed of individuals bearing a very striking resemblance to each other in their forms. The same resemblance holds in their internal qualities, between such plants as resemble one another in configuration. Thus the grasses are all
nutritious; the liliaceous plants in
poisonous; umbelliferous plants grow
high dry soils are generally whol
those of wet situations are general
sonous. The importance of keepin
families undivided in a botanical cl
tion is evident, and if plants were
sally separable into such distinct fan
those above mentioned, a natural
would be easy and perfect: but pl
too diversified; they approach each
such various shades, that it is ce
complete natural system can never
fected, or must be too intricate for
use. Jussieu's system, with all its
open to both these objections; it is
fect, were it only from being found
the structure of the seed, that part
which is, perhaps, seldomer than an
capable of being observed by the
The following synopsis of the clas
orders are demonstrative of its intr
there are 15 classes and 100 orders.

The classes have no particular
but are distinguished by numbers,
short statement of essential characte
orders are named after some princip
in each. There are some inaccur
the arrangement; many plants, con
by Jussieu as monocotyledonous,
known to be without any cotyledon

Class I. *Acotyledones* (plants ha
cotyledon).

Order	1. Fungi.	6. Naiades, co
	2. Algæ.	several wate
	3. Hepaticæ.	as the Duc
	4. Musci.	(*Lemna*), &
	5. Filices.	

Class II. *Monocotyledones* (plants
cotyledon). Stamens inserted ben
germen.

Order	7. Orchideæ, as	Arum.
	8. Typheæ -	Typha, &c.
	9. Cyperoideæ	Cyperus, the &c.
	10. Gramineæ	Grasses.

Class III. *Monocotyledones.* Sta
serted round the pistil, that is, on
rolla or calyx.

Order	11. Palmæ -	Palms, cocoa
	12. Asparagi -	Asparagus, lil valley, &c.
	13. Junci -	Rushes, &c.
	14. Lilia -	Lily, tulip, &
	15. Bromelia -	Pine apple, &
	16. Asphodeli -	Asphodelus, o
	17. Narcissi -	Narcissus, s &c.
	18. Irides -	Iris, crocus, &

Class IV. *Monocotyledones.* Sta
serted on the germen or style.

der 19.	Musæ	Plaintain tree, &c.
20.	Cannæ	Sugar cane, &c.
21.	Orchideæ	The orchises.
22.	Hydrocharides	Hydrocharidis, &c.

lass V. *Dicotyledones* (plants with two yledons) without petals. Stamen on the men or style.

ler 23. Aristolochiæ, Aristolochia, &c.

lass VI. *Dicotyledones* without petals. mens inserted into the calyx.

der 24.	Elæagni	Elæagnus, &c.
25.	Thymeleæ	Daphne, &c.
26.	Proteæ	Protea, &c.
27.	Lauri	Laurel, &c.
28.	Polygoneæ	Polygonum, rhubarb, &c.
29.	Atriplices	Atriplex, &c.

Class VII. *Dicotyledones* without petals. mens inserted beneath the germen.

der 30.	Amaranthi	Amaranthus, &c.
31.	Plantagines	Plantago, &c.
32.	Nyctagines	Marvel of Peru, &c.
33.	Plumbagines	Plumbago, &c.

Class VIII. *Dicotyledones.* One petal serted under the germen.

Order 34.	Lysimachiæ	Primrose, &c.
35.	Pediculares	Veronica, &c.
36.	Acanthi	Acanthus, &c.
37.	Jasmineæ	Lilac, &c.
38.	Vitices	Verbena, &c.
39.	Labiatæ	Sage.
40.	Scrophulariæ	Antirrhinum.
41.	Solaneæ	Potato, &c.
42.	Borragineæ	Borage, &c.
43.	Convolvuli	Convolvulus, &c.
44.	Polemonia	Polemonium, &c.
45.	Bignoniæ	Bignonia, &c.
46.	Gentianæ	Gentian, &c.
47.	Apocinæ	Apocynum, &c.
48.	Sapotæ	Jacquinia, &c.

Class IX. *Dicotyledones.* One petal inserted into the calyx.

Order 49.	Guaiacanæ	Styrax, &c.
50.	Rhododendra	Rhododendron.
51.	Ericæ	Heaths.
52.	Campanulaceæ	Harebell, &c.

Class X. *Dicotyledones.* One petal crowning the germen; anthers united into a tube; flowers compound.

Order 53.	Cichoraceæ	Lettuce, &c.
54.	Cinarocephalæ	Thistle, &c.
55.	Corymbiferæ	Chrysanthemum.

Class XI. *Dicotyledones.* One petal rowning the germen; anthers distinct.

rder 56.	Dipsaceæ	Scabious, &c.
Order 57.	Rubiaceæ	Blackberry, &c.
58.	Caprifolia	Ivy, &c.

Class XII. *Dicotyledones.* Several petals; stamens upon the germen.

Order 59.	Araliæ	Panex, &c.
60.	Umbelliferæ	Carrot, &c.

Class XIII. *Dicotyledones.* Several petals; stamens inserted under the germen.

Order 61.	Ranunculaceæ	Anemone, &c.
62.	Papaveraceæ	Poppy, &c.
63.	Cruciferæ	Cabbage, &c.
64.	Capparides	Mignionette, &c.
65.	Sapindi	Sapindus, &c.
66.	Acera	Maple, &c.
67.	Malpighia	Malpighia, &c.
68.	Hyperica	Hypericum, &c.
69.	Guttiferæ	Gambogia, &c.
70.	Aurantia	Orange, &c.
71.	Meliæ	Melia, &c.
72.	Vites	Vine, &c.
73.	Gerania	Geraniums, &c.
74.	Malvaceæ	Mallow, &c.
75.	Magnoliæ	Magnolia.
76.	Anonæ	Anona, &c.
77.	Menisperma	Menispermum.
78.	Berberides	Berberry, &c.
79.	Tiliaceæ	Lime tree.
80.	Cisti	Cistus.
81.	Rutaceæ	Rue, &c.
82.	Caryophyleæ	Pink, &c.

Class XIV. *Dicotyledones.* Several petals; stamens inserted into the calyx or corolla.

Order 83.	Sempervivæ	Houseleek, &c.
84.	Saxifragæ	Saxifrage, &c.
85.	Cacti	Creeping cereus.
86.	Portulaceæ	Purslane, &c.
87.	Ficoideæ	Ice plant, &c.
88.	Onagræ	Fuchsia, &c.
89.	Myrti	Myrtle, &c.
90.	Melastomæ	Rhexia, &c.
91.	Salicariæ	Willow herb, &c.
92.	Rosaceæ	Rose, &c.
93.	Leguminosæ	Kidney bean, &c.
94.	Terebintaceæ	Sumach, &c.
95.	Rhamni	Holly, &c.

Class XV. *Dicotyledones.* Stamens in separate flowers from the pistils.

Order 96.	Euphorbiæ	Box, &c.
97.	Cucurbitaceæ	Cucumber, &c.
98.	Urticæ	Nettle, &c.
99.	Amentaceæ	Oak, &c.
100.	Coniferæ	Cypress, &c.

At the end Jussieu places a large assemblage of genera, consisting of plants, the construction of whose seed is undetermined. This, of course, is an imperfection, but not peculiar to Jussieu's system. It must be the case with all systems founded on nature, unless their contrivers could have at once before them a specimen of every species of plant, that the various portions of our globe produce. This system has been greatly modified and improved by Decandolle, Lindley, and others; and it is now justly preferred to the artificial system of Linnæus. (*G. W. Johnson; Dr. Lindley; G. Sinclair, Trans. High. Soc.* vol. i. p. 81.)

BOTS. In farriery, a kind of worms very troublesome to horses. Bots are the larvæ or maggots of a species of gad-fly (the *Œstrus equi*), which deposits its eggs on the legs, mane, or those parts of the horse that the animal is most apt to lick. The egg is immediately hatched by the warmth and moisture of the tongue, and the little worm conveyed into the mouth, whence it crawls down the œsophagus into the stomach. It adheres to the cuticular coat of the stomach by means of little hooks, with which its mouth is furnished; and there it remains from the summer of one year to the spring of the next, nourished by the mucus of the stomach, or the food which it contains. Then having attained its full size as a maggot, it loosens its hold, and is carried along the intestines with the other contents of the stomach, and evacuated with the fæces. Before it drops, it generally clings for a while to the verge of the anus, and tickles and teazes the horse to a very great degree. Except they exist in most unusual numbers, bots do neither good nor harm during their residence in the stomach of the horse. It is the habitation which nature has assigned to them; and the safety of so noble an animal as the horse would not have been compromised for the sake of a maggot and a fly. The best advice that can be given, therefore, is to let them alone, or at most to be content with picking them off when they appear under the tail. There are two good reasons for this; the first is, that there is not any medicine that will expel them; the strongest and even the most dangerous purgative is insufficient. The second reason is, that if the bots are let alone, they will, in due time, come all away without our help or meddling. (*Clater's Farriery*, p. 168—170.) Green food, however, expels them readily, as does common salt in the proportion of two to four ounces to a quart of water. The most simple and efficient remedy is a quart of milk, mixed well with a quarter of a pound of honey, or brown sugar, given fasting. This is much better than aloes.

BOUDS. A name given in some districts to the weevils, which breed in several kinds of grain, malt, &c.

BOUND. (Sax. bunde; from bindan, to bind.) In veterinary medicine, a term of various application. Any part of an animal that is embraced with an unnatural
said to be bound: thus horses are li
be *hoof-bound, hide-bound*, &c. Or the
may be constricted so as not to pa
the fæces: in which case the belly is
be *bound*.

BOW. (Sax. boᵹ.) See ARCHE

BOWEL DISEASES. (Mod
boyaux; old Fr. *boailles.*) The ho
other quadrupeds are liable to vario
eases affecting the bowels. Of inflam
of the bowels there are two kinds; tha
external and that of the internal coa
former is a very frequent and fatal
and is recognised by the farrier un
name of *red colic.* It is frequently
by the application of cold to the bell
horse, either by taking him into the
or washing him about the belly wit
water; or suffering him to drink plenti
it when he is heated, or by exposure
over exertion on a full stomach, &c.
whatever cause it arises, it runs its
with fearful rapidity, and sometimes
the horse in less than twenty-fou
The symptoms should be carefully
One of the earliest is the expressio
acute pain. The animal paws, roll
gles violently, lies upon his back,
his legs and mouth are cold, the flan
violently, the horse shivers and sw
The violence of the symptoms soo
and the horse becomes weak, and
able to stand. Prompt and copious
should be at first resorted to, until
nearly or quite succeeds; and mild
may be next administered. The wh
belly should be stimulated with th
blistering liquid, or with spirit of tu
and these appliances should be rub
hardly and thoroughly as the ten
of the belly will allow. The hors
be kept quiet, warmly clothed, and
bandaged. Inflammation of the
of the bowels is usually the conseq
physic, either of bad quality, or giv
over dose; or the horse may have bee
or driven far and fast with nothing b
meat in his belly. This disease can
be confounded with the foregoin
horse does not roll so violently nor
desperately, nor is there any heat
tenderness of the belly. At the
he is purged, instead of exhibiting
stinate costiveness which generally
panies the former. Plenty of tolerab
gruel or starch should be forced dow
will possibly sheathe the coats of the
from the effect, either of some por
the physic or the acrimony of the
and the purging will gradually st
this should have no effect, bleeding,
watched, and stopped when the pulse

esorted to; and thicker gruel and medicine must be administered. e last species, warm clothing and about the legs will be of essence. (*Clater's Farriery*, p. 173—

LDERS, or BOULDERS. A term y, implying rounded masses of rock; provincially applied to a kind of tone, common in the soils of the districts. In the north it is pro- sometimes *bowder* or *booder*, and ther.

LDER-WALL. A wall generally sea-coast, constructed of large peb- bowlders of flint, which have been by the action of water.

-LEGGED. In horsemanship, is a conformation or posture of the s of a horse.

LING-GREEN. A level piece of with a smooth grassy surface, kept r bowlers.

S OF A SADDLE are two pieces laid archwise to receive the upper the horse's back, to give the saddle form, and keep it steady.

X DRAIN. An underground drain, rly built, with upright sides, and a flat or brick cover; so that the close section appearance of a square box. See and DRAINING.

X TREE. (Sax. box; It. *bosso*; Fr. Lat. *Buxus sempervirens*.) We con- he English name of this plant to be a tion of the Latin word *buxus*, or from ish *box*, and that it gave the name wooden cases made by the carpenter ner, rather than derived its own from ases. The box was formerly much entiful in England than at present. in Gloucestershire, was named from , and it also gave the name of Box- those delightful downs near Dork- Surry, where this shrub seems to rown naturally, as it is known to ounded there long before the time e Earl of Arundel retired to that d, as it is stated, planted the box. the box trees cut down on Box- duced upwards of 10,000*l*. This n bush, or small tree, is found all rope, as well as upon the chalk hills nd; but it acquires its largest di- in the south. The duty on box- quite oppressive; being 5*l*. a ton if from a foreign country, and 1*l*. a m a British possession. It is from that the principal part of the wood ed into England; whether or not really furnished by *Buxus semper-* not known. It is not improbable s *balearica*, a larger species, too tender to thrive in this country, may furnish a part, at least, of that which comes from the Mediterranean. It is said, that the wood of this species is coarser, and of a brighter yellow than that of the common species. At an average of the three years ending with 1831, the entries of box-wood for home consumption amounted to 382 tons a year. In 1832, the duty produced 1867*l*. 17*s*. 4*d*. Turkey box-wood sells in the London market for from 7*l*. to 14*l*. a ton, duty included. Box is a very valuable wood. It is of a yellowish colour, close-grained, very hard, and heavy; it cuts better than any other wood, is susceptible of a very fine polish, and is very durable. In consequence it is much used by turners and mathematical and musical instrument makers. It is too heavy for furniture. It is the only wood used by the engravers of wood-cuts for books; and, provided due care be exercised, the number of impressions that may be taken from a box wood-cut is very great. In France, box-wood is extensively used for combs, knife handles, and button moulds. The value of the box-wood sent from Spain to Paris is reported to amount to 10,000 fr. a year.

Where box trees are required, they should be raised from seed, which should be sown soon after it is ripe, in a shady border of light loam, or sand; but it is generally propagated by cuttings planted in the autumn, and kept moist, until they have taken root. The box plant is best known for its use in gardens as edgings to borders; the kind so employed is a dwarf variety. It is very useful, as it grows freely under the drip and shade of trees. Dwarf box is increased by parting the roots, or planting the slips. The best time for transplanting this shrub is October; though it may be removed almost at any time, except summer, if it be taken up with a good ball of earth.

With respect to its medicinal properties, box-wood has been substituted for *guaiacum* as a sudorific in rheumatism; but is now seldom prescribed. Oil of box root is a cure for the toothache, when dropped on cotton, and put into a carious tooth. (*Phillips's Sylv. Flor.* vol. i. p. 44.; *Brande's Dict. of Science*; *M'Culloch's Com. Dict.*)

BOX *of a Wheel*. The aperture wherein the axis turns.

BOX *of a Plough*. The cross-piece in the head of the plough which supports the two crow-staves.

BRACE. The general name for a couple, or pair, of such animals as bucks, hounds, partridges, &c. It is also applied to any thing that serves to strengthen or support.

BRACKEN. It is written also *brahen*, and sometimes pronounced *breckin* in the north of England. The same with brake or fern. See **Fern.**

BRADLEY, RICHARD, was one of the first writers on agriculture and horticulture, who sought in any considerable degree the light of other sciences for their improvement. His first writings were in the *Philosophical Transactions* for 1713, "On the Motion of the Sap in Vegetables; and Microscopical Observations on Vegetation, and on the quick Growth of Mouldiness on Melons" (vol. xxix. p. 486. 490.).

The following is a list of his works: —

1. Historia Plantarum Succulentarum, &c. 4to.; commenced in 1716, in decades, of which five only appeared. 1717, 1725, and 1727; republished in 1734. 2. New Improvements of Planting and Gardening, both Philosophical and Practical. London. 1717. 8vo. 1718, 1719, 1724, 1731. 3. A new Improvement of Planting and Gardening, both Philosophical and Practical, explaining the Motion of the Sap and Generation of Plants. 1720. 8vo. 4. A Philosophical Account of the Works of Nature. 1721. 4to. 5. A Treatise on Husbandry and Gardening. 1721. 8vo. 6. The Monthly Register of New Experiments and Observations in Husbandry and Gardening. 1722, 1723. 8vo. 7. A general Treatise of Husbandry and Gardening. 1723. 8vo. 8. A Philosophical Treatise of Agriculture. 1723. 9. Family Dictionary, containing the most approved Methods for improving Estates and Gardens. 1726. 2 vols. folio. 10. Practical Discourses concerning the Four Elements, as they relate to the Growth of Plants. 1727, 1733. 8vo. 11. Dictionarium Botanicum, or a Botanical Dictionary for the Use of the Curious in Husbandry and Gardening. 1728. 2 vols. 8vo. (Plunket considers this the first Botanical Dictionary that appeared in England.) 12. The Vineyard, a Treatise on Vines, &c. 1728. 8vo. 13. The Gentleman and Gardener's Kalendar. London. 1718; the 3d edition, 1720. 8vo. 14. A general Treatise of Husbandry and Gardening. 1726. 2 vols. 8vo.; a compressed edition of this appeared with notes in 1757. 1 vol. 8vo. 15. Calendarium Universale. London. 1718, and 1726. 12mo. 16. A Catalogue of Seed Plants. London. 1720. 17. The Country Gentleman, and Farmer's Monthly Director. London. 1721, 1727, 1729, and 1732. 8vo. 18. New Experiments relative to the Generation of Plants. 1724, 1734. 8vo. 19. Treatise on Fallowing Ground. London. 1724. 4to. 20. A Survey of Ancient Husbandry and Gardening. 1725. 8vo. 21. Experimental Husbandman and Gardener. 1726. folio. 22. Discourses concerning the Growth of Plants. 1727. 8vo. 23. A complete Body of Husbandry. London. 1727. 8vo. 24. The Weekly Miscellany for the Improvement of Husbandry. 1727. 8vo. 25. The Science of good Husbandry; or the Æconomicks of Xenophon. London. 1727. 8vo. 26. An Account of Mr. Cowell's Aloe, 1729. 8vo. 27. Proposals for the Improvement of Waste Lands. 8vo. 1723. 28. British Housewife and Gardener's Companion. 1726. 2 vols. 8vo. 29. The Riches of a Hop Garden explained. 1729.

(*G. W. Johnson's Hist. of Eng. Gard.*)

BRAIRD. In the agriculture and gardening of Scotland, the term braird is applied to the springing up of seeds, which, when they come up well, are said to have a fine braird.

BRAKE. The name of a wooden instrument for dressing hemp and flax, used to bruise or break the bun or stem, &c. in order to separate the cortical part or rind from it. It is sometimes applied to a thicket, or the place where fern grows; and is another name for the barnacles, or pincers, used by farriers. Brake is also a sharp bit, or snaffle for horses. A smith's brake is a machine in which horses unwilling to be shod are confined during that operation. Some species of large heavy harrows are frequently called brakes. See **Harrow.**

BRAKES, or FEMALE FER
Smith describes two species: —
mon brakes (*P. aquilina*), wh
every where most abundantly.
perennial root, long, tapering, cr
ternally black. Fronds annual,
one to six feet high, repeatedly
with horizontal spreading bran
ribs are smooth, all of a light br
The main stalk is angular and sh
wounding the hands severely if
cautiously. When cut across, th
branched appearance, resemblin
eagle, whence the Latin name. T
fern is impatient of severe cold in
and its curled scaly shoots will sc
any frost, though its natural
often the most exposed and blea
The roots are generally killed by
ing. There is a singularly delic
with rounded, more distant, bar
or segments, and very slender st
is found on maritime rocks or da
towns, but rarely. 2. *Curled* or
is found in open stony mountai
tions. Root moderately creeping,
with many fibres. Fronds ann
erect, smooth, from six to tw
high, of a bright pea-green h
elegant feathery aspect; thin s
pale, polished. (*Smith's Eng. F*
p. 317.)

BRAMBLE, FLOWERIN
odoratus.) A hardy exotic shru
feet in height, blowing a pin
coloured flower in June and
loves shade and moisture, and is
by suckers. It is known also as th
raspberry.

BRAMBLE or BRAMBL
(Sax. bꞃæmbel, formerly writte
Lat. *Rubus.*) The bramble, or
the generic name of a large fami
which creep along the hedge of
The common bramble (*Rubu*
derives both its Latin and Engl
name from the colour of its fruit
stages of ripeness. However g
bramble is reprobated as a troubl
we must acknowledge that, wh
fruit or flower, it forms a princip
numberless hedgerow beauties,
without its utility in particular
ally in poor sandy lands, where th
other hedges is slow, and where,
the looseness of the soil, the dit
fence. When planted in such
will, by its quick growth, soon
thorny branches in the dead hed
an almost impervious fence agai
sions of cattle, sheep, and other
Brambles mixed with other hedg
render them thicker and strong

ged against the more general adop-
mble fences are, that, by the yearly
portion of the shoots, they soon fill
with dead wood, which has not only
tly appearance, but is also hurtful
er plants; and again it is said, that
are so broad and numerous as to
very other plant, by depriving it
un and air. When brambles are
rable abundance, as is often the
aste and other lands that require
ght into cultivation, they should
grubbed or hoed up; and if the
fterwards ploughed with a good
he remaining roots will be torn up,
plants at length destroyed. This
ich is only used by the chance pas-
casionally plucking its fruit, pos-
wever, several advantages which
ur attention. Its long branches
e of need, be employed as cords;
ruit produces an excellent wine,
of making which is as follows: —
ures of the ripe fruit, with one of
six of wine, are taken and boiled;
s skimmed off, the fire removed,
ixture being passed through a
h, is left to ferment. It is then
s, and allowed to ferment in a
k. In Provence bramble-berries
give a deep colour to particular
Allgem. *Forst-und Jagd-Zeitung*,
p. 104.) The juice of the black-
d with raisin wine before it has
will give it both the colour and
laret. "The berries," says Pliny,
iccative and astringent virtue,
ost appropriate remedy for the
flammation of the tonsils." The
ell as the berries of the bramble,
tly considered by the ancients
against the most dangerous
hey are diuretic; and the juice
of the tendrils, or young shoots,
ds reduced to the consistency
standing in the sun, is, adds the
, "a singularly efficacious me-
inwardly or applied outwardly,
eases of the mouth and eyes,
the quinsy, &c." But Pliny
lebrity as a medical authority,
ad any; and modern black-
also lost their virtue. Boer-
, that the roots taken out of
ebruary or March, and boiled
re an excellent remedy against

lackberries, picked when only
g and astringent in common
fluxes. The bruised leaves,
ripe fruit, applied outwardly,
re ringworm.
in his work on Planting, says, "To the poor in the vicinity of Newcastle it is of great importance; many of whom go a great number of miles to gather blackberries while they are in season, and carry them from ten to twenty miles, to Newcastle, Shields, and Sunderland, where they sometimes sell them as high as 3*d.* and 4*d.* per quart, for puddings, tarts, preserves, or jellies, and even making of wines." The fruit is, in particular, much esteemed and sought after by the wives and mothers of sailors, to send on board the ships, as it is found to be very healthful to the men to eat with their biscuits, as well as for puddings, much more so than their common fare of salt beef and pork. All through the season, after the gooseberries are over (for apples, plums, &c. are often scarce and dear), the people are regaled with the fruit of the bramble as the greatest domestic luxury, and would probably lay in a store for future consumption if sugar were cheaper. The leaves of the dwarf crimson bramble (*Rubus arcticus*) are often used to adulterate tea. (See WHORTLEBERRY.)

Of the *Rubus fruticosus*, or common bramble, we have (says Phillips) five varieties; and as one has been discovered in a hedge near Oxford by Bobart which produces a white fruit, it will be necessary to adopt the proper name of bramble-berry for this fruit, to avoid the contradictory appellation of *white blackberry*. The variety with a double flower is now one of the ornaments of the shrubbery; the other varieties are, one with variegated leaves, one with cut leaves, and the bramble without thorns. Smith, in his *English Flora*, describes fourteen species of bramble (*Rubus*); which include the raspberry, cloudberry, and dewberry. Several reputed varieties of the common bramble have also been observed in Britain (says Smith, vol. ii. p. 400.), differing in the shape and pubescence of their leaflets, not to mention other characters. These have recently been proposed as species in a very able work, with excellent plates partially coloured, by Dr. A. Weihe and Prof. Ch. G. Nees ab Esenbeck of Bonn, under the title of *Rubi Germanica*. Notwithstanding the colour of the flowers, I cannot suppose our British *R. fruticosus* to differ from theirs. (*Smith's Engl. Flora*, vol. ii.; *Phillips's Hist. of Fruits*, p. 63.; *Quarterly Journ. of Agr.* vol. i. p. 816.; vol. iii. p. 182.)

BRAN. (Old Fr. *bren*; Ital. *brenna.*) The thin skins or husks of corn, particularly wheat, ground and separated from the meal by a sieve or boulter. It is gently laxative; owing to the mechanical irritation it excites. An infusion of it, under the name of bran tea, is frequently used as a domestic remedy for coughs and hoarseness. Infusions of bran also remove scurf and dandriff. Calico-printers employ bran and warm water with great success, to remove colouring matter from those parts of their goods that are not mordanted. Bran is an useful ingredient, when well scalded, and employed occasionally in moderate quantities, in mashes for horses; but the constant use of it, whether raw or scalded, is prejudicial, as it is apt to weaken the horse's bowels, and thereby expose him to many disorders. It is also highly useful in stall-feeding cattle, and for sheep, when given as a dry food. According to the analysis of M. Saussure, 100 parts of the ashes of the bran of wheat contain (*Chem. Rec. Veg.*),—

	Parts.
Soluble salts - - -	44·15
Earthy phosphates - -	46·5
Silica - - - -	0·5
Metallic oxides - -	0·25
Loss - - - -	8·6

BRANCH. (Fr. *branche*; Lat. *brachium.*) The arm or bough of a tree; or that part which, sprouting from the trunk, helps to form the head or crown. It also signifies the part of a river which empties itself into a larger branch or the main stream.

BRANCHES OF A BRIDLE are two pieces of iron bent, which, in the interval between one and the other, bear the bit-mouth, the cross-chains, and the curb; so that on one end they answer to the head-stall, and on the other to the reins, in order to keep the horse's head in subjection.

BRAND-GOOSE, or BRENT-GOOSE. A kind of wildfowl, less than a common goose, having its breast and wings of a dark colour. (See GOOSE.)

BRANK. A provincial name sometimes applied to buckwheat, which see.

BRAWN. The flesh of the boar, after being boned, rolled up, or collared, boiled, and pickled. Brawn is made of the flitches, and some other parts, the oldest boars being chosen for the purpose, it being a rule that the older the boar the more horny the brawn.

The method of making it is generally as follows:—The bones being taken out of the flitches, or other parts, the flesh is sprinkled with salt, and laid in a tray, that the blood may drain off; after which it is salted a little, and rolled up as hard as possible. The length of the collar of brawn should be as much as one side of the boar will bear; so that, when rolled up, it may be nine or ten inches in diameter. After being thus rolled up, it is boiled in a copper or large kettle, till it is so tender that you may almost run a stiff straw through it; when it is set by till thoroughly cold, and then put into a
pickle composed of water, s
bran, in the proportion of t
each of the latter to every g
which, after being well boi
strained off as clear as pos
bran, and, when quite cold,
into it. (*Willich's Dom. E*

BRAXY. In sheep. Se
EASES OF.

BREACHY or BREEC
the short coarse wool of a
that which comes from the
animal.

BREAD. (Sax. bꞃeoꝺ ; G
forms an important and pri
the food of most civilised n
sists of a paste or dough for
or meal of different sorts
with water, with or witho
ment, and baked.

Bread may be divided,
stance, into *leavened* and *un*
When stale dough or yeast
fresh dough of flour and w
swell, it is said to be leave
thing of this sort is added, t
to be unleavened. These
subdivided into various kin
The principal sorts in use ar
household, and *brown* brea
from each other in their de
In the first, all the bran is
the flour; in the second, c
parts of it; and in the third
all: so that fine bread is ma
wheaten bread of flour, wi
fine bran; and household br
substance of the grain, wit
scarcely any either of the c
fine flour. We have also
bread, and French bread,
white breads made of the pur
bread there is sometimes an
and in French bread butter
is likewise ginger-bread, ma
of wheat and rye, or someti
barley; and other breads, m
substitutes for flour, as
bread, pea and bean bread,

The President de Goguet
(*Origin of Laws, &c.* vol.
Eng. trans.) to trace the su
which it is probable men
cover the art of making bre
positive is known on the
certain, however, from th
the sacred writings, that
leavened bread was commo
Abraham (Gen. xviii. 8.); a
bread was used in the
(Exod. xii. 15.). The me
corn by hand-mills was pr
and Greece from a very re

hened period, the Romans had
ethod of making flour than by
sted corn in mortars. The con-
the Romans diffused, amongst
r useful discoveries, a knowledge
f preparing bread, as followed in
ough the whole south of Europe.
of yeast in the raising of bread
ever, from a passage of Pliny (lib.
), to have been taken advantage of
ermans and Gauls before it was
by the Romans; the latter, like the
aving leavened their bread by in-
the fresh dough with that which
me stale. The Roman custom
have superseded that which was
y in use in France and Spain; for
f raising bread by an admixture of
not practised in France in modern
towards the end of the seventeenth

he formation of bread, a certain
f fermentation, not unlike vinous
tion, is requisite, care being taken to
acetous fermentation, which ren-
bread sour, and, to most persons,
ble. This fermentation is called
If dough be left to itself in a
ly warm place (between 80° and
degree of fermentation comes on,
wever, is sluggish, or, if rapid,
run into the *acetous*; so that, to
t kind of fermentation requisite
oduction of the best bread, a fer-
dded, which is either *leaven*, or
an already fermenting state, which
ccelerate the process of the mass
t is added; or *yeast*, the peculiar
ich collects in the form of scum
in the act of fermentation. (See
Of these ferments, leaven is slow
ain in its effects, and gives a sour
ightly putrid flavour to the bread.
ore effective; and, when clean
it rapidly induces panary fer-
but it is often bitter, and some-
peculiarly disagreeable smell and
d well raised and baked differs
ented bread, not only in being
compact, lighter, and of a more
ste, but also in being more easily
h water, with which it does not
us mass; and this circumstance
portance to health. All, then,
tial to make a loaf of bread is
hich a certain quantity of yeast
led. This mass, or *sponge*, in
of the baker, is put into any
mould or form, or it is merely
one mass; and, after being kept
ime in rather a warm place, so
ation may have begun, it is sub-
process of baking in a proper oven. Carbonic acid is generated, and the viscidity or texture of the dough preventing the immediate escape of that gas from the innumerable points where it forms, the whole mass is puffed up by it, and a light porous bread is the result. Along with the carbonic acid alcohol is evolved, but the quantity is so insignificant and the spirit so impure as not to be worth notice; thence the attempts which have been made to collect it upon a large scale have entirely failed in an economical point of view.

The general process of making household bread is this:—To a peck of meal or flour is to be added about three ounces of salt, half a pint of yeast, and three quarts of water, cold in summer but warm in winter, and temperate between the two; the whole being then well kneaded in a bowl or trough, and being set by in a proper temperature, rises in about an hour, according to the season. It is then moulded into loaves, and put into the oven to be baked. In placing the dough aside, it is proper to cover it; this is termed *setting the sponge*, and it undergoes a second kneading before it is baked.

For French bread, take half a bushel of fine flour, ten eggs, a pound and a half of fresh butter (the eggs and butter, however, are very seldom used), and the same quantity of yeast with manchet; and, tempering the whole mass with new milk, pretty hot, let it lie half an hour to rise; which done, make it into loaves or rolls, and wash it over with an egg beaten with milk, taking care that the oven is not too hot.

Other flour, besides that of wheat, will, under similar circumstances, undergo panary fermentation; but the result is a heavy, unpalatable, and often indigestible bread; so that the addition of a certain quantity of wheat flour is almost always had recourse to. It is the gluten in wheat which thus peculiarly fits it for the manufacture of bread, chiefly in consequence of the tough and elastic viscidity which it confers upon the dough.

Wheat flour is composed chiefly of starch and gluten; the proportion of these and other substances which it contains, according to Vogel, are—

	Parts.
Starch - - -	68·0
Gluten - - -	24·0
Gummy sugar - -	5·0
Vegetable albumen - -	1·5

Sir H. Davy states, that wheat sown in autumn contains 77 per cent of starch, and 19 of gluten; while that sown in spring yields 70 of starch and 24 of gluten. The wheat of the south of Europe contains a larger proportion of gluten than that of the north; and hence its peculiar fitness for making macaroni and vermicelli. Oats yielded, according to Davy's analysis, 59 of starch, 6 of gluten, and 2 of saccharine matter; while the same quantity of rye gave only 6·1 parts of starch, and half a part of gluten.

Like all other farinaceous substances, bread is very nourishing on account of the gluten which it contains; but if eaten too freely, it is productive of acidity, which deranges the intestines, and lays the foundation of dyspepsia. Stale bread, in every respect, deserves the preference over that which is newly baked; and persons troubled with flatulency, cramp of the stomach, or indigestion, should abstain from new bread, and particularly from hot rolls. Bread made from the best flour is necessarily costly, but is more wholesome for those persons who are liable to a relaxed state of the bowels. Brown bread, on the contrary, is the cheapest and most desirable for persons whose habit of body is of the contrary nature: but there is an intermediate kind made from flour, in which the finer portion of the bran is retained, called locally "seconds," which is preferable to either of the above. (*Quar. Jour. Agr.* vol. ix. p. 585.)

The species of bread in common use in a country depends partly on the taste of the inhabitants, but more on the sort of grain suitable for its soil. The superiority of wheat to all other farinaceous plants in the manufacture of bread is so very great, that wherever it is easily and successfully cultivated, wheaten bread is used to the nearly total exclusion of most others. Where, however, the soil or climate is less favourable to its growth, rye, oats, &c. are used in its stead. A very great change for the better has, in this respect, taken place in Great Britain within the last century. It is mentioned by Harrison, in his *Description of England* (p. 168.), that in the reign of Henry VIII. the gentry had wheat sufficient for their own tables, but that their households and poor neighbours were usually obliged to content themselves with rye, barley, and oats. It appears from the household book of Sir Edward Coke, that in 1596 rye bread and oatmeal formed a considerable part of the diet of servants, even in great families, in the southern counties. In 1626, barley bread was the usual ordinary food of the great bulk of the people. At the Revolution, the wheat produced in England and Wales was estimated by Mr. King and Dr. Davenant to amount to 1,750,000 quarters. (*Davenant's Works*, vol. ii. p. 217.) Mr. Charles Smith, the very well informed author of the *Tracts on the Corn Trade*, originally published in 1758, states that in his time wheat had become
much more generally the food of th
mon people than it had been in 16
he adds (2d edit. p. 182. Lond. 1766
notwithstanding this increase, som
intelligent inquirers were of opinio
even then not more than *half* the p
England fed on wheat. Mr. Smith
estimate, which is very carefully dra
is a little higher; for, taking the pop
of England and Wales, in 1760, at 6,0
he supposes that 3,750,000 were con
of wheat, 739,000 of barley, 888,000
and 623,000 of oat bread. He furth
posed that they individually consu
the first class, 1 qr. of wheat; the
1 qr. and 3 bushels of barley; the
qr. and 1 bushel of rye; and the fo
qrs. and 7 bushels of oats. Abo
middle of last century, hardly any
was used in the northern counties o
land. In Cumberland, the principal
used only a small quantity about Ch
The crust of the goose-pie, with w
most every table in the county is th
plied, was, at the period referred to
uniformly made of barley-meal.
On the Poor, vol. i. p. 564.)

Every one knows how inapplica
statements are to the condition of t
of England at the present time.
bread is now almost universally m
in towns and villages, and almo
where in the country. Barley is
used; oats are employed for brea
the northern parts of the island;
consumption of rye bread is com
inconsiderable. The produce of
crops has been, at the very leas
since 1760. And if to this im
crease in the supply of wheat, w
still more extraordinary increa
supply of butcher's meat (see CA
fact of a very signal improveme
condition of the population, in
food, will be obvious. When flo
verted into bread, it is found, on
it when taken from the oven, that
creased from 28 to 34 per cent
(3 lbs. of flour makes 3 lbs. 10 oz.
but when it has been kept thirty-
that which had gained 28 will lose a
cent. There are, however, several
stances which influence the quantity
obtained from a given weight of flo
as the season in which the wheat wa
and the age of the flour: the bett
flour is, and the older, within certain
the larger is the quantity of the bre
duced.

According to the assize acts, a
flour weighing 280 lbs. is supposed
of being baked into 80 quartern
one fifth of the loaf being supposed

r and salt, and four fifths of
the number of loaves that may
om a sack of flour depends en-
s goodness. Good flour requires
r than bad flour. Sometimes 82,
ven 86 loaves have been made
k of flour, and sometimes hardly
re generally made, at 4 lbs. 6 oz.
ng into the oven, by the London

ll known that *home-made bread*
's bread are very different; the
usually sweeter, lighter, and more
of moisture, and will keep well
weeks, especially if a little rye
ixed with it; the latter, if eaten
r it has cooled, is pleasant and
but if kept more than two or three
ecomes harsh and unpalatable, and
Small quantities of alum are in-
used by the London bakers, with
of whitening or bleaching the
r it will be observed, that what-
be the quality of the flour which
home-made bread is always of a
ively dingy hue. By some respect-
ers it was formerly in extensive
might still be used, with perfect
for in so small a quantity as a
of a pound of alum to 1 cwt. of
ould not be in the least degree in-
According to Mr. Accum (*On the*
tion of Food), the requisite quan-
um for this purpose depends upon
ty of the flour. The mealman, he
es different sorts of flour from the
d of grain. The best flour is
ed for biscuits and pastry, and the
inds for bread. In London, no
n five kinds of wheaten flour are
into the market; they are called
seconds, middlings, coarse mid-
d twenty-penny.

nd peas are also, according to the
ority, frequently ground up with
lour. The smallest quantity of
is from three to four ounces to
of flour of 240 lbs. Alum may
detected in bread, by pouring
ter on it, pressing out the water,
away to one third, allowing it to
ng it through paper, and adding
r liquor some solution of muriate
loride of calcium). If considerable
now appear, it is proof of adult-
none other can well be suspected
Another article occasionally
bread and ginger-bread making
of ammonia. As it is wholly
y the heat of the oven, none
he baked loaf. It renders the
and perhaps neutralizes any acid
ve been formed (exclusive of carbonic acid); but it is too dear to be much employed. To some kinds of biscuits it gives a peculiar shortness, and a few of the most celebrated manufacturers use it largely. According to Mr. E. Davy, bread, especially that of indifferent flour, is materially improved by the addition of a little carbonate of magnesia, in the proportion of twenty to thirty grains to the pound of flour; it requires to be very intimately mixed with the flour. Salt, which, in small quantity, is absolutely necessary to the flavour of the bread, is used by fraudulent persons as an adulteration; for a large portion of it added to dough imparts to it the quality of absorbing and retaining a much greater quantity of water than it otherwise would, thus making the loaf heavier. The taste of such bread is a sufficient index to its bad quality. It is rough in its grain. (*Domestic Economy*, vol. i.) A long list of other articles which are said to be used in the adulteration of bread might be given, but no advantage could result from such a statement.

Making bread at home is an operation very easy of acquirement; and, doubtless, most of our farming friends are fortunate in possessing worthy helpmates or experienced servants who provide the families with this daily necessary. To such a practical method of performing the art would be deemed needless; but others of our readers, who may not have considered the expediency of this bread, its superior salubrity, its decided economy, and the feasibility of its preparation, may be pleased to meet with the details. We may refer them, therefore, to the *Quar. Journ. of Agr.* (vol. ix. pp. 289. and 583.), a work which is probably in the hands of the greater number of the British farmers; or they may consult with advantage any of the works cited at the end of this article, for our limits will not permit us to go into the particulars. The writer there states, that the addition of potatoes is wholly unnecessary, unless it be the intention of a housewife that her product shall resemble that of the baker in insipidity and whiteness; both qualities will result from the use of that root, which enters largely into the composition of all bread that is purchased. Notwithstanding the prejudice in favour of the use of potatoes, it has been proved, by careful calculation, that although even a third part of the flour be exchanged for potatoes, so immense is the quantity of water which they contain, that the substitute would cause a loss rather than a gain.

Substitutes for wheat flour. — Various substances have been used for bread, instead of wheat. In the year 1629-30, when there was a dearth in this country, bread was made in London of turnips. And again in 1693, when corn was very dear, a great quantity of turnip bread was made in several parts of the kingdom, but particularly in Essex. The process is, to put the turnips into a kettle over a slow fire, till they become soft; they are then taken out, squeezed, and drained as dry as possible, and afterwards mashed and mixed with an equal weight of flour, and kneaded with yeast, salt, and a little warm water. A series of interesting experiments were made some years ago by the Board of Agriculture, to determine what were the best substitutes for wheaten flour in the composition of different kinds of bread. For this purpose, all the sorts of grain, &c. commonly sold in the markets in London were procured, ground into meal, and baked in various proportions into bread; such as wheat, rye, rice, barley, buck-wheat, maize, oats, peas, beans, and potatoes. Many of these form the principal nourishment of mankind in various countries. Buck-wheat, made into thin cakes, is the chief article of food in Bretagne and parts of Normandy. Rice nourishes, probably, more human beings in the East than all other articles of food taken together; and, for its bulk, is supposed to be the most nutritious of all the sorts of grain. Maize is a principal article throughout the south of Europe, and is made into bread in Italy and in America. Peas and beans have rarely, it is believed, been used alone as bread; but, it is suspected, they enter largely, though clandestinely, into its composition in various districts.

To ascertain the respective qualities of all these grains, and to discover their operation on each other, in correcting by means of one the defects of another, would be an inquiry deserving great attention, but it has not yet been experimentally investigated. With almost all the several kinds of grain enumerated, experiments were made on seventy sorts of bread. But as all these sorts were made at once, by several bakers, in order to be examined at the same time, the execution, it is observed, was by no means such as gave the Board of Agriculture, who instituted the inquiry, satisfaction. One general result, however, was, that very few, if any, of the loaves then exhibited, were too bad for human food in times of scarcity; and it may be observed, that though at first a change may prove disagreeable, yet the practice of a few days soon reconciles the stomach to almost any species of food, by which, at least in the same country, other individuals can be supported. These experiments were followed by others, which I will explain under distinct heads.

Rice. — Of all the mixtures, non
made bread equally good with ric
ground, but boiled quite soft, and
mixed with wheaten flour. One thir
and two thirds wheat make good
but one fourth rice makes a bread su
to any that can be eaten, better eve
all of wheat; and as the gain in ba
more than of wheat alone (since ric
tains 85 per cent of starch), there
no doubt of its nutritive quality.
bread thus formed is sweetish to the
and very agreeable; but, as the pro
of gluten is considerably less than in w
bread, it is less nutritive. Exceller
cuits are formed of the mixture.

Potatoes. — The experiments mad
this root were similar. It makes a p
palatable bread with wheat in the
tion of one third, but one fourth still
and better. Specimens of barley a
tatoes, and also of oats and the sam
made into bread, were submitted
Board, which promise well. In som
the potato was not boiled, but merely
down into a pulp and mixed with w
flour, in which mode it made ex
bread. It has been found by other tria
good bread may be made from equal
tities of flour and potato meal, wh
been greatly the practice in those co
most remarkable for the plentiful cul
the potato.

Various experiments have been
combine the meal of wheat, barle
bean, and pea flour with vegetabl
stances, and which have been found
duce very wholesome and nutritive

Using the potatoes after boiling, st
or baking, and reducing them into a
powder, seems, however, to be the
ready method of making them into

Oats.—It appears, from some exper
made by Dr. Richard Pearson of B
ham, that oats answer better mixed w
tatoes, than has been commonly appre

He found that 3 pints (dry meas
fine oatmeal, 3 pints of seconds flo
1 quart of potato pulp kneaded
dough, with a proper quantity of yea
and milk and water, made a bread
cellent quality.

Barley. — Mixed with an equal
tion of wheat, or one fourth potato
three fourths barley, barley bread i
The following method of making b
wheat and barley flour has been s
recommended. To 4 bushels of wheat,
to one sort of flour, extracting only
small quantity of the coarser bra
3½ bushels of barley flour. The oven
be hotter than when bread is made o
alone; and the loaves should remain

two hours or more. The offal of
is good food for hogs. This
rs to be improved by being
f-gallon loaves.

several parts of the kingdom a
rye and wheat is reckoned an
pecies of bread. In Notting-
ven opulent farmers consume
heat, one third rye, and one
; but their labourers do not
s rye is well known to be a
and nutritious grain, its con-
annot be too strongly recom-
he astringent quality of rice,
rye, corrects the laxative qua-
ter, and makes it equally strong
ing with the same weight of
eaten bread. The principal
rye is the circumstance of the
sometimes ergotted, which ren-
ad unwholesome.

n.—The flour of maize or Indian
lf, makes a heavy bread. The
f manufacturing it is to boil the
consistency of paste, and then,
with wheat flour, it makes a
nt bread. If used by itself, it
re at first a laxative effect, but
es by use, and at any rate can
rected by a mixture either of
e. It is stated, on very respect-
ty, as the general opinion of the
f the United States, but more
of the people of Virginia, Mary-
re, and Kentucky, where Indian
d in the largest quantity, and
e greatest variety of uses, that
nutriment is contained in a
lian corn than of wheat. In the
above mentioned it constitutes
ntire food of the labouring class
e, and has supplanted the use of
ad.

several sorts of Indian corn
The yellow flinty corn is
e sweetest and most nutritive.
ground corn of the southern
the fairest, but considerably
flour. Of this last species there
y called the flour-corn, which is
very valuable.

at. — This is not kiln-dried, but
sun, being reaped in October, a
kably dry and serene in America.
taken off by what is called run-
gh the mill-stones. The fari-
of the grain is then easily se-
the husk by winnowing; and,
wards ground fine, forms an
d nutritive aliment, and mây
to bread with wheat flour or
nces.

l peas. — When these are used as bread, in some places the flour is steeped in water to take off the harsh flavour, and afterwards, when mixed with wheat flour, the taste is hardly to be perceived. Specimens of very good bread have been produced, mixed as follows: — 1 lb. bean flour, 1 lb. potatoes, and 4 lbs. of wheat flour. The flour or meal both of beans and peas, by being boiled, previous to its being mixed with wheaten flour, incorporates more easily with that article, and is probably much more wholesome than it otherwise would be.

Bran may in times of scarcity be advantageously employed in the making of common household bread; this is effected by previously boiling the bran in water, and then adding the whole decoction in the dough; thus the bran will be sufficiently softened and divested of its dry husky quality, while the nutritive part, which is supposed to contain an essential oil, is duly prepared for food. It is asserted, that the increase in the quantity of bread, by the addition of one fourth bran, or 14 lbs. 14 oz. of bran to 56 lbs. of flour, is from 34 lbs. to 36 lbs. of bread, beyond what is produced by the common mode.

Dr. Davison considers that there are many vegetables which would afford wholesome nutriment either by boiling or drying and grinding them, or by both these processes. Amongst these may be reckoned, perhaps, the tops and bark of gooseberry trees, holly, hawthorn, and gorse. The inner bark of the elm may be converted into a kind of gruel; and the roots of fern, and probably those of many other plants, such as some of the grasses, and clovers, might yield nourishment, either by boiling, baking, and separating the fibres from the pulp, or by extracting the starch from those which possess an acrid mucilage, such as the white bryony. If, in these days of improved chemical knowledge, a quartern loaf of *very good bread* can be made out of a deal board (see *Quart. Rev.* No. civ., quoted also in *Quart. Journ. of Agr.* vol. v. p. 626.), there is no reason why many of our native herbs and shrubs, which are now comparatively useless, should not, as their various nutritive properties become better known, be turned to considerable advantage in the production of a greater or less proportion of cheap and wholesome food. There are many other substances which may be formed, by a proportionate admixture of wheaten flour, into palatable bread, and advantageously employed in the manufacture of this indispensable article of human sustenance. (*Brande's Dict. of Science and Art; M'Culloch's Com. Dict.; Penny Cyc.* vol. v.; *Willich's Domes. Encyc.*)

BREAKING. (Goth. *brikan*; Sax. bpeccœn.) In rural economy, the bringing of an animal under subjection. The breaking of a colt is commonly, especially for race-horses, commenced when he is much too young; for this, as for all other breeds of horses, too much caution and gentleness can hardly be used. (Darvill, *On Training*.) Of dogs, spaniels should begin to be broken in at five or six months old. The water spaniel, according to old Markham, as soon as "even when you first weane him;" and, according to Blaine (*Encyc. of Rural Sports*), the education of a pointer or a setter should commence at five or six months.

BREAKING UP. A term that is often applied to such lands as are ploughed from leys, or which are cut or pared for the purpose of being burned.

BREAM. (Fr. *brame; Cyprinus latus.*) An English fresh-water fish, breeding both in rivers and ponds, and very rapidly in some waters. Eyes large, narrow sucking mouth, two sets of teeth. The French esteem this fish highly; and, according to Dugdale (*Hist. of Warwick*, p. 668.), in the 7 of Henry V., one was valued at 20*d.* The best part of the bream is the belly and head. The baits to catch bream are paste made of brown bread and honey; gentles, or the young brood of wasps, hardened in an oven or dried on a tile before the fire to make them tough; or a grasshopper with his legs nipped off in June or July, or a large red worm. (*I. Walton's Angler*, c. x.)

BREAST-PLATE. The strap of leather that runs from one side of the saddle to the other over the horse's breast, in order to keep the saddle tight, and hinder it from sliding backwards.

BREAST-PLOUGH. A small plough, contrived so that a man may easily shove it before him. It consists of a cutting-iron about eight or nine inches long, having one of its sides turned up to cut the turf. This iron is fixed to a pole bending upwards, about five or six feet long, and forked at the upper end, having a crutch, or cross handle, mortised into the forks. Against this crutch the ploughman places his breast, and shoves the plough forwards, in order to turn up the turf, its principal use being for cutting up the surface of the ground in paring and burning, or burn-baking.

BREASTS. Part of the bows of a saddle.

BRECK. A provincial word applied to a breach or gap in a hedge. It is sometimes written *brack.*

BREED. (Sax. bpæban.) A sort or variety of any kind of live-stock. The breeds of most domestic animals are numerous, and distinguished by certain invariable marks or appearances peculiar to each, as in Cattle, Sheep, Horses, and Swine. See these different heads.

BREEDER. In agriculture, a f
who is much employed in breeding and
ing animals of any of the domestic kin

BREEDING IN AND IN. The b
ing from close relations. "This plan,
Professor Youatt (*Cattle*, p. 525.),
many advantages to a certain exten
may be pursued until the excellent
and quality of the breed are develope
established. It was the source w
sprung the fine cattle and sheep of
well, and the superior cattle of Colling
disadvantages attend breeding 'in a
and to it must be traced the speedy
neracy, the absolute disappearance
new Leicester cattle, and in the ha
many an agriculturist, the impairme
constitution and decreased value o
new Leicester sheep and the short-h
beasts. It has therefore become a
of principle with the agriculturist to
some change in his stock every seco
third year: and that change is most c
niently effected by introducing a ne
or ram. These should be as nearly a
sible of the same sort, coming from a
lar pasturage and climate, but possess
relationship, or at most a very distan
to the stock to which he is introdu
These remarks apply to all descri
of live stock. In cattle, as well as
human species, defects of organisati
permanent derangements of function
and are handed down when the rela
is close. In Spain the deformed an
state of the aristocracy arises fro
liances being confined to the sa
whilst in England, which can b
finest aristocracy in the world, th
classes are improved by constant
being formed with the daughters o
classes, where wealth has been accu
See the heads, Cattle, Horse, S

BREEDING-PONDS. Such
are employed for breeding fish.
lities of a pond, to make it profi
breeding fish, are very different f
which are sufficient for the feeding
inasmuch as some particular po
only for one of these purposes, a
for the other; and scarcely ever
pond is found to answer for both.
neral, it is much more rare to fin
breeding-pond than a good feedi
The indications of a good breedin
are these,—a considerable quantity o
and grass about its sides, with gr
shoals, such as horse-ponds usually
The spawn of fish is prodigiously
in quantity; and where it succeeds,
fish is able to produce some millions. T
in one of these breeding-ponds, two or
melters, and as many spawners, will,

stock the whole country.
nds are not meant entirely
t the owner wishes to have
o some size in them, the
in their numbers; for they
starve one another. It may
to put in other fish that will
oung, and thin them in the
r. Eels and perch are the
is account, because they prey
e spawn itself, but upon the
the first hatching to the time
siderable size. Some fish are
ed indifferently in all kinds of
nature are the roach, pike,

The process of obtaining
solution from malt, or other
onverting this solution into
ors, ale, porter, or beer.
doubt of the antiquity of this
ptians are said to have been
f beer. The early Germans,
forefathers, were as fond of
odern citizens of Lubec and
ow, or the English of all ages.
ecessary, in this work, to go
the description of a process
ountry persons understand so
rections may be divided into
1. The grinding of the malt:
s, as in many other parts of
iderable difference of opinion;
it ground between stones,
ed by rollers; some prefer a
thers a coarse one. 2. The
ually performed in a vessel of
a false bottom pierced full of
s bottom the malt is laid; the
admitted, which, for pale ale,
, should be of the temperature
to 185°, according to the quan-
the heat being increased as
nishes. For porter, not higher
r lower than 156°. For the
, an increased temperature of
ll be advisable. For the first
ery quarter of malt, a barrel
f water may be used, and the
xed with the water. The mash
to rest for some time, and
to run off into an ,auder-
it is pumped into the boiler,
raised to the boiling tempera-
the wort is sufficiently drained
h-tub, another portion of hot
d for a second mash. The
added, and the boiling is com-
in general requires an hour
r until the wort breaks bright
when a sample is taken from
The wort is let off into coolers,
or iron; where, when sufficiently cooled, or else in proper fermenting tuns, the yeast or barm is added. The fermentation speedily begins; and when it is thought that a sufficient quantity of alcohol is formed, the fermentation is stopped, and the yeast is separated by running it into smaller vessels, and skimming off the barm; or else by allowing it to run off from the bung-holes of the casks, which are, for this purpose, kept completely filled. A small portion of salt is commonly added, and occasionally, especially by the professional brewer, a portion of isinglass or other finings. In all these operations, cleanliness is a most essential part, for without this it is impossible to have good beer.

The quantity of hops to be added varies with the quality of the beer. 4 lbs. to the quarter of malt is sufficient for beer for present use, and from this to 28 lbs. have been used for beer for long keeping, as for exportation, &c.

The temperature of the fermentation should range between 56° and 62°. Not more than 60° for ale worts, nor more than 62° for porter. Great care should be taken to have good, sound, healthy, and new yeast, —and of this about 2 lbs. per barrel are commonly needed. Good malt and hops, of course, are requisite; but the quality of the water is not of so much consequence as is very often considered to be the case. Some of the best ales in England are brewed either with soft or with hard water, and from rivers, or springs, or ponds. From those issuing from the limestones of Nottinghamshire, the chalks of Dorsetshire, the clays of Staffordshire, the gravels and sands of Surrey and Middlesex, is made some of the most excellent beer in the United Kingdom. The quantity of alcohol, upon an average, in brown stout is about 6·80, in ale 8·88, and in small beer from 2 to 3 per cent. (*Brande.*) Beer came under the excise in the year 1643, but the duties were repealed in 1830. The exportation of beer from this country was in—

		Tuns.
1830	- -	10,212
1832	- -	11,330
1834	- -	10,406

The specific gravity of the wort, when it is placed in the fermenting vessels, varies from 1·060, when it contains 14·25 per cent. of solid matter, to 1·127, when it contains 28·2 per cent. That of small beer varies from 1·015 to 1·040, the first containing about 3·5 per cent. of solid matter, the latter about 9·5 per cent. The chief use of the hops (ground ivy and other herbs were used by our Saxon ancestors for this purpose) is to communicate the peculiar bitter flavour from the oil which is contained in them;

partly to hide the sweetness of the saccharine matter, and partly to counteract the tendency which wort has to run into acidity. (*Thomson's Chem.* vol. iv. p. 376.)

"Hops," says Dr. Lardner (*Domestic Economy*, vol. i.), "are by no means the only bitter which may be made use of for preparing and flavouring ales; others can be much more conveniently procured in certain situations. Mixtures, in various proportions, of wormwood, powdered bitter oranges, gentian root, and the rind of Seville oranges, will afford an excellent bitter, perhaps more wholesome than hops, and, if skilfully combined, to the full as palatable; in this position the brewers cannot refuse to bear me out." Strasburg beer, which is much prized on the continent, owes much of its excellence to the use of avens (*Geum urbanum*). It has been shewn by Mr. Dubrunfault, that a good beer can be produced from potatoes grated to a pulp, mixed with barley malt. In Ireland, beer is made from parsnips. Cane sugar answers admirably (14 lbs. of cane sugar, dissolved in 10 gallons of boiling water, with 1½ lbs. of hops). The beer made in this way is pale coloured, it is true; but colour may be given readily by scorched treacle, or the raspings of an over-baked loaf. (*Quart. Journ. of Agr.* vol. ii. p. 634.) Beer "which would not disgrace a nobleman's table" has also been made from mangel wurzel 150 lbs., and 1 lb. of hops in 16 gallons of water. (*Mechanic's Mag.*) It may also be made from the seeds of the Fiorin grass (Donovon, *Domestic Economy*), Indian and other corn. (*Baxter's Lib. of Agriculture.*)

BRICKS are building materials often employed by the farmer for the construction of drains, besides the ordinary purposes, for which they answer very well; but they are more expensive than draining tiles, which see. By the 17 *G.* 3. *c.* 42., under a penalty of 20*s.*, and 10*s.* per 1000, all bricks made in England for sale shall be 8½ inches long, 4 inches wide, and 2½ inches thick; and all pantiles 13½ inches long, 9½ inches wide, and ½ an inch thick. If the farmer wishes to make his own bricks, the London plan is to mix 50 chaldron of coal ashes, or breeze, with 240 cubic yards of clay, which makes 100,000 bricks; and to burn these, 15 chaldrons of coarse sifted breeze are required. The soils called brick earths vary much in their composition; they contain alumina in different proportions. Potters' clay is perhaps the richest in that earth, being composed, according to M. Vauquelin, (*Bull. Phil.* xxvi.) of—

	Parts.
Silica (flint) - -	43.5
Alumina - -	33·2
Lime - - -	3·5
Oxide of iron - -	1·0
Water - - -	18·0
Loss - - -	0·8
	100·0

BRIDLE. A contrivance made of or thongs of leather, and pieces of i order to keep a horse in subjectio direct him in travelling. The severa of a bridle are, the bit or snaffle; the stall, or leather from the top of the h the rings of the bit; the fillet, o forehead and under the fore-top; the band, which buckles from the hea under the throat; the nose-bands through the loops at the back of th stall, and buckled under the chee reins, or long thongs of leather th from the rings of the bit, and, be over the horse's head, the rider hol hand.

BRIDLE-HAND, is the horsem hand; the right being called the sword hand; and that in which the wh

BRIDON. A sort of snaffle, wi slender mouth-bit, without any b They are much used in this country sometimes written *Bridoon.*

BRILLS. In horsemanship, a name for the hair growing on the eye-lids.

BRIM. A term applied to a sow she goes to the boar, which is called to brim. It is sometimes written *Bri*

BRINING OF GRAIN, is the pr of steeping it in pickle, in order to vent smut or other diseases. The st made with common salt and wat sufficient strength to float an egg; sea-water, with salt added to it till i the requisite strength. The seed is put into it, and well stirred about: th grains rise to the surface, and are sk off; the rest is put upon a sieve to and new-slaked lime sifted upon it: being carefully mixed, and when a dried, it is put into the earth. Urine, kept stale, is used in the same manner if the seed be sowed directly, with effect. Brining the seed wheat is com believed by the farmers to be a prev of smut, a disease which has been sho Sir Joseph Banks to be a parasitical f Recent experiments have suggested may even be of use, when employed in quantities, as a preventitive of mil the most dreadful of the numerous d to which the cultivated grasses are ex The experiments of the late Rev. E. wright strongly evidence, that whe

are sprinkled with a brush upon
lants, it is actually a complete
in apparently the most desperate
he proportion, one pound to a
water, laid on with a plasterer's
operator making his casts as when
orn: it is instant death to the
but it also destroys some plants.
and expense are trifling. It ap-
in the course of some inquiries
the Board of Agriculture, that a
farmer, Mr. Sickler, and also the
Hoblin, were accustomed to employ
lt as a manure, and that their *crops*
er infected with the rust or blight.
ner may see most of the authorities
l together on this important fact in
, *On Salt*, p. 50. If potatoes are
d in a solution of ammoniacal water
or five days (one ounce of the com-
quor ammoniæ to a pint of water),
ll have, according to Mr. Webster,
egetative power completely checked
royed, and may be in this way pre-
throughout the year, without the
jury to their general qualities — the
ffect is produced by immersing them
rong brine. This merely requires
quent ablution, and repeated changes
er. (*Quart. Journ. of Agr.* vol. vii.
)

STLE-FERN, *Short-styled.* (*Tri-*
ne brevisetum.) A perennial rare
plant, growing in watery places, or
rocks, flowering in May or June.
Eng. Flora, vol. iv. p. 325.)

TLES. (Dut. *borstels*; Ger. *borsten.*)
ng glossy hairs growing upon the
he wild boar and the hog. Those
e of brush-makers, saddlers, shoe-
c., are imported to a very con-
extent from Russia, those of the
eing the best. At an average of
rs ending with 1831, says Mr.
, the entries for home consump-
nted to 1,789,801 lbs. annually.
ain a considerable quantity of
hich may be separated from them
water.

LE HOOF, is an affection of
hoof, very common, especially in
this country, from bad stable
t. A mixture of one part of oil
l two of common fish oil, well
the crust and the hoof, will re-
natural pliancy and toughness of
nd very much contribute to the
of its growth. (Youatt, *On the*
82.)

MEDIA. Common quaking
ies' tresses: a perennial grass,
n May and June. It is distin-
the panicle of short spikelets, tinged with purplish brown. The spikelets are ovate, on very slender stems, which makes the panicle tremulous. This grass, says Sinclair, is best fitted for poor soils; its nutritive powers are considerable, compared with other grasses tenanting a similar soil. It is eaten by horses, cows, and sheep; and for poor sandy and tenacious soils, where improvements in other respects cannot be sufficiently effected, to fit them for the productions of the superior soils, the common quaking grass will be found of value. From a poor sandy soil, destitute of manure, the produce of this grass per acre, at the time of flowering, is 10,890 lbs., containing nutritive matter 453 lbs. From a moist unmanured clayey soil, the produce was, at flowering time, per acre, 8167 lbs., and the nutritive matter 293 lbs. From a rich black loam the produce, under similar circumstances, was 9869 lbs. of grass, and 462 lbs. of nutritive matter. (*Hort. Gram. Wob.* p. 206.)

BRIZE LANDS. A provincial term for lands which have remained long without tillage. *Brize* is also a name for the gad-fly, used commonly in the days of Shakspeare and Ben Jonson. (*Tr. and Cress.*; *Poetaster*, iii. 1.)

BROAD-CAST SOWING. The primitive rapidly diminishing method of putting grain, turnip, pulse, clover, grasses, &c. into the soil, performed by means of the hand. This mode of sowing seems better adapted to the stony and more stiff kinds of land than that by machines; as in such grounds they are liable to be constantly put out of order, and to deposit the seed unequally. In this way, however, the seeds are scattered over the ground, and not confined in regular rows, as is the case with the drill husbandry, which is in several ways more advantageous to the farmer. This mode of sowing, perhaps from its being that made use of in the infancy of agriculture, has often been called the *old method.*

In this method of sowing, the usual practice, especially where the ridges are equal in breadth, and not of too great a width, as five or six yards, is that of dispersing the seed regularly over each land or ridge, in once walking over; the seedsman, by different casts of the hand, sowing one half in going, and the other in returning. In doing this, it is the custom of some seedsmen to fill the hand from the basket or hopper, which they carry along with them, as they make one step forward, and disperse the seed in the time of performing the next; while others scatter the seed, or make their casts, as they are termed by farmers, in advancing each step. It is evident, therefore, that in accomplishing this business with regularity and exactness, upon which much of the success of the crop must depend, there is considerable difficulty, and the proper knowledge and habit of which can only be acquired by experience. This, however, by long practice is done with surprising regularity and precision. The broad-cast system not only requires more seed, but it renders the hoeing, so essential to the most profitable growth of corn, much more difficult. Machines have been invented for distributing the seed broad-cast, which they perform with perfect precision: these are more especially useful for the grass seeds, and are simple and economical; a plate of one may be seen in Professor Low's *Prac. Ag.* p. 108., and another in *British Husb.* vol. ii. p. 14. These, however, require some attention in their working, to prevent the clogging of the seed.

BROADS. A provincial word applied to lakes or broad portions of water.

BROAD-WHEELED WAGGON. A four-wheeled carriage, in which the parts of the wheels that act upon the road are of considerable breadth. By the acts 3 *G.* 4. c. 126. *s.* 12., and 4 *&* 5 *W.* 4. *c.* 81., waggons, wains, and other four-wheeled carriages, whether on springs or not, whose wheels have their fellies of not less than four and a half inches at the bottom or soles, are considered to be broad-wheeled.

BROCCOLI. (*Brassica oleracea botrytis.*) The varieties of this cabbage are now numerous, and are chiefly the fruits of the great attention which has been paid to its cultivation of late years. For an uninterrupted supply, scarce any of these varieties can be dispensed with; but the purple and white are those most generally cultivated. With respect to their quality, it has been remarked that they have less of the peculiar alkalescent taste, and are more palatable, in proportion as they approach a pale or white colour. (*Transact. Hort. Soc. Lond.* vol. i. p. 116.)

1. Purple Cape, or autumnal broccoli. 2. Green cape, or autumnal broccoli. 3. Grange's early cauliflower broccoli. 4. Green, close-headed winter broccoli. 5. Early purple broccoli. 6. Early white broccoli. 7. Dwarf brown close-headed broccoli. 8. Tall large-headed purple broccoli. 9. Cream-coloured, or Portsmouth broccoli. 10. Sulphur-coloured broccoli. 11. Spring white, or cauliflower broccoli. 12. Late dwarf close-headed purple broccoli. 13. Latest green, Siberian, or Spanish broccoli.

Broccoli is propagated by seed. As all of the kinds are not generally at command, the following times and varieties are specified as being those employed in general practice, and by which a supply nearly unfailing is
accomplished. A first sowing ma
under a frame at the close of Ja
a second at the end of Februar
in March, on an eastern wall-bor
purple Cape and early cauliflowe
for production at the close of su
during autumn; the seedlings
sowings are respectively fit fo
out, if that practice is followed,
and early in April, and for final
the close of the latter month and
April, another crop of the sam
may be sown, for pricking out in
planting in June, to produce at
autumn and in early winter. I
middle of May, a fourth and large
any of the preceding, of the ea
and white varieties, to be prick
June and planted in July; and
last open-ground crop may be sow
to be pricked out in the succeedi
and planted in August and Septe
plants will follow from the othe
cession throughout winter and
a frame, however, they may be
the cauliflower, in the last days
to remain until the following M
then planted out for productio
summer. By these repetitions, w
a family, should be small, an almos
supply is afforded; but in gene
mestic use, especially if the estab
small, three sowings of moderate
be sufficient; the first in the seco
April, the second in the third we
and the third in the middle of
frame. Each variety should be
rately, and the sowing performe
beds not more than three or fou
for the convenience of weeding,
be performed as often as weeds
they are very inimical to the gro
vegetable. The seed must not
more than half an inch; and t
netted over to keep away the bi
especially in showery weather, a
structive. The fitness of the
pricking out is intimated by th
five or six leaves, rather more th
in breadth; they are set four or
apart each way, and water given
until they have taken root.
have four or five weeks' growth
are again moved; or not until
leaves nearly three inches in brea
planted out, they must be set on
two feet asunder each way; in
little wider, in winter rather clos
to be given at the time of plantir
casionally afterwards until they
blished; during the droughts of
may be given plentifully with t
advantage. They must be hoe

that when the crop sown about
ird week in May has been planted
weaker plants which remain should
ight or ten days to acquire strength,
en planted in pots (sixteens), filled
ry rich compost; to be shaded, and
until struck. These are to be
in the ground at similar distances
ain crops, and about three inches
e surface, so as to form a cup for
water round each; these cups are
by the necessary earthings, which
pressed firmly down to prevent the
ening them. A few of the plants
flower early, and, to guard against
rosts, must have the leaves broken
: but on the approach of settled
ecember or January, the pots must
up and removed into a frame, shed,
lace of shelter from the extreme
f the weather; but to have air
. (*Tra. Hort. Soc. L.* vol. i. p. 118.)
crops which have to withstand
in the open ground, salt is bene-
plied, as it preserves them from
ed in the neck, and also their roots
worm-eaten; which may also be
r. Mackay of Errol House, N. B.,
, by pouring soap-suds between
which application is also very
o the plants. (*Mem. Caled. Hort.*
p. 275.)

erve the winter standing crops
uction by severe weather, it is
tice, early in November, to take
njuring the roots as little as pos-
to lay them in a sloping direction
, with their heads to the north.
tion of this plan, adopted by the

For the production of seed, such plants of each variety must be selected, in March or April, as most perfectly agree with their peculiar characteristics, and are not particularly forward in advancing for seed. As the stems run up, some gardeners recommend the leaves to be taken away; but this must be injurious. Mr. Wood of Queensferry, North Britain, is particularly careful that no foliage appears on the surface of the flower: he always lifts his plants, and plants them in another bed, watering abundantly; as this, from his long experience, he finds, prevents their degenerating, or producing *proud seed;* and when the head begins to open, he cuts out its centre, and leaves only four or five of the outside shoots for bearing. The sulphur-coloured he always finds the most difficult to obtain seed from. (*Mem. Caled. Hort. Soc.* vol. ii. p. 266.) As the branches spread, four or six stakes should be placed at equal distances round each plant, and hooped with string, to support them and prevent their breaking. When the pods begin to form, water should be given repeatedly, and occasionally some thrown over the whole plant, which tends to prevent mildew. Before the pods begin to change colour, those from the extremity of every shoot must be taken away; as these yield seed which produce plants very apt to run to seed without heading, and by an early removal the others are benefited. The branches ought to be gathered as soon as the pods upon them ripen. Varieties must never be planted near each other, or they will reciprocally be contaminated. The seed ripens in August or September; and it is often recommended to preserve it in the pod until warm water. In bad cases a veterinary surgeon is absolutely necessary, who will examine with his probe, and apply bandages, and even, in need, the hot iron.

BROKEN-WIND, in horses, is, says Professor Youatt, the rupture, dilatation, or running together of some of the air cells,—the inspiration by one effort, and the expiration by two; and is thus easily distinguishable from thick wind, in which the inspirations and the expirations are equal in amount. In healthy lungs, when the lungs are expanded, the air will rush in easily enough, and one effort of the muscles of expiration is sufficient for the purpose of expelling it; but when these cells have run into each other, the cavity is so irregular, and contains so many corners and blind pouches, that it is exceedingly difficult to force it out again, and two efforts are scarcely competent fully to effect it. A dry husky cough accompanies this disease, of a peculiar sound. Broken wind is usually caused by smart exercise on a full belly. We do not, therefore, find broken-winded horses on the race course; for, although every exertion of speed is required from them, their food lies in a small compass; the stomach is not distended, and the lungs have room to play; and care is taken that their exertion shall be required when the stomach is nearly empty. Carriage and coach horses, from a similar cause, are not often broken-winded. The majority of broken-winded horses come from those for whose use these pages are principally designed; the farmer's horse is the broken winded horse, from being fed on bulky food; and because, after many hours' fasting, the horses are often suffered to gorge themselves, and then, with the stomach pressing upon the lungs, and almost impeding ordinary respiration, they are put again to work, and sometimes to that which requires considerable exertion. But the pressure of the distended stomach upon the lungs is sufficient to do this, without exertion; many a horse goes to grass or the straw-yard sound, and returns broken-winded. The cure of a broken-winded horse no one has witnessed, yet much may be done in the way of palliation; the food should consist of much nutriment in little compass; the oats should be increased, and the hay diminished; occasional mashes will be found useful; water should be given sparingly except at night, and the horse should never be exercised on a full stomach. Carrots are excellent food for him. (*The Horse; Lib. of Useful Know.* p. 195.)

BROMUS. The brome grasses; a genus of which the chief species are as follows:—

Bromus arvensis, taper field brome grass, has a spreading, drooping, compound panicle, with lanceolate, sha
lets. Each spikelet consis
cated, smooth florets, wi
at each side. The leaves
whole plant about three
confined to rich pasture
while the next two, *Brom*
Bromus mollis, known by
soft and downy, abound
exhausted grass lands: the
The farmer considers t
grasses: the field brome g
fords an early bite in the
and lambs; it does not ex
roots do not extend to an
which it sheds, readily and
and yield food; and it wi
well: it flowers on the sec
gust. At the time of flow
of its grass grown on a sa
is 23,821 lbs.; of nutritive

Bromus diandrus, uprig
grass. Produce per acre,
loam, at time of flowering
tritive matter, 957 lbs.

Bromus erectus, upright
grass. The produce, at the
from a rich sandy soil, 12,
nutritive matter, 555 lbs.
chalky soils.

Bromus inermis, smoot
grass. When flowering, fro
sandy loam, is obtained of
lbs.; of nutritive matter, 6

Bromus littoreus, sea-si
from a clayey loam, when
tained per acre of this gr
nutritive matter, 973 lbs.

Bromus mollis, soft bro
sandy loam, when flower
tained of this grass 10,890
matter, 510 lbs.

Bromus multiflorus, man
grass (named from the spi
from ten to fifteen florets
per acre of this grass, whe
a sandy loam, is 22,460 lbs
ter, 1754 lbs.

Bromus sterilis, barren b
produce per acre, from a s
ering time, is 29,947 lbs.; of
2339 lbs.: it grows princip
in the shade; cattle refuse

Bromus tectorum, noddin
grass. Produce from a
7486 lbs.; nutritive matter

These were all examine
by Sinclair, but he had
opinion of them as field
Gram. Wob.)

BRONCHITIS. A dis
is, says Professor Youatt, a
beyond the entrance of the l

harder breathing than catarrh,
eezing, coughing up of mucus.
moderate bleeding, chest blis-
alis. Neglected bronchitis often
k wind. (*On the Horse*, p. 189.)

MARES. Mares generally com-
ding at three or four years of age.
ence at two years, which is much
A mare will, if only moderately
ntinue to breed till nearly twenty.
at in the early part of the spring;
bout eleven months in foal; but
considerably, some have been
foal four or five weeks before this
s five or six later. In race horses,
ge is calculated the same, whe-
born in January or May. It is de-
t the mare should go to the horse
possible. But in ordinary cases
best month; for then the mare
period when there is an abundance
ural food.

KLIME. (*Myositis palustris.*)
loves shallow streams and wet
ke the water-cress, which it re-
taste. It flowers and seeds in
y, and August. Brooklime is
its thick stalk, roundish leaves,
es of small bright blue flowers.
about a foot in height, and it
at the lower joints, and the roots
The leaves are broad, oblong,
ented, round at their edges, and
point, to use an Irishism. The
d singly upon short foot-stalks,
nother, forming a sort of loose
klime possesses slight medicinal
t it should be used fresh, as it
perties when dried. It is often
ds, which is a pleasant mode of
g it; but its flavour is in any
nd agreeable.

WEED. (*Samolus valerandi.*)
ernel. Grows in watery situa-
ravelly soil. It is found also in
Wales, and other parts of the
ith's *Flora*, vol. i. p. 323).

(the *Spartium scoparium* or
arius of botanists). An ever-
hed shrub, native of sandy soils
Europe. The broom, with its
flowers, blooming from April
tough stalks, and flat hairy pods,
wn on all barren and waste
wing abundantly in dry gravelly
fields, and is often admitted
ries, for its delicate blooms and
arance. It is sown extensively
try as a shelter for game. Its
ich are tough, are made up into
hich they have given their name.
stalks and tops of brooms are
employed. They have a bitter nauseous taste, and a peculiar odour when green. The green twigs, when burnt, yield a large quantity of carbonate of potash, and several other salts. Broom tops, administered in strong infusion, are emetic and purgative: in smaller doses they are diuretic; and as such have been long employed to excite the action of the kidneys in dropsy; but its efficacy depends on the nature of the dropsy, and its cause. When inflammation is present, broom tops do much harm; and, therefore, like other remedies, its use should not be entrusted to non-professional persons. It may be useful to know that its action is promoted by dilution.

BROOM-RAPE. (*Orobanche major.*) This is a parasitical plant which is found amongst the red clover; "meaning perhaps," says Mr. Main, "a robber of broom, from its being frequently found on waste grounds growing on the roots of the common broom, and in fields on the roots of clover. In its first appearance it resembles the roots of asparagus, just as they break through the ground; the stems rise from 6 to 10 inches high, and without proper leaves, having what are called bractes instead. The flowers are arranged on the stem like those of a hyacinth, but not so showy, being of a dingy brown colour, succeeded by oblong capsules of seeds. A straggling individual plant is sometimes met with amongst ley-wheat feeding on a clover plant, which has escaped destruction by the plough and harrow at wheat sowing; but it never appears again until the field is sown with clover. From a note by Mr. Rham, quoting *Von Aelbrock's Agriculture of Flanders*, p. 283., it would seem that the minute seeds of the broom-rape, which can hardly be observed with the naked eye, exude a glutinous substance, by which they adhere to the seeds of the clover, and with which they are in consequence often sown. (*Journ. Roy. Eng. Ag. Soc.* vol. i. p. 175.) Orobanche is a powerful astringent, and might be advantageously used in chronic diarrhœas.

BROOM, SPANISH. (*Spartium junceum.*) A handsome shrub, now common in England. Its fragrant yellow blossoms appear in July; and Miller says, in cool seasons, it will keep blowing until September. It loves a sheltered situation. If raised by seed, sow it as soon as it is ripe, in a shady bed of common earth, kept free from weeds. Plant out the seedlings the following autumn. The white Spanish broom (*Spartium monospermum*) is more tender; therefore it should be sheltered during the winter. It grows well in shrubberies not exposed to a hot sun. Raised from seed. Phillips recommends the Spanish broom for shrubberies, from its long continuance in bloom, from July to

October; and he adds, the common broom (*S. scoparium*) may as judiciously be placed at the foot of towering trees, where it will shine as gay in the gloom as a cypress fire in a forest. (*Shrubbery*, vol. i. p. 151.)

BROWN BENT. See AGROSTIS.

BRUISE. (Sax. bꞃẏꞅan; anciently written *brise*, or *brese.*) An injury caused by the percussion of something blunt or heavy. Bruises of cattle or horses are best treated by cooling remedies, and by bleeding. For a lotion, one ounce of turpentine, one ounce of Goulard's extract (vinegar and sugar of lead), one ounce of spirits of wine, one pint of strong vinegar. Bathe the part affected two or three times a day. A bruise of a horse's foot is best treated by bleeding at the toe, and by poultices. (*Clater*, p. 318.)

BRUSH. (Fr. *brousse.*) A provincial word applied to stubble, as wheat or oat brush.

BRUSHWOOD. Rough, close, shrubby thickets. Small wood for fireing is sometimes called brushwood. Dr. Johnson almost fancies it is derived from *browsewood*, or low wood, on which cattle browse, an use of much more importance in northern countries to the stock owner than with us. Plantations of brushwood might very generally be turned to a more valuable account than they are at present. "For in many districts," says Dr. Singer, "large tracts of land are occupied with brushwood in such a way as to be unsightly to the eye, and almost useless to the persons concerned in the soil. Nor is this all, or even the worst part; for it is frequently in good lands, and sometimes in soils that, by due attention, might become almost the best on the respective estates, that this useless brushwood appears; affording perhaps a little shelter, but, at the same time, occupying so much of the soil, as to leave it incapable of producing much grass for use to stock, and to prevent all improvement." (*Trans. of High. Soc.* vol. i. p. 137. See also Mr. Blakie on the same theme, *Ibid.* p. 360.)

BRYONY, BLACK. (*Tamus communis.* Gr. βρυω, I grow rapidly.) This is a wild native plant, and climbs like the white bryony; but it wreathes its stalk around the bushes, having no tendrils. The stalk also runs fifteen feet in length. The leaves are broad, shaped like a triangle, smooth, polished, and of a black green colour. The flowers and berries resemble the white bryony.

BRYONY, WHITE. (*Bryonia dioica.*) This plant, with its tendrils and leaves, somewhat resembles the vine, and clings like it around the trees and bushes in its progress. It grows in many parts of England under hedges and thickets. The leaves are hairy
and broad. The flowers sm
greenish white colour, blowi
till August. The berries are
of seeds. The root is large
white, and the stalks from ten
in length. The root contains a
principle, which has been te
The root is poisonous, being
emetic and purgative, produc
resembling those of cholera.
herbalists under the name of
Many ignorant persons have b
by the employment of bryony
eases in which it is said to be
herbals. Decoctions made wi
of the fresh root are purgati
This is a powerful medicine
be given cautiously in small
cattle.

BUCK. The male of th
rabbit, &c.

BUCK-BEAN. (*Menyanth*
This is a beautiful wild flo
serving of cultivation. It
habits turbaries, and marshy
garden it will live for many ye
in a pot filled with peat eart
sphagnum or bog moss, and
pan of water; or better still,
in rich soil, where it can be
water from a pond or tank.
a beautiful, but a valuable gift
—for it possesses powerful e
medy against the fevers preval
districts. (*Gardener's Chronic*
ing, in speaking of this plant,
sessed of powerful medicinal
infusion of the leaves is ext
and is prescribed in rheumati
sies; it may be used as a subst
in making beer, and is emplo
gative for calves. It is easil
possessing a very singular ap
grows a foot high; the leaf-st
the roots, and upon each stal
large oblong leaves, somewh
the garden bean leaves. The
selves are round, thick, and
flowers are small, white, with a
of purple, and hairy inside.
together, forming a short, thi
stand upon thick, round, whiti
stalks. The root is long, thi
whitish colour. Buck-bean
be gathered before the flower
and dried. Their powder, tal
any liquid, is excellent for rh
ague.

BUCK-HEADING. A
applied to the cutting hed
fence-height.

BUCKHORN. See STAR O

BUCK HUNTING. "In

ays Mr. Blaine, "the hunting of a
leer, whether male or female, is said
buck hunting." This, according to
hafing, in the reign of James II., was
ly practised after dinner; it was so
able, and so generally delighted in at
eriod, that even the judges on the
were accustomed to partake in it.
's Field Sports, p. 435.)
CKLE-HORNS. A provincial name
ort crooked horns turning inward in
ontal manner.
CK-STALLING. A provincial term
d to the operation of cutting hedge-
, fence-height, &c.
CKTHORN, ALDER. See Berry-
NG Alder.
CKTHORN, COMMON. (*Rhamnus*
ticus.) A hardy indigenous prickly
, common in hedge rows; flowering
y, and ripening its fruit in September.
eaves have strong lateral nerves, are
, toothed, with linear stipules; the
rs are yellowish green, and are suc-
d by a black berry, which is glossy,
he size of a large pepper-corn, con-
g three or four seeds, and a violet red
The bark is glossy and dark-coloured.
shrub likes a sheltered situation, and
eds in any soil. It is propagated by
layers, and grafts. The juice of the
e berries is a deep green dye, if boiled
a little alum. The juice contains a
tive principle, which enables it to
e as a powerful cathartic; but its
is accompanied with much griping
rst. It was formerly often used as
stic purgative; but the frequent
of its action has caused its disuse.
, in his *Herbal*, published in 1619,
following account of its medicinal
of good sense, and applicable at
nt time: — "They be not meete
istered, but to young and lustie
the countrie, which do set more
eir money than their lives."
THORN, SEA. See Sallow-

WHEAT. (Germ. *buchweizen*.)
of a particular species of grain,
for the sake of their seeds, there
ecies cultivated in Europe—1. the
uckwheat (*Polygonum Fagopy-*
he Tartarian buckwheat (*P. ta-*
nd another in China and Tartary
inatum). A new kind of buck-
wn to the peasants of Germany
ame of *Le blé d'Italie sauvage*,
y prefer to the common buck-
ause it is more productive, hardier,
hiter and more savoury meal, is
in the *Bull. des Scien. Agr.*, *April*,
art. Journ. Agr. vol. iii. p. 368.) Its

flower is said to be deeper-coloured, and smaller.

Buckwheat is a plant known in almost every part of the world. It has been supposed to have been first known in Europe after the time of the Crusades. The French, in fact, call it *blé Sarrazin*. In China, Japan, and Russia, it forms a very considerable portion of the food of the inhabitants; it is likewise generally eaten in Switzerland and the southern parts of France; and in Flanders it is a considerable branch of husbandry. Gerard speaks of it as cultivated in England about the year 1597, particularly in the counties of Lancashire and Cheshire. It appears, however, to have made small progress in this kingdom, and has received less attention than it deserved. It thrives well in almost any dry soil, even those of the poorest kinds: and in most of the arable districts it is sown on the inferior sorts of land; as, when cultivated on the richer kinds of soil, it is found to run too much to straw. It is well adapted to light sandy lands. The quantity of seed sown varies from five to eight pecks per acre. Buckwheat is an annual. It has a strong, cylindrical, reddish, branching stem, about two feet in height, with alternate ivy-shaped leaves; the flowers which are white, tinged with red, are in bunches at the end of the branches, and are succeeded by black angular seeds. Its flowers are very attractive to bees. It begins flowering in July, and is generally fit to mow about the beginning of October. If put together, says Mr. Main, a little green or damp, it does not much signify; for although ever so mouldy, the grain is never damaged, and the more mouldy it is the earlier it can be thrashed. It is the easiest of all barn-work for the thrasher. (*Quart. Journ. Agr.* vol. vii. p. 180.)

The proper time for sowing buckwheat is in May, when there is no longer any danger to be apprehended from the frosts; for so tender is this vegetable at its first appearance, as to be unable at an earlier period to withstand the vernal cold. The slightest frost in their infant state would infallibly cut off the young shoots; and as, from this circumstance, it must be sown at a season when dry weather may be expected, the crop, on that account, not unfrequently fails. The produce, which varies with the seasons (and this is rather an uncertain crop), ranges from two to four quarters per acre. It is commonly grown in England in preserves, as food for pheasants and partridges. It is an excellent food for poultry; pigs thrive upon and are fond of it (it is commonly given to them mixed with potatoes); and when bruised it is good food for horses, two bushels being equal, for this purpose, it is said, to three of oats (a bushel weighs about forty-six pounds). Cows, when fed with it, yield a large increase of milk. Sheep, when fed upon the plant when in blossom, stagger and tumble about as if drunk. It is sometimes made into hay, which is nutritive, but tedious to make, and should be consumed before the winter. It is often grown on poor exhausted soils, and ploughed in when in bloom; in this way it increases very materially the fertility of the soil, and is a mode often practised in Essex, Suffolk, Norfolk, and in Scotland. Mr. Ballingal has given an account of his experiments with it upon a clay loam recently limed; from the result of which he warns his brother farmers that it is "needless to attempt to grow it upon damp soils, or to expect full crops upon lands exhausted by over cropping." (*Trans. High. Soc.* vol. ii. p. 125.)

In reaping buckwheat, many farmers prefer pulling it, as less likely to shed the seed. The morning, or late in the evening, should be chosen for this purpose, when the dew is upon the plant. M. Vauquelin found 100 parts of its straw to contain 29·5 of carbonate of potash, 3·8 of sulphate of potash, 17·5 carbonate of lime, 13·5 carbonate of magnesia, 16·2 of silica, 10·5 earth of alum, and 9 of water.

Vast quantities of this grain, says Mr. Main, are annually imported into this country from Holland and other northern countries, for the use of the gin-distilleries; who also consume considerable quantities of British growth, which not being kiln-dried, as most of the Dutch grain is found to be, is more valued. The average quantity of buckwheat imported into this country is about 10,000 quarters. It pays the same duty as barley. (*M'Culloch's Com. Dict.*)

Buckwheat bread is very light and digestive for delicate stomachs.

BUD. (Fr. *bouton.*) The germ or first fruit of a plant, which is the organised rudiment of a branch or flower. Buds proceed from the extremities of the young shoots, and also along the branches, sometimes single, sometimes two and two, either opposite or alternate, and sometimes collected in greater numbers. In general, we may distinguish three kinds of buds; the *leaf-bud*, the *flower-bud*, and *mixed buds*, which contain both in one covering. The first species (*foliferous buds*) contains the rudiments of several leaves, which are variously folded over each other, and surrounded by scales. The second species, or flower-bud (*floriferous buds*), contains the rudiments of one or several flowers, folded and covered in a similar manner. The third sort, which is the most common of any, produces both flowers and leaves. A leaf-bud is constructed thus: — in its centre it con
a minute conical portion of soft suc
cellular tissue (the plumule or rudin
the new twig), and over this are ar
rudimentary leaves, in the form of
These scales are closely applied t
other; those on the outside are the
and thickest, and those in the inter
smaller and more delicate. In cold cou
the external scales are often covere
hair, or a resinous varnish, or some
contrivance, which enables them to
the access of frost to the young and
centre which they protect, for th
strictly hybernacula; but in warm co
where such a provision is not requir
are green and smooth, and much
merous. The cellular centre of a
the seat of its vitality; the scales th
it are the parts towards the develop
which its vital energies are first
(*Penny Cyclopædia*, vol. v. p. 524.)

BUD. A term made use of in s
tricts for a weaned calf of the firs
probably from the horns then begin
bud or shoot forth.

BUDDING, or grafting by germ
Mr. Loudon (*Encyc. of Gard.* p. 2050
sists, in ligneous plants, in taking an
bud attached to a portion of the b
different sizes and forms, and ge
called a shield, and transporting i
place in another, or a different ligneo
getable. In herbaceous vegetables, the
operation may be performed, but wi
success. It may also be performed
buds of two or three years' standing,
trees of considerable size, but not gen
so. The object in view in budding
most always that of grafting, and de
on the same principle, all the diffe
between a bud and a scion being,
bud is a shoot or scion in embryo; in
respects, budding is conducted on the
principles as grafting. The bud is
pared off, with a sharp knife, along
half an inch of bark adhering at the
end, an inch and a half at the lower
holding the bud firmly between the
and thumb of the left hand, the small
wood is to be removed by a jerk
knife, and nothing left but the bud
adhering bark. An incision is then
made in the bark of the stalk to be b
and after separating the bark fro
wood with an ivory blade, the prepare
is to be inserted, and gently pushed
wards, below the transverse incision.
operation is finished by carrying a l
round the stem so as to fix the bud
to the new wood on which it is place
every case, the bud and the stock m
botanically related. An apple m

f the ox. In modern zoology, the
, or the "bubaline group" of the
s, include those species which have
y core of the horn excavated with
lls or sinuses, communicating with
ty of the nose; the horns are flat-
nd bend laterally with a backward
, and are consequently less appli-
goring than in the bisons or taurine
f oxen. The buffaloes are of large
t low in proportion to their bulk;
ve no hunch on the back, and only
dewlap on the breast; the hide is
y black, the tail long and slender.
ffaloes occupy the warm and tropical
of the earth; they avoid hills, and
the coarse vegetation of the forest
regions to those of open plains;
ve to wallow and lie for hours sunk
n water; they swim well, and cross
roadest rivers without hesitation.
gait is heavy, and they run almost
with the nose horizontal, being prin-
guided by the sense of smelling.
rd together in small flocks, or live
, but are never strictly gregarious
ld state. The females bear calves
rs following, but remain sterile the
hey propagate at four and a half
ld, and discontinue after twelve.
ommon buffalo (says Professor Low)
e to us, beyond a question, from
Asia. He seems to have been in-
l into Italy about the sixth century,
w an important animal in the rural
of that country. He is used by
ans as food, and as the beast of
nd may be said to form the riches
inhabitants in many parts of the
He is cultivated, too, in Greece

tenuifolia.) An annual plant, with a slender fibrous root, named after Buffon, found on the sea-coast; very rare. The stem is smooth, round, about a span high; leaves awl-shaped, three-ribbed; flowers small, white, solitary, erect, on terminal or axillary roughish stalks. (*Smith's Eng. Flora*, vol. i. p. 226.)

BUGLE, COMMON. (*Ajuga reptans.*) This very pretty wild plant grows in woods, copses, moist pastures, and shady places, flowering in April, May, and June. It is a perennial; has blue flowers, upright leafy stalks, and glossy leaves, of a deep purplish-green colour, oblong, broad, blunt at the point, and slightly indented round the edges, some growing immediately from the root. The flower-stalks rise eight or ten inches high, of a pale green—often purplish—and have two leaves at each joint, which joints are far apart from each other. The joint leaves are as large as those growing from the root. The scentless flowers are blue and white, sometimes entirely white, growing round the upper part of its stalk, forming a kind of loose spike. The cups remain, when the flower has fallen off, to hold its seeds. This plant is often denominated *sicklewort*, and *herb carpenter*. The roots (says Smith) are slightly astringent; but the herb has little taste or smell, and still less of any healing or vulnerary property. The white variety abounds in the Isle of Wight; and a flesh-coloured one has sometimes been observed. In dry mountainous situations the plant acquires a considerable degree of hairiness. The French who are great herbalists, affirm, that "with bugle and sanicle, no one needs a surgeon."

Besides the common bugle, Smith, in his

than at present. It has been, however, in our days, much improved for musical purposes by the introduction of keys.

BUGLOSS. (*Lycopsis arvensis.*) The stalks of this plant are from one to two feet high, rough, round, solid, erect, and marked with black spots. The root is small, tapering, and whitish; whole herb very bristly and prickly; leaves light green; the flowers bright blue; seeds hard and grey.

Bugloss is a hardy annual, blowing in June. It thrives in a dry soil, and is found very common in fields, waste grounds, and on dry banks. Propagate by parting its roots in autumn. It is indigenous. The narrow-leaved bugloss blows in May; treated as above. The root is long and brown. Bugloss is sometimes known by the name *Ox-tongue*. Ancient writers say, that bugloss is good in decoction, as a drink for nurses. They assert, also, that it is healing in coughs and colds; but modern authors agree in affirming that it has no extraordinary virtues, though it is often used like borage in cool tankards.

BUGLOSS, VIPER'S. (*Echium vulgare.*) This plant is met with most frequently in fields and waste grounds, especially on a sandy or gravelly soil, as well as on old walls and rubbish. It is a biennial, flowering in June and July. The whole herb is very rough, with prickly bristles, arising from callous points, intermixed with smaller hairs. Stems one or more, one to two feet high, erect or spreading; leaves alternate, lanceolate, single-ribbed, dull green, tapering at the base. Clusters of numerous crowded large beautiful flowers, pink in the bud, then blue or purple, occasionally white. (*Smith's Eng. Flora*, vol. i. p. 268.)

BUILDING. (Dut. *bilden;* Sax. bẏlðan.) In rural economy, any kind of erection raised upon a farm. It is a business that mostly belongs to the proprietor of the lands to perform, though, in some cases, it may be necessary to be done by the tenant. In undertaking it, the different circumstances of the particular cases should be carefully considered, in order that the greatest advantage and economy may be preserved that the situation admits of, and the several buildings have the greatest relative convenience. All buildings, where bricks and mortar are employed, should be done as early in the spring as possible, and never in the winter season, where it can be avoided, in order that they may have time to dry before the winter sets in. (See FARM-BUILDINGS.)

BULB. (Lat. *bulbus;* Gr. βολϐος.) A bud usually formed under ground, having very fleshy scales, and capable of separating from its parent plant. Occasionally it is
produced upon the stem, as in son
It contains the rudiments of the
plant, and partakes of the characte
bud (which see). In bulbous plant
tulip, onion, or lily, what we gener
the *root* is in fact a bulb or hybern
or winter case, which incloses and
the embryo or future shoot. At t
part of this bulb may be observed
disk, knob, or tubercle, whence p
number of fibres or threads. Th
with the fibres attached to and
from it, is, properly speaking, the tr
the upper part being only the c
nursery of the future stem, whic
replaced a certain number of ti
bulb perishes; but not till it has
at its sides a number of smaller
cloves for perpetuating the spec
bulbous plants, where the stalk an
leaves of the plant are sunk below,
bulb, the radicles or small fibres t
from the bulb are to be considere
root; that is, the part which furnis
rishment to the plant: the several
shells whereof the bulb chiefly con
cessively perish, and shrink up into
dry skins, betwixt which, and in the
are formed other leaves and shells,
the bulb is perpetuated. There ar
kinds of bulbs; namely, 1. the
bulb (*Bulbus tunicatus*), formed
membranous layers, as, for exam
onion; 2. the scaly bulb (*B. squa*
formed of fleshy abortive leaves,
layers, as in the *lily*. The cloves, w
produced between the scales of b
often, as it were, starved, when t
throws up a vigorous flowerin
thence, in order to propagate b
flowering stem should be destroye
as it appears.

BULBOCODIUM. (*Bulbocodi*
num.) A bulbous-rooted plant,
the Pyrenées, blowing a light purp
in March. It loves shade, and th
peat mould. Take up the roots in
replant in October.

BULLACE TREE, WILD.
insititia.) A small tree, chiefly gr
hedges and plantations, with ir
spreading round branches, for the
tipped with a sharp straight thorn.
several varieties of the black kin
ing in size and flavour, some good
fresh state, and of more or less excelle
dressed. (*Smith's Eng. Flor.* vol. ii.

BULL, BULL-CALF. See C

BULL-BAITING. See BAITI

BULL-DOG. See DOG.

BULLEN. A provincial name
to the hempstalk when the bark is
from it.

ULLEYN, WILLIAM, was born in
sle of Ely, early in the reign of Henry
.; Watts, in his *Bibliotheca Britan-*
says in 1500. He studied first at
ridge, and subsequently at Oxford.
avelled in Germany, Scotland, and his
e country, studying their natural pro-
ons with a zeal and success, that marks
ery prominently as a man of science
t age, so benighted as it was in every
that appertains to natural history.
was appointed, in June 1550, to the
ry of Blaxhall in Suffolk. It is pro-
that he united the practice of a phy-
with that of a divine, a union of pro-
ns which was not thought incompatible
as late as the commencement of the
nt century. It is certain he resigned
hurch preferment in 1554, and soon
settled in practice as a physician at
am, and became a proprietor, with Sir
as Hilton, in some salt works. On
eath of Sir T. Hilton, Dr. Bulleyn re-
d to London. His death occurred
7. 1576. (*Biographia Britannica.*)

works were published collectively, and are en-
"A Bulwarke of Defence against all Sicknes, Sore-
and Wounds, that doe daily assaulte Mankind;
Bulwarke is kept with Hillarius the Gardener,
h the Physician, with their Chirurgion, to help the
ded Soldiers, &c. with his Boke of Simples. Lon-
1562. fol." Another edition bears date, 1579, fol.

ULLFINCH. (*Pyrrhula.*) This is too
non a bird not to be exceedingly well
rn, and is found in most parts of Eng-
but particularly those which are
ed and cultivated, preferring gardens,
rds, hedgerows, plantations, and small
s, to bleak and exposed tracts of
ion, waste, or moor. It is found to be
ularly destructive in gardens through-
he spring of the year, devouring the
r-buds of the various sorts of goose-
es, cherries, plums, apples, and med-
in succession, to such an extent as
estroy, if unmolested, all prospect of
rop of fruit for the season. In winter
ds on hips, the fruit of the dog-rose,
es, and seeds. It is a late breeder,
m beginning to build until the early
of May, and produces but one brood
e season. Nest formed of small twigs,
with fibrous roots, usually placed four
e feet above the ground, on a branch
ir tree or in a thick bush. Eggs, four
ve, pale blue, speckled and streaked
purplish grey and dark purple. These
atched after fifteen days' incubation.
call-note of the bullfinch is soft and
tive, and this bird is principally prized
s power of imitation and its memory.
nches are liable to great changes of
r in their plumage. In an adult male
ak is shining black; irides dark brown; top of head jet black; nape of neck, back, and lesser wing-coverts delicate bluish grey; greater wing-coverts black, ends white, forming a conspicuous bar across the wing; rump above white; the chin black; ear-coverts, side of neck, throat, breast, belly, bill, red; under surface of wings slate grey; legs, toes, and claws, purple brown. The female has the grey colour of the back more mixed with brown; and the under surface of the body, where the male is red, is in her of a brownish purple red; head, wings, and tail, not quite so pure a black. (*Yarrell's Brit. Birds*, vol. i. pp. 1—7.)

BULLHEAD, or MILLER'S THUMB. (*Cottus Gobio.*) An English fish common in most rivers. Head smooth, yellowish, variegated with black underneath, whitish, with a spine on each side; food, young fish and insects. The bullhead hides under large stones. Isaac Walton says, "In very hot days he will lie long still on a stone or gravel, and sun himself; at which time he will suffer an angler to put a hook baited with a very small worm very near into his mouth, and he never refuses to bite, or indeed be caught by the worst of anglers." This fish, when properly cooked, is very good eating. (*Walton; Blaine's Rural Sports.*)

BULLOCK. See CATTLE.

BULLOCK SHEDS. See FARM-BUILDINGS.

BULL-RUSH. (*Scirpus lacustris.*) A perennial found commonly in clear ditches, ponds, and the borders of lakes and rivers; flowers in July and August. (*Smith's Flora*, vol. i. p. 56.) From this plant the bottoms of chairs, mats, &c. are made. The common bullrushes of the English marshes, which bear masses of brown flowers, are the *Typha latifolia* and *angustifolia*.

BULLS. A provincial term applied to the stems of hedge-thorns.

BULL'S-FOOT. A name sometimes given to colt's-foot.

BULLWEED. (*Centaurea nigra.*) A perennial weed, common in corn-fields, pastures, and road sides; it rises to about two feet high; the stalks are round, streaked, and hoary; the bottom leaves oblong and undivided, but those which grow on the stalk are cut and divided. The flowers resemble those of the bluebottle in shape, but are red. The seed is small, oblong, reddish, and hairy in the upper part. It is frequently known by the names of *black knapweed*, *black matfellon*, *cockheads*, &c. (*Smith's Eng. Flora*, vol. iii. p. 465.; *Sinclair's Weeds of Agr.* p. 65.)

BUNS. A provincial term for hollow stems; also for the stalks of hemp from which the bark has been taken off.

BUR. The rough head of the burdock, &c.

BURDEN BAND. Provincially a hempen hay-band.

BURDOCK. (*Arctium.*) There are two species, the *A. Lappa*, common burdock or clot-bur, and the *A. Bardana*, woolly headed burdock. This very cumbrous weed is removed the first year of its growth by stubbing, like other things comprehended by farmers under the name of docks, and paid for accordingly to the weeder. It is also very commonly found in waste ground, by way sides, and among rubbish. (*Smith's Eng. Flora*, vol. iii. p. 379.) It grows a yard high, with large leaves of a triangular shape, and of a whitish green colour. The stalks are round, solid, and tough. The florets are small and red, and they grow among the prickles of those heads called burs, which stick to the clothes of passers by. The root is long and thick, brown outside, and whitish within. The plant is a biennial, and flowers in July and August. The root in decoction is a diuretic and sudorific; but it is of little value, except as a vehicle for more important medicines in some affections of the skin. This is a great remedy among village doctresses, who sometimes apply the bruised leaves to the soles of the feet in hysterics. Either the root or seeds decocted, or infused, are equally useful with the leaves. The root of the *lesser burdock*, or *xanthium* (*Bardana minor*), has a bitter and acrid flavour, and is useful in scrofulous disorders. A decoction of the root should be persevered in for a considerable length of time.

BURGLARY. The breaking into a dwelling-house in the night with a felonious intent. The 7 W. 4. & 1 Vict. c. 86. s. 2. enact, that whosoever shall burglariously break and enter into any dwelling-house, and shall assault with intent to murder any person being therein, or shall stab, cut, wound, beat, or strike any such person, shall be guilty of felony, and being convicted thereof shall suffer death. S. 3. enacts, that whosoever shall be convicted of the crime of burglary shall be liable, at the discretion of the court, to be transported beyond the seas for the term of the natural life of such offender, or for any term not less than ten years, or to be imprisoned for any term not exceeding three years. S. 4. enacts, that, so far as the same is essential to the offence of burglary, the night shall be considered to commence at nine of the clock in the evening of each day, and to conclude at six of the clock in the morning of the next succeeding day. (*Archbold's Crim. Law.*)

BURGOT. A provincial word applied to yeast. It is sometimes pronounced *burgood.*

BUR-MARIGOLD. (*Bidens.*) This is an herbaceous, mostly annual, genus of plants, flowering in August and Sept
It is met with very frequently in
places, and about the sides of ditch
ponds. There are two species with
two varieties in each. In the thre
bur-marigold (*B. tripartita*), the
tapering with many fibres; stem
three feet high, erect, solid, smooth
with opposite axillary branches. Leav
green, strongly serrated, in three de
ments, sometimes five. Flower, te
solitary, of a brownish yellow, so
drooping, devoid of beauty and of fra
Seeds with two or three prickly angl
as many erect bristles; likewise prick
reflexed hooks, by which they sti
burs to any rough surface, and are sai
times to injure fish by getting int
gills. The herb of this species gives a
colour to woollen or linen. The noddi
marigold (*B. cernua*) has a root with
stout fibres, herb more erect and talle
less extended branches than the fo
species. Leaves undivided, pointed,
deeply serrated. Flowers drooping,
their stalks are quite straight to th
summit; larger and handsomer th
last. (*Smith's Eng. Flora*, vol. iii. p.
400.)

BURN-BAKING, or BURN-B
ING. See Paring and Burning.

BURNET. (*Pimpinella*). This ge
plants grows in barren places, under h
and in dry sandy grounds; flowering
June till September, when the seed
The leaves which rise from the ro
pinnate, or composed of a great num
small leaflets growing on each side
middle rib, with an odd one at th
They are broad, short, somewhat
and serrated on their edges. The
which are a foot high, are round, gre
purplish. The flowers are small, and
pale red colour, having a number of t
in the middle. The root is very astri
and dries well. Given in powder,
cocted, it is useful in stopping dia
The leaves of burnet are eaten in sal

BURNET, COMMON. (*Pim*
Saxifraga.) There are three species o
net; namely, *burnet saxifrage*, *dwarf*
and the *greater burnet.* The common
plant was, a quarter of a century
much cultivated as a green crop, fr
being able to thrive on very poor, thi
sandy soils, but it has been gradually
seded by better grasses. Its grow
rather slow. Cattle prefer it to clove
rye grass, but sheep do not. (*Ann.*
vol. i. p. 394.) It is sown in spring
the same as other grass seeds, and with
severe weather. It should be fed of
young (*Ibid.* vol. ii. p. 170.); and the

ng. "it is one of the best grasses
(*Ibid.* p. 369.), who are at that
growth exceedingly fond of it.
of seed suffice for an acre (*Ibid.*
55.); and the produce is six or
ls per acre, on moderate land.
x. p. 237.)

T, SALAD, SMALL or UP-
oterium Sanguisorba, from the
ωov, a cup, used in cool tank-
stem, which is angular, smooth,
ises 1 to 2 feet high, furnished
ous-green, smooth, pinnated
sharply cut stipules, in pairs
of the footstalk. The flowers
and barren; the latter with
amens resembling elegant silk
Smith.) It delights in a dry,
bounding in calcareous matter;
compartment that has an open
therefore, may be allotted to it,
beneficial addition that can be
ing bricklayers' rubbish or frag-
chalk. A small bed will be suf-
the supply of a family. It may
ated either by seed, or by slips and
or offsets of the roots. The seed
own towards the close of February,
eather, and thence until the close
but the best time is in autumn, as
is ripe; for if kept until the spring,
ften fail entirely, or lie in the ground
same season of the following year,
vegetating. It may be inserted in
ix inches apart, or broadcast; in
ode, thin, and not buried more than
inch. The plants must be kept
ly clear of weeds throughout their
When two or three inches high,
y be thinned to six inches apart,
e removed placed in rows at the
stance, in a poor, shady border,
ing given occasionally until they
en root, after which they will require
r attention until the autumn, when
t be removed to their final station,
foot apart. When of established
the only attention requisite is to
their stems occasionally in summer,
te the production of young shoots,
utumn to have the decayed stems
s cleared away. If propagated by
&c. of the roots, the best time for
it is in September and October.
ws freely from seed, this is not
ractised. They are planted at
e they are to remain, and only re-
sional watering until established.
parts of their cultivation are as
raised from seed. For the pro-
seed, some of the plants must be
ered from, and allowed to shoot
n the summer; they flower in July, and ripen abundance of seed in the autumn. The leaves taste and smell like cucumbers, thence the plant is used to flavour salads. (*G. W. Johnson's Kitchen Garden.*)

BURNING. See Arson.

BURNING OF HEATH. See Heath.

BURNING OF LIME. See Lime.

BURNS, in live stock, are best treated by a lotion composed of lime-water and linseed oil, equal parts, applying it frequently: this allays the inflammation very rapidly.

BURNT CLAY. See Ashes.

BURNT EARS. See Smut.

BUR-PARSLEY. (*Caucalis.*) Of this plant there are two kinds, both annual, the smaller and the greater, which are met with occasionally in corn-fields on a chalky soil. In the small bur-parsley (*C. daucoides*) the root is small and tapering, and the herb nearly smooth and bushy. The fruit is large, oblong, and very hairy. The great bur-parsley (*C. latifolia*) is one of the most striking and handsome of its tribe, and has rough herbage, somewhat glaucous. The stem is taller and less spreading than in the foregoing, about three feet high, beset with minute ascending prickles.—Petals bright pink, inversely heart-shaped, the outermost of the marginal prolific flowers thrice as large as the rest. Fruit beset with double rows of straight, rough, purplish bristles. (*Smith's English Flora*, vol. ii. p. 40.)

BUR-REED. (*Sparganium.*) Smith (*Eng. Flora*, vol. iv. p. 73.) enumerates three species:—1. the branched bur-reed (*S. ramosum*); 2. the unbranched upright bur-reed (*S. simplex*); 3. the floating bur-reed (*S. natans*). They are all creeping-rooted, aquatic, juicy, smooth, upright, or floating herbs, and found in pools and ditches, and the margins of ponds and rivers: common: the last named principally in muddy fens or slow rivers. The bur-reed is a perennial, flowering in July and August; the stems of some of the species attain to the height of three or four feet. The herbage of the branched bur-reed serves for package along with similar coarse grassy plants, and is softer and more pliant than most of them, not cutting the hand by any sharp edges, like *carices* or ferns. The unripe burs are very astringent. A strong decoction of the burs makes a wash for old ulcers.

BURROW. (Teut. *bergen*, to cover.) A provincial word, signifying a heap or hillock, hence stone-burrows, peat-burrows, &c.

BUR-TREE. A provincial name sometimes applied to the elder-tree. It is also written *Bor-tree.*

BUR-WEED. (*Xanthium strumarium.*)

The broad-leaved bur-weed is an annual plant, flowering in August and September, found in rich moist ground, or about dunghills in the south of England; but rare. It is herbaceous or somewhat shrubby, rather downy, of a coarse habit, root fibrous; stem solitary, erect, branched, leafy, two feet high, solid; leaves on long stalks, heart-shaped, two or three inches wide; clusters of four or five fertile green flowers, and one or two barren ones, making no show. Old tradition reports that the xanthium is good for scrofulous disorders, as the specific name seems to indicate; but it is justly out of use. The generic appellation alludes to a quality of dyeing yellow, which Dioscorides mentions. (*Smith's Eng. Flora*, vol. iv. p. 136.)

BUSH. (Teut. *busch;* Dan. *busk.*) A thick shrub, or a collection of shrubs or plants, growing close together, so as to form a sort of clump. It is also a provincial word, signifying the box of the nave of a wheel.

BUSH-DRAINING. A term applied to a kind of draining, which is done by putting in, or filling the drains with bushes.

BUSHEL. (Old Fr. *buschel;* low Lat. *bussellus.*) A measure of capacity for dry goods, as grain, fruit, pulse, and many other articles, containing 4 pecks, 8 gallons, or 32 quarts, and is the eighth of a quarter. The name seems to be derived from an old English word, *buss,* signifying a box or vessel.

The bushel, by a statute made in the twelfth year of Henry the Seventh, is to contain 2150·42 cubic inches, or 8 gallons of wheat; the gallon of wheat to weigh 8 lbs. troy-weight; the pound, 12 oz. troy-weight; the ounce, 20 sterlings; and the sterling, 32 grains. By 5 Geo. 4. c. 74. the imperial gallon is declared the standard measure of capacity, and is directed to be made such as to contain 10 lbs. avoirdupois of distilled water, weighed in air at the temperature of 62° of Fahrenheit's thermometer, the barometer standing at 30 inches, or to contain 277 cubic inches, and 274 thousandth parts of a cubic inch; consequently, the imperial bushel contains 80 lbs. of distilled water, or 2218·192 cubic inches. By the same act (§ 7.), the bushel is declared the standard measure of capacity for coals, culm, lime, fish, potatoes, or fruit, and all other goods or things commonly sold by heaped measure, and is prescribed to contain 2815 cubic inches, to be made round with a plain and even bottom, and being 18 $\frac{13}{24}$ inches in the interior diameter by 8 in depth, and 19½ inches from outside to outside; the goods to be heaped up in the form of a cone, to a height above the rim of the measure of at least three fourths of its depth.

Besides the standard or legal bushel, we have several local bushels, of diff
mensions in different places. At
and Andover, a bushel contains 9
at Appleby and Penrith, a bushel
rye, and wheat, contains 16 gallons
ley, big malt, mixt malt, and oats, 2
A bushel contains, at Carlisle, 24
at Chester, a bushel of wheat, rye,
tains 32 gallons, and of oats
Dorchester, a bushel of malt
contains 10 gallons: at Falmouth, t
of stricken coals is 16 gallons;
things 20, and usually 21 gallons:
ston-upon-Thames, the bushel con
at Newbury, 9; at Wycomb and
8¾; at Stamford, 16 gallons. The
of the bushel seems to have been
increasing; the Winchester bushel
this country from the time of He
to 1826, contained 2150·42 cubic
The imperial bushel is therefore
Winchester bushel as 2218·192 to
or as 1 to ·969447. Hence to conv
chester bushels into imperial, mu
·969447. To convert prices per Wi
bushel into prices per imperial bus
tiply by 1·0315157.

The *heaped* bushel was abolished
Will. 4. c. 49., an act which to
from the first of January, 1835. (
Dict. Science; Penny Cyclopædia;
loch's Com. Dic.)

BUSH-HARROW. An implem
stituted of any sort of bushy branch
woven in a kind of frame, consisting
or more cross-bars, fixed into two e
in such a manner as to be very r
brushy underneath. To the extre
the frame before are generally atta
wheels, about twelve inches in diame
which it moves; sometimes, howeve
are not employed, but the whole r
face is applied to, and dragged
ground. See HARROW.

BUSH-HARROWING. The
of harrowing with an instrument of
just described. It is chiefly nec
grass-lands, or such as have been
pasture, for the purpose of breaki
and reducing the lumps and clod
earth or manures that may have
plied, and thereby rendering the
capable of being washed into the
or for removing the worm-casts a
matter that may have formed on the

BUSH-VETCH. (*Vicia sep*
plant of the vetch kind, which may
be cultivated to advantage by the
where lucerne and other plants of
nature cannot be grown. Its root
nial, fibrous, and branching; th
many, some of them shooting im
upwards, others creeping just u

surface of the ground, and emerging, some near to, and others at a considerable distance from, the parent-stock. The small oval leaves are connected together by a mid-rib, with a tendril at the extremity; the flowers are in shape like those of the common vetch, of a reddish-purple colour; the first that blossom usually come in pairs, afterwards to the number of four at a joint; the pods are much shorter than those of the common vetch, larger in proportion to their length, and flatter, and are of a black colour when ripe; the seeds are smaller than those of the cultivated species, some speckled, others of a clay colour. It yields, from a brown sandy loom, 17,696 lbs. per acre of grass, and of nutritive matter 976 lbs. It flowers in the middle of May, and maintains its place when once in possession of the soil, but appears unfit for clayey soils. The seeds are sown in April or the beginning of May. (*Hort. Gram. Wob.* p. 210.) Being a perennial plant, Mr. Swayne deems it to be a proper kind to intermix with grass-seeds for laying down lands intended for pasture; and that it is as justly entitled to this epithet as any herbaceous plant whatever, having observed a patch of it growing in one particular spot of his orchard for fourteen or fifteen years past. It is not only a perennial, but an evergreen; it shoots the earliest in the spring of any plant eaten by cattle with which he is acquainted; vegetates late in autumn, and continues green through the winter, though the weather be very severe; add to this, that cattle are remarkably fond of it. The chief reason which has
therto prevented its cultivation, has been
very great difficulty of procuring good
d in any quantity. The pods, he finds,
st ripen altogether; but as soon almost
hey are ripe, they burst with great elas-
ty, and scatter the seeds around; and
r the seeds have been procured, scarce
third part of them will vegetate, owing,
e supposes, to an internal defect, occa-
ed by certain insects making them the
and food for their young. It seems,
, that a crop of this kind of vetch may
ut three or four times, and in some cases
so early as the beginning of March—
ircumstance of much importance to
ers who have a large stock of cattle.
ns. *Bath and West of England Society*,
iii.)

USK. (Dan. *ousk*, a bush.) A term
incially applied to a bush.

USS. (Irish, *buss*, the mouth.) A term
incially applied to a grass-calf.

USTARD, THE GREAT. (*Otis*
a.) This is a bird of such interest as
s magnitude, that every individual
ure becomes a subject for ornithological record. Dr. Turner, who wrote in 1544, includes it among his English birds. In the printed catalogue of the contents of the Tradescant Museum, preserved at South Lambeth in 1656, is "the bustard, as big as a turkey, usually taken by greyhounds on Newmarket Heath;" and Merrett, in 1667, includes the bustard as taken on Newmarket Heath and about Salisbury. Although now seldom met with in England, the bustard is too great an honour to the country to be passed over without notice. We need hardly say, that it is the largest of our land birds, being as much as four feet long, and from twenty-five to thirty pounds in weight. The bustard was, within thirty or forty years, to be met with on many of the large plains of England. The female lays two or three eggs in a depression on the bare ground; olive-brown in colour, sparingly and indistinctly blotched with greenish broccoli-brown; length two inches eleven lines, by two inches two lines in breadth. The birds feed on green corn, grasses, trefoil, and other vegetables; are said to kill and eat small mammalia; and from their partiality to marshy ground, it is probable they also devour small reptiles. Like the ostrich, the bustard swallows small stones, bits of metal, &c.; and Buffon relates, that in the stomach of one which was opened, no less than *ninety doubloons* were found. Adult male has a strong beak clay-brown; the under mandible palest, head and upper part of neck greyish white; from chin, passing backwards and downwards on each side, there is a tuft or plume, about seven inches long, directed across, and partly concealing a vertically elongated strip of bare skin, of a bluish grey colour; lower part of neck behind, the back, and tail feathers, of an ochrous yellow, or pale chestnut, barred transversely with black; tail feathers tipped with white; neck, breast, and under surface of the body, thighs, &c. white; legs, toes, and claws, brown. The whole length of the male bird is 45 inches. (*Yarrell's Brit. Birds*, vol. ii. p. 362.) The gular pouch of the great bustard is so large as to be capable of containing two quarts of water. It probably serves the same purpose to this bird on its dreary plains, as the water-bag to the camel in the desert; but there is a doubt on the subject. The bustard rarely takes to the wing, thence it is coursed by dogs. The female is only one third the size of the male; and differs from it chiefly in the want of the moustaches, and the gular pouch.

BUSTARD, THE LITTLE. (*Otis Tetrax.*) The lesser bustard is a very diminutive type of the large species, weighing only twenty-five ounces, and being but sixteen inches and a little more in length, and thirty-five in breadth, with outstretched wings. The little bustard can only be considered an accidental, and, generally, a winter visiter to this country; the male has never been killed here in the plumage assumed during the breeding season; nor has the nest or the eggs been found. The nest is on the ground, among herbage which is sufficiently high to hide the bird; eggs, from three to five, two inches by one inch six lines, of uniform light-brown, but sometimes slightly clouded with patches of darker brown. Bewick (*Brit. Birds*, p. 360.) says, the female lays in June, and the eggs are of a glossy green. Food; herbs, grain, and insects. The flesh has the appearance and flavour of a young hen pheasant. Adult male, when in the plumage peculiar to the breeding season, has beak brown; irides golden yellow; top of head pale chestnut, mottled with black; cheeks, front and sides of neck, bluish grey, bounded inferiorly by rings of black and white; shoulders, back, &c. pale chestnut-brown; breast white; legs, toes, &c. clay-brown. (*Yarrell's Brit. Birds*, vol. ii. p. 371-5.; *Blaine's Rur. Sports*, 886.; *Ornitholog. Dic.* p. 63.)

BUTCHER'S BROOM. (*Ruscus aculeatus.*) This is a small shrubby perennial plant, with little prickly leaves and bushy tops, growing on heaths and in rough barren ground a foot and a half high, flowering in March and April. The sprouts must be gathered in spring, and its berries in August. Its stalk is roundish, stunted, and tough; naked about the root, and divided into branches towards the top, which is covered with short, broad, oval, and pointed leaves of a bluish green colour. The small purple flowers grow upon the upper disk of the leaves, which are merely dilated extensions of the stalk; and each flower is succeeded by a red round berry, the size of a pea. The root, which is thick and white, is medicinal, but the young shoots are very bitter, and both are diuretic.

BUTT. A provincial term applied to such ridges or portions of arable land, as run out short at the sides or other parts of fields; also to a vessel holding 126 gallons of wine, 108 of beer; and to a measure of from 15 to 22 cwts. of currants. *To butt*, from Dutch *botten*, to strike. *Butt-Land* is the place where, in days of archery, the butts for practice were placed. It is also applied provincially to a close-bodied cart: hence, a *dung-butt* or wheel cart, *gurry-butt* or sledge cart, *ox-butt*, *horse-butt*, &c.

BUTTER. (Ger. *butter*; Dut. *boter*.) A well known article of domestic consumption, commonly procured by churning the milk of the cow. It was not an articl
ployed by the early Greeks and Ro
"The ancient Romans," says Mr.
(*Quart. Journ. Agr.* vol. v. p. 357.), "
nothing of making butter until they
taught by the Germans how to make i
it was not used by them as food but n
as oil." Herodotus says, that the Scy
formed butter by agitating mare's mil
the poet Anaxandrides says, that the
cians ate butter, at which the Grecian
surprised. When Julius Cæsar in
England, he found that the inhabitan
abundance of milk, from which they
butter, but could not make cheese til
were taught that art by their inv
The Arabs, it seems (*Burckhardt's T*
in Nubia, p. 441.), are very large cons
of fresh butter, and they are in the h
drinking every morning a cup-full of
butter, or *ghee* as it is called in the
In India ghee is made from the milk
buffalo, and a very considerable tr
carried on with it. It is usually conve
leather bottles or duppers, holding fr
to forty gallons; some are made o
The colour of butter is yellow; it posses
property of an oil, and mixes readil
other oily bodies; it melts and be
transparent at 96° Fahrenheit, and i
kept in this state for some time, it as
exactly the appearance of oil, los
peculiar flavour, and some curds and
separate from it. Milk, in fact, is com
of cream, curd, and whey. The crea
the milk are merely united mechan
and when, therefore, the new milk is al
to rest, the cream being the lighter
two rises gradually to the top; the cu
parates from the milk, too, with th
sistance of a very slight degree of a
Butter may be made by the agitati
either cream, or new milk: fresh cr
not commonly used, because it require
times the churning that stale cream
(Fourcroy, *Ann. de Chém.* tom. vii. p.
The contact of the atmospheric air
absolutely essential to the producti
butter from cream, although the oxy
the air is usually absorbed in churning
cording to Dr. Young there is an in
in the temperature during the operat
four degrees. Butter-milk is merely
deprived of its cream, in which it r
becomes sour, and the curdy or *chees*
is separated from the whey, or *serum*.
of the specific gravity 1·0244 was fo
Berzelius to contain,

	Pa
Butter - - -	4
Cheese - - -	3
Whey - - -	92

Curd, which is easily separated

milk by rennet, has many of the
of coagulated albumen: it is
according to the analysis of MM.
ac and Thenard, of

	Parts.
n	59·781
en	11·409
gen	7·429
	21·381
	100·

adds Dr. Thomson (*System of*
iv. p. 499.), as is well known, is
king cheese, and the cheese is the
more it contains of cream, or of
matter which constitutes cream.
known to cheese-makers, that the
f it depends in a great measure
nner of separating the whey from
If the milk be much heated, the
broken in pieces, and the whey
parated, as is the practice in many
Scotland, the cheese is scarcely
y thing; but the whey is delicious,
the last squeezed out whey; and
y be obtained from it in consider-
ities. But if the whey is not too
ted (100° is sufficient), if the co-
allowed to remain unbroken, and
be separated by very slow and
ssure, the cheese is excellent, but
is almost transparent and nearly
(*Journal de Phys.*)
lk is deprived of its cream it is
according to M. Berzelius, of

	Parts.
	928·75
th a little cream	28·
milk	35·
of potash (chloride of ium)	1·70
te of potash	·25
cid, & acetate of potash	6·
phosphates	·30
vol. iv. p. 501.)	1000·

ome valuable experiments on the
re at which butter may be best
from cream by Dr. John Barclay
Allen, it appeared, "that cream
t be kept at a high temperature
ocess of churning: in the expe-
hen the temperature was lowest,
ity of butter obtained was in the
roportion to the quantity of cream
as the temperature was raised the
al quantity of butter diminished;
he last experiment, when the mean
re of the cream had been raised
t only was the quantity of butter
d, but in quality it was found to
ferior, both with regard to taste and appearance. That the lowest possible temperature should be sought in churning, appears likewise from another result of these experiments, the specific gravity of the churned milk having been found to diminish as the temperature of the cream was increased; thus showing, that, at the lower temperature, the butter, which is composed of the lighter parts of the cream, is more completely collected than at the higher temperature, in which the churned milk is of greater specific gravity." The conclusion to which they came therefore was, that the most proper temperature at which to commence the operation of churning butter is from 50° to 55°, and that at no time of the operation ought it to exceed 65°; while on the contrary, if at any time the cream should be under 50° in temperature, the labour will be much increased without any proportional advantage being obtained, and a temperature of a higher degree than 65° will be injurious as well to the quality as the quantity of the butter. (*Trans. High. Soc.* vol. i. p. 194.) One of these experiments it may be well to abridge. 15 gallons of cream at the temperature of 50° were churned; each gallon (equal to holding 8 lbs. 4 oz. of water) weighed 8 lbs. 4 oz.; by churning for two hours, the temperature of the cream rose to 56°, at the end of the churning it was 60°. The butter obtained weighed 29¼ lbs. avoirdupoise, or nearly 2 lbs. for each gallon of cream; the butter was firm, rich, and pleasant. A gallon of the churned milk weighed 8 lbs. 9 oz.

Mr. J. Ballantyne found that the greatest quantity of butter from a given quantity of cream is obtained at 60°, and the best quality at 55° in the churn just before the butter came; when the heat exceeded 65°; no washing could detach the milk from the butter without the aid of salt; but when a quantity of salt was wrought well into it, and the mass allowed to stand for twenty-four hours, and then well washed, the milk was separated. (*Trans. High. Soc.* vol. i. p. 198.)

The method of making the best butter all over the dairy district of Scotland is thus described by Mr. Aiton (*Quart. Journ. Agr.* vol. v. p. 351.):—The milk when drawn from the cow is placed from six to twelve hours in coolers, the same as when set aside to cast up its cream; but this is merely to let the milk cool; and whenever it is divested of its natural heat the whole meal of milk is emptied from the coolers into a stand vat or tub sufficient to contain the whole. If the vat is large, and a second meal of milk has become cold before the former meal of milk has begun to acidify, the second may be turned into the first. It is then placed in a vat covered over and allowed to remain undisturbed, till the milk has not only acidified, but until it has been formed into a coagulum (or *lapper* in dairy language). It is now ready to be churned, and provided the lapper is not broken (which makes it ferment) it may remain, without injury, unchurned for some days.

Milk prepared in this way is churned in upright or plunge churns, of a size to suit the magnitude of the dairy. Where only a few cows are kept, the churns will hold about 100 quarts, from 200 to 240 quarts, and some still more. These large churns are on some large farms moved by machinery of various constructions, but in most dairy farms, churns of 200 quarts are wrought by hand labour only. After the clotted milk is put into the churn, as much hot water is poured amongst the milk as to raise the temperature frôm 50° or 55° (the temperature of the milk-house) to 70° or 75°, one person agitating while another throws in the water. The temperature must be raised to or above 70° before the butter can be separated from the milk; and this cannot be accomplished in any way so well as by pouring in boiling water after it has begun to be churned. If the milk is too cold, when churning it swells, has a pale white colour, throws upon the surface many air bubbles, and emits a rattling noise; the time of churning is from 2¼ to 2¾ hours; the milk being of ordinary quality; 24 pints imperial yield 24 ounces of butter.

In the making of butter care and cleanliness are requisite. The cows should be milked in the cool of the morning and evening; they should be driven very gently, and if brought to the milking place some little time previously, it will be all the better. In some countries they milk them in their pastures, a practice commonly followed in mountainous districts, and where they are distant from the dairy. The teats of the cow should be washed often with water, and the dairy floors (which are best of brick) and all the dairy utensils cannot be too frequently washed, not only because dirt is exceedingly noxious to the production of good butter, but from the coolness which it produces in the dairy.

When the milk is brought into the dairy it is strained through a sieve to remove any mechanically diffused matters; and then placed in shallow pans and coolers, or leaden troughs. Some are made of iron tinned, others of brass. There is, however, an objection to leaden troughs, for at the point of contact between the air and the cream, the latter aids the oxidizement of the lead; and carbonic acid being attracted, a carbonate of lead (*white lead*) is formed, and
communicates a poisonou
cream. Painter's colic has
times communicated to ala
or iron tinned, is prefer
dairy vessels. The same
to brass as to lead. Metal
as the best, from their rap
summer, and from their
warmed in the winter; the
the same remark applies
&c.) more readily and co
than those of wood or e
dairy should be well ve
gauze windows, and pro
trees or buildings from th
In twelve hours the fine
cream has risen to the surf
separated from the milk
duces a very delicate bu
monly left, however, for tv
and then skimmed off,
an earthen vessel. In t
usual size, the cream col
every two days, and the
butter is found to be mate
by the cream acquiring a
deed, it has been sometim
without the presence of a
not be made. Lactic acid
present in butter-milk—
even, in some cases, impa
dairy women, who add a
vinegar or lemon juice; t
not improve the flavour o
it injures it considerably
effect the separation of th
cream, a considerable deg
necessary, varying with th
the atmosphere, and other
the influence of electricity
who has witnessed the ef
storm on a dairy of milk
or churning is produced
churns, the most commo
is the upright wooden c
right plunger; others are
turning on an axle by me
winch; some are made like
much in the same manner
chiefly by hand. But it is s
horse power, and very c
Cheshire by small porta
steam-engines: these last
made to cut chaff, bruise co
bones, and a variety of oth

In the course of a per
one hour to several hours,
cumstances, the butter beg
pearance in small lumps
are gradually increased i
churning proceeds; these
placed in a shallow wooden
tub, and when all the b

acted, little else remains but the but- k. The butter placed in the washing worked by the hand into a mass, utter-milk squeezed out, and the washed in water, an operation , when it is intended for keeping, can- e too carefully performed; and if the n who works it has not a very cool it should be kept as cool as possible equent ablutions in cold water. A portion of the butter made at a dis- from large towns is salted and put into or firkins, which weigh about 56 lbs.; 3 or 4 lbs. of salt are required for purpose, which should be of the finest purest description, totally free from the r deliquescing salts which commonly ed in that made by artificial heat from vater. The casks also should be made of wood, and before the butter is placed em they should be well washed with brine. "If," says a writer in the *Penny lopædia*, "there is not a sufficient quan- to fill the cask at once, the surface ade smooth, some salt is put over it, a cloth is pressed close upon it to ex- le the air. When the remainder is added the next churning, the cloth is taken off, the salt which had been put on the face is carefully removed with a spoon. e surface is then made rough with a small oden spade, and left so, and the newly ed butter is added, and incorporated pletely. This prevents a streak which ld otherwise appear at the place where two portions joined. When the cask is ome salt is put over it, and the head is on. If the butter is well freed from he butter milk, and the salt mixed it quite dry, it will not shrink in the and it will keep its flavour for a long Dr. Anderson recommended for pre- g butter a composition of salt 2 parts, re 1 part, sugar 1 part; 1 oz. of this to 16 oz. of butter. It seems that thus treated will keep sweet for a ned period; but that for the first t it does not taste well.

evonshire the method of making peculiar to the county. The milk in tin or earthen pans, and twelve fter milking, these pans (each bout eleven or twelve quarts) are n an iron plate, over a small fur- he milk is not boiled, but heated hick scum arises to the surface; if small portion of this is removed ppear, the milk is removed, and to cool. The thick part is then the surface, and this is the *clouted* Devonshire, which is known all over By a gentle agitation this clouted speedily converted into butter.

In Holland they churn the cream and milk together, after it has been kept sufficiently long for a slight acidity to appear. They churn, it seems, sometimes with a horse, sometimes by a dog, or turnspit, working on a wheel; a plan which I think might be well adopted, in many cases, in this country, to the saving of the labour of many a poor dairy-maid. In the large dairies, however, about Dixmunde and Furnes, the cream only is churned three times a week. (*Flemish Husb.* p. 61.)

On an average, four gallons of milk produces a pound of butter, and a good cow should produce six pounds of butter per week in summer, and three pounds in winter. Of English butter, that of Cambridge and Epping is the most celebrated. But the consumption in England is much greater than the farmers can supply: very large quantities are in consequence annually imported into this country; thus, in 1825, the import from Ireland amounted to 422,883 cwts., and from foreign countries 159,332 cwts.; this last in 1835 was 134,346 cwts., of which 106,776 cwts. came from Holland. (*M'Culloch's Com. Dict.; Trans. High. Soc.; Quart. Journ. Agr.*)

BUTTER-BUR. (*Tussilago Petasites.*) This singular plant grows in moist situations, and its leaves continue till winter sets in. The flowers appear in April, before the leaves, growing upon round, thick, spongy stalks of a whitish colour, having a few fibres or scales instead of leaves growing upon them. A spike of reddish flowers garnish the top of each stalk, the whole not rising beyond eight inches in height. When they are dead and gone the leaves rise, and are recognised by their large size as well as by their being dark green on the upper side, whitish underneath, and standing singly upon their hollowed foot-stalks of a white, purple, or green hue. They are often three feet broad. The root is white, long, and creeps under the surface of the ground. It is a slight diuretic.

BUTTER and EGGS. See TOAD-FLAX.

BUTTER-CUP, butter-flower, or upright meadow crow's-foot (*Ranunculus bulbosus*, Smith). A common perennial weed, abounding in meadows and pastures, and blooming in May. The whole plant is extremely acrid, so as often to be employed by country people to raise a blister. Bees are, however, very fond of it; it is eaten by sheep and goats; but horses, cows, and swine refuse it; drying destroys its acrimony. The roots are perennial, and bulbous; the stem rises a foot high, and bears its yellow flowers on the ends of its branches.

BUTTERFLY. The common English name, says Brande (*Dict. of Science*), of an extensive group of insects, as they appear in their last and fully developed state, when they constitute the most beautiful and elegant examples of their class. These insects belong to the order *Lepidoptera*, and to the section *Diurna* of Latreille, or the genus *Papilio* of Linnæus. The eggs of the butterfly are deposited on such plants as afford the nutriment most appropriate to the caterpillars, that are to be excluded from them; thus, the common white butterfly (*Pieris brassicæ*) and other species oviposit upon cabbages, and hence have been termed *Brassicariæ*; the gaudy peacock butterfly lays her eggs upon the nettle. The eggs are coated with a glutinous secretion as they are excluded from the parent, and thus they are provided with the means of adhesion to the leaves, or stems of the plants selected.

BUTTER-JAGS. Provincially the flowers of the wild trefoil.

BUTTERWORT. (*Pinguicula vulgaris.*) A perennial weed growing in moist soils, as bogs and wet heaths. The viscid exudation of the leaves, which are thick and glutinous, says Smith (*Eng. Flor.* vol. i. p. 29.), is reputed to be good for the sore teats of cows, whence the Yorkshire name of this plant, sanicle. The country people make it into a syrup as a purgative, and boil it with their garden herbs in broth as a remedy in colds. An ointment made from butterwort is also used for chapped hands, and to rub upon animals when bitten by an adder or slow-worm.

BUTT-LOAD. A provincial word applied to a load of six seams.

BUTT OF A TREE. That part of the tree to which the root is attached. It is also sometimes applied to the lower part of the stem.

BUYING AND SELLING. Sale or exchange, says Blackstone (*Com.* vol. ii. p. 446.), is a transmutation of property from one man to another, in consideration of some price or recompense in value. If it be a commutation of goods for goods, it is more properly an *exchange;* but if it be a transferring of goods for money it is called *a sale*, which is a method of exchange introduced for the convenience of mankind; for if goods were only to be exchanged for goods by way of barter, it would be difficult to adjust their respective values, and the carriage would be intolerably cumbersome: all civilized nations, therefore, adopted very early the use of money, for we find Abraham giving "four hundred shekels of silver," for the field of Machpelah (*Gen.* xxiii. 16.); but the practice of exchange is still common to savage nations. The law with regard to exchanges is the same with regard to sales.

Moral writers, says Sugden (
Purchasers, p. 1.) insist, that a s
in *foro conscientiæ*, to acquain
of the defects of the subject of
Arguments of some force ha
been advanced in favour of
doctrine, and our law does no
incide with this strict principle
If a person enter into a contr
knowledge of all the defects i
no question can arise. So, if
the contract the vendor was
any defect in the estate, it se
purchaser must take it with
and cannot claim any compensa
But if the vendor knows that
tent defect in his estate, which
could not by any attention wha
discover, he is bound to disclos
the estate be sold expressly
its faults. But a purchaser is
disclose to the vendor any late
in the estate, as for instance i
covered a mine on it. (2 *Bro.*
purchaser cannot obtain any
a vendor for a false affirmatio
being deemed the purchaser's
credit a nude assertion of that n
20.) Besides, value consists
and estimation, in which men
102.) But a remedy will lie aga
for falsely affirming that a g
paid for the estate than is actu
for that is a circumstance wi
knowledge; and the same reme
a person who is *not interested in*
if made *fraudulently*, that is,
tention to deceive; whether it
the owner, or from an expect
vantage to the party himself, or
towards the other, or from m
ness, appears to be immateri
p. 5.; 3 *T. R.* 51.; 1 *East*, 318.;
10 *Vesey, jun.* p. 470.) See

If a man buys goods at a
he may not carry them away
paid for them, for it is no
payment, unless the contrary
agreed; and therefore, if the
the price of a beast is 4*l.*, a
dee says he will give 4*l.*, the
struck, and they neither of
liberty to be off, provided im
session be tendered by the othe
if neither the money be paid n
delivered, nor tender made, no
quent agreement be entered i
contract, and the owner may d
goods as he pleases. (*Hob.* 41.)
part of the price is paid down,
a penny, or any portion of the
vered by way of *earnest*, the pr
goods is absolutely bound by

recover the goods by action, as
endor may the price of them.
ot do in buying a horse to pay
ng and take it back again. (7
And such regard, continues
vol. ii. p. 447.), does the law pay
an evidence of a contract, that
ar. 2. c. 3., no contract for the
, to the value of 10*l.* or more
unless the buyer actually re-
the goods sold, by way of ear-
art, or unless he gives part of
the vendor by way of earnest
argain, or in part of payment,
e note in writing be made and
e party or his agent, who is to
ith the contract; and with re-
ls under the value of 10*l.*, no
greement for the sale of them
d, unless the goods are to be
hin the year, or unless the con-
e in writing, and signed by the
agent who is be charged there-
he note must state the price of
8 *D. & R.* 345.): anciently,
ls was held necessary to bind
A sale thus made was called
in process of time the same
ade to signify the price or ear-
was given immediately after or
he shaking of hands. As soon
ain is struck, the property of the
sferred to the vendee, and that
e to the vendor. But the pur-
ot take the goods until he tenders
reed upon. (*Hob.* 41.) But if he
money to the vendor and he re-
vendee may seize the goods, or
ction against the vendor for de-
m. And by a regular sale without
he property is so absolutely vested
dee, that if A. sells a horse to B.
d B. pays him earnest, or signs a
ting of the bargain, and afterwards,
delivery of the horse or money
horse dies in the seller's custody,
entitled to the money, because by
ct the property was in the pur-
Noy, c. 42.)

gard to stolen horses, a purchaser
roperty in a horse which has been
less it be bought in a fair or mar-
according to the directions of the
c. 7. and 31 Eliz. c. 12.; by
enacted, that the horse shall be
posed in the time of such fair or
one whole hour together, between
morning and sunset, in the public
for such sales, and not in any
rd or stable, and afterwards
both the vendor and the vendee
-keeper of such fair or market;
paid if any be due, and if not, one penny to the book-keeper, who shall enter down the price, colour, and marks of the horse, with the names, additions, and abode of the vendor and vendee, the abode of the former being properly attested. But in case any one of these points be not observed, such sale is utterly void, and the owner shall not lose his property, but at any distance of time may seize or bring an action for his horse wherever he happens to find him. (*Blackstone*, vol. ii. p. 451.)

BUZZARD. (*Falco Buteo.*) The buzzard is one of the most common of the larger kind of hawks which inhabit the wooded districts of this country, preying upon small quadrupeds, birds, and even reptiles. There are several kinds of buzzards, the principal of which are the common buzzard (called provincially the puttock), the rough-legged buzzard, and the honey buzzard. The length of the common buzzard is 21 inches, breadth 50, weight 32 oz. Bill bluish; cere, irides, and feet, yellow. Plumage above, deep brown; below, greyish brown. Breeds in trees; eggs two or three, size of those of a hen, white, with rusty spots at large end. The rough-legged buzzard in colour resembles the common buzzard, nor does it greatly differ in size, but is readily distinguished from it by its feathered leggings, which reach nearly to the toes. Eggs four, clouded with red; feeds on *glires* and frogs. The honey buzzard derives its vernacular name from feeding on the larvæ of bees and wasps. Its length is 23 inches, breadth 52; weight 31 ounces. Bill, cere, gape, and claws, black; irides and feet, yellow. Eggs grey, with obscure spots. See HARRIERS and HAWKS. (*Blaine's Encyc. of Rural Sports*, p. 686.; *Yarrell's Brit. Birds*, vol. i. pp. 76—85.)

BYRE. A term made use of in some places to signify a cow-house. It is commonly employed in the northern parts of the island, and in Scotland; and they are differently denominated, according to the uses to which they are applied: thus, there are feeding-byres, turnip-byres, &c.

BYSLINS. A provincial word signifying the first milk of a new-calved cow.

C.

CABALLARIA. An ancient tenure of land, by which it was necessary to furnish a horseman with suitable equipage, for the use of the lord in time of war, and on other occasions.

CABBAGE. (Fr. *cabus*; probably from *cab*, old Fr. for head, top, or extremity. Ital.

cabuccio; Dutch, *kabuys.* "But the form of the cabbage, resembling a head, shows *caput* to be the original."—*Todd's Johnson.* Lat. *brassica;* from πρασιχη, a garden herb; or perhaps from *brachia,* from its numerous sprouts.) A biennial genus of plants, of which there are a large number of species and innumerable varieties. Many are extensively cultivated in the vicinity of London; and several kinds are also grown by the farmer for the purpose of feeding his cattle and sheep. Our field and garden cabbages, with their varieties, have originated from the *Brassica oleracea,* or culinary cabbage, an indigenous sort of colewort growing principally on cliffs near the sea-coast. It is found abundantly at Dover. (*Smith's English Flora,* vol. iii. p. 220.) The cabbage, says Mr. Amos (*Comm. to Board of Agriculture,* vol. iv. p. 178.), is a most invaluable plant, very productive, accessible at all times, and is an infallible supply for sheep-feeding during the spring months, especially for ewes in lamb. Beasts and sheep are all exceedingly fond of cabbages. It may be of some importance to the farmer to be informed that among all the plants of the natural order to which the cabbage belongs, not one perhaps is possessed of any really deleterious property. Among nearly one thousand species (as Dr. Lindley observes), scattered over the face of the world, all are harmless, and many highly useful. The innumerable varieties arise from difference of soil and cultivation; and as all the cabbage tribe form hybrids, new varieties are continually produced. This is effected by the bees, when different sorts are in flower. Hence, only one variety should be in flower at the same time in any garden or field, when we wish to keep the sort unadulterated, particularly if some sorts have expanded leaves, and others close heads. It is thus only that the excellent small miniature cabbage, which grows on the stem of the Brussels sprout, can be kept in perfection. The different sorts of cabbage most prized for the garden are chiefly divided into the close-hearting and the spreading. Of the first, the York and the savoys are the most common; of the latter, the coleworts and Scotch kale. (*Penny Cyclo.* vol. vi. p. 92.) Of the genus *Brassica,* or cabbage, the species chiefly interesting to the farmer, and the objects of cultivation, are, 1. Common turnip (*B. Rapa*); 2. Wild navew (*B. campestris*); 3. Rape or cole (*B. Napus*); 4. Early cole (*B. præcox*); 5. Cabbage (*B. oleracea*). These species may be cultivated nearly in the same manner, but they may produce small fusiform roots when they are cultivated for their leaves, or for their seeds, which yield oils; or they may
produce large esculent roots when t
cultivated chiefly for their roots.
Elem. of Prac. Agric. p. 290.) The d
kinds of cabbage in cultivation ma
Professor Low (p. 307.), be arranged
ferent classes, according to their
aspect and more popular characte
Those which bear their leaves
without their being formed into
Some of these have crisped leaves,
a class of hardy potherbs every w
miliar in the culture of the garden
have smoothish leaves, with long b
stems. These comprehend the larg
most productive of all the cabbages,
Jersey cole, the thousand-headed ca
and others. 2. Those whose leav
formed into a large head. These comp
the larger cabbages cultivated in the
The savoys of our gardens are allied
class. 3. Those whose roots become
form, as the *kohl-rabe.* 4. Those in
the stem divides, and forms a corymbo
as in the cauliflower and broccoli.

The cabbages of the first class
crisped leaves, frequently termed gre
very hardy. They are cultivated
extensively in some parts of the n
Europe; but in others they are chi
garded as potherbs, and confined
garden. The branched kinds with sm
leaves are the most productive; but
same time they demand a good soil
vourable climate. Their leaves are
off as they are required for use; and
are constantly supplied by fresh lea
plants yield a succession of forage thro
a great part of the season, and they
growing for several years.

There are different varieties of
larger cabbages, which are more or l
lued in the places where they are cult
The thousand-headed cabbage, *chou*
têtes, is remarked as possessing a
number of shoots; the cow cabbage
rean cole or tree cabbage, as growin
to one stem, and producing cream-c
flowers; the Jersey cole, as being si
its growth, and producing yellow
In the Netherlands, and the Channel
where the cultivation of these plants
understood, they are sown in beds in
and planted out in succession fro
vember till February. About the
of April the farmers begin with t
sown, to strip off their under leaves
They give them to their cows, hogs,
and other stock, cutting them in small
and mixing them with bran and o
rinaceous substances. During the
they continue this process of strip
the leaves, the plant in the meantim
to the height of several feet. (*Gar*

is plant requires a good soil and
anure, and is regarded as a great
of the soil. It perhaps yields a
portion of nutriment within the
d than any other forage plant.
presumed that it is not well fitted
cultivation, and in this country
ucceed in favourable situations,
th of England and Ireland, and
ful little islands where it is now

t class (continues Professor Low)
those in which the root becomes
The principal variety is the kohl-
urple turnip cabbage (*Brassica*
ar. *caulo-rapa*).[*] This plant is
in Germany and the north of
It is valued as a resource for cat-
ter. While it produces a root like
it at the same time sends forth
ring leaves like a cabbage. It is
hardy, but keeps better in store
plant of the cabbage kind. It may
ated in the same manner as the
and yellow turnips; but the ex-
that have been made with it in
ry lead to the inference that it is
to those turnips for the purpose
g. The cabbages of the last-men-
as, as the cauliflower and the broc-
entirely limited to the garden.
ds of the cabbage which are best
r field crops and the support of cat-
e York, or large Scotch, the ox-
drum-head, the red-veined, and
ican, which commonly produce
0 to 20 lbs., and not unfrequently
upwards of 30 lbs. weight. The
other names, however, are fre-
plied where there is no real dis-
The most productive of these are
headed and American; but the
and Scotch stand the winter best.
ll known by their large leaves,
he plant advances collapse and
se head. The large field cab-
hose which are generally consi-
e best suited to farm culture,
erefore those most commonly
t the species known as the sugar-
, and so called from its pointed
h rarely exceeding from 5 to
t be in many cases found more
, for it can be grown on land of
y quality than the other kinds;
n constitution, more solid and
d the inferiority of its weight
great degree made up by the
its size allowing of the plants
er together (*Brit. Husb.* vol.
f the different kinds, therefore,
t the large field cabbage, what-
may receive, is that which is best suited for common field culture. This plant impoverishes the soil very much. In collecting the produce for consumption, the plants (says the late Mr. Sinclair) should be drawn up by the roots, and not merely cut over, as is often practised to the detriment of the soil. The different varieties above enumerated afford about equal quantities of nutritive matter. The nutritive matter of the cabbage is wholly soluble in water; that of the potato only partially so, for a great proportion of the potato consists of starch. According to Mr. Sinclair's experiments—

	Nutr. Matter, grs.	Woody Fibre, grs.	
7000 grs. or 1 lb. of the drum-head cabbage (*B. oleracea capitata*) contains	430	280	The remainder water.
—— Early York cabbage (*B. oler.*, var.)	430	312	
—— Woburn perennial kale (*B. oler. fimbriata perennis*) - - -	438	932	
—— Green curled kale (*B. oler. viridis*)	440	880	
—— Purple borecole, or kale (*B. oler. laciniata*) - - - -	448	1120	
—— bulb of turnip-rooted cabbage (*B. Rapa*, var.) - - - -	400	320	
—— Leaves or tops of ditto - -	252	360	

And upon an analysis of the respective average nutritive qualities of each species of root, cabbages were generally found superior to common turnips, in the proportion of 107½ to 80, and inferior to Swedes in that of 107½ to 110. Carrots are more nutritive than cabbages, in the proportion of 187 to 107½. (*Hort. Gram. Wob.* p. 407-8.) It is, however, the opinion of an experienced farmer (Mr. Brown of Markle), that the culture of cabbage, taking into consideration the greater consumption of manure, and the superior nature of the requisite soil, does not afford advantages to be compared with the scourge it occasions to the land. (*Brit. Husb.* vol. ii. p. 258.)

It is no uncommon thing to raise single cabbages that weigh 40 lbs.; calculating the roots upon an acre to average each 20 lbs., and one to be planted on every square yard, the produce would yield 43 tons: although it frequently averages 30 tons, few crops, except under very favourable circumstances, would reach to that extent. Cabbages are greatly esteemed by those farmers who have land capable of growing them, from their forming a substitute for turnips during frosty weather, and also affording an admirable change of food for cattle, by whom they are much relished; and they are also found to be very nutritious for stall feeding, or for the dairy, when used with the addition of sound hay. Hogs prefer them to turnips, and they are excellent for rearing calves and toothless crones. An acre of good cabbages is therefore considered by many as worth two of turnips, and is certainly equal to one and a half.

Woburn perennial kale is a valuable variety of the open-growing cabbage, which has been recently introduced, and appears far superior in amount of produce to either the green, purple, or borecole, and requires less manure. It has also this advantage, that it continues highly productive for many years, without further trouble or expense. Propagated by planting, in beginning of April, cuttings taken from the stems and branches of old plants. The seed is apt to produce spurious plants. For the table it is not inferior to the best kinds of greens, or kale; and for the farm and cottage garden its highly productive powers, and cheapness of culture, promise to render this plant highly valuable. Its perennial habit places it out of the reach of the yearly accidents of weather, bad seed, and depredations of insects, to which all other varieties sown annually are subject. (*Trans. Hort. Soc. Lond.* vol. v. art. 40.)

The *turnip-rooted*, or bulb-stalked cabbage (*B. oleracea*, var.), is distinguished by its irregularly-shaped root, and the swelling of the stalk in the upper part, which forms a kind of round fleshy head at the end of the stem, on which the leaves are produced. It is a native of Germany, and was first introduced from thence by Sir Thomas Tyrwhitt, under the name of *Kohl-rabe*. (*Decandolle*, in *Trans. Hort. Soc.* vol. v. art. 1.) The produce is nearly the same as that of Swedish turnips, and the soil that suits the one is equally good for the other. Two pounds of the seed will produce a sufficiency of plants for one acre: 64 drs. of the bulb of kohl-rabe afford 105 grs. of nutritive matter. (*Hort. Gram. Wob.* p. 411.)

The turnip-rooted cabbage is a hybrid production between the cabbage and turnip, which both belong to the same genus; and the various kinds which have become disseminated throughout Europe are so confused in nomenclature, that it has become difficult to state their properties with any great degree of precision, or to draw any certain inferences to guide us in their use. (*Brit. Husb.* vol. ii. p. 259.)

These species of brassica are but little cultivated, and at most a very small quantity of each is in request. The bulbs, for which they are cultivated, must have their thick outer skin removed, and in other respects treated as turnips in preparing them for use. Of the turnip cabbage, which is so named on account of the round fleshy protuberance that is formed at the upper end of the stem, there are four varieties: — 1. White turnip cabbage; 2. Purple turnip cabbage; 3. Fringed turnip cabbage; 4. Dwarf early turnip cabbage.

Of the turnip-rooted cabbage, which is distinguished from the above by its root having the protuberance near the origin of the stem, there are two varieties,
and the red. (*Trans. Hort. S*
vol. v. p. 18—24.) They are p
by seed, which may be sown broad
drills at monthly intervals in smal
ties, from the commencement of A
the end of June. The best mode
thin, in drills two feet and a half a
allow the plants to remain where
plants being thinned to a similar
apart; or, if sown broadcast, to al
to remain in the seed-bed until of
size to be removed into rows at si
tances for production, rather than,
practice of some gardeners, to
them, when an inch or two in heig
shady border in rows three inches
way, to be thence removed as abo

Water must be given every nig
removal until the plants are ag
blished; and afterwards in dry we
casionally, as may appear necessar

Earth may be drawn up to the
the turnip cabbage as to other s
brassica; but the bulb of the turn
must not be covered with the mou

For directions to obtain seed,
Broccoli, Turnip, &c. (*G. W.*

The red cabbage differs from the
cabbage in nothing but its colour,
purplish or brownish red. The va
three in number; the large, the d
the Aberdeen red. It is chiefly
pickling, and the dwarf red is cons
best sort. Cultivated precisely
the white cabbage. The cabba
nearly só extensively cultivate
country as it ought to be. It is
valuable food for live stock, rare
plant, and is come-at-able in all
but it is exceedingly useful to fi
spaces on the ridges where the Sw
common turnips have missed pla
parts of cabbage contain 73 parts
tive matters. (*Brit. Husb.* vol. ii.;
Agr. Lib.; Sinclair's Hort. Gra
Low's El. Agr.; Com. Board
vol. iv.; *Quart. J. Agr.*, vol. vii. p.

The cauliflower is considered t
to be digested of all the various
cabbage. It is not destitute
in a medicinal way; a decoctio
cabbage being supposed capable of
acrimonious humours in some di
the breast, and also in hoarseness.
Dom. Encyc.) A cabbage leaf
any fleshy part acts in keeping
blister; but it should be frequently
as it speedily becomes corrupt.
bruised and boiled is good in bro

Garden Cabbages.—For the se
soil should be moist, mouldy, and
but for final production it should

h clayey loam, though very
om heavy, as they delight in
and mouldy. Such crops as
tand the winter may have a
tment allotted to them; the
cular, requires this, though it
as for the other crops with-
ent: an extreme of richness
r all the crops to be avoided.
is advantageously dug two
nd should be well pulverized
on. Stable manure is usually
eparing the ground for this
Mr. Wood, of Queensferry,
for the greater part of his
ular attention to the cultiva-
i, recommends the following
a preference for that vege-
are justified in concluding
d be equally beneficial to all
ies. The manure collected
roads used alone causes the
strong, but with small heads.
road-rakings, sea-weed, and
better. A manuring of the
on which they were intended
with sea-weed in autumn,
ough, repeating the applica-
, and pointing the ground
, produced the finest heads he
but the compost of all others
to them is one composed of
f old ditches, tree leaves, and
aled. Hort. Soc. vol. ii. p. 265.)
nust in every instance be free
ugh for the summer crops
eous to have them shaded
lian sun. They must never,
nder the drip of trees, or in
tions; for in such they, and
ys, are most subject to be in-
terpillars, and to grow weak
. In planting cabbage, it
rved whether the roots of the
tted or clubbed, as such should
the excrescence entirely re-

ous varieties of the cabbage,
W. Johnson, may be divided
sses, as most appropriate for
qual number of periods of the
be here remarked, that, for
t few should be planted of the
, as they soon cabbage, harden,
the contrary, the large York,
t are mentioned in the middle
not far behind the others in
ing, never become hard, and
in a state fit for the table.
rops.—Early dwarf; York;
sugar-loaf; early Battersea;
; East Ham.
Crops.—Large early York. Large sugar-loaf. Early Battersea; early imperial: these mentioned again as being valuable for successional crops also. Penton: this is valuable in late summer, when other varieties are strongly tasted. Antwerp. Russian: to have this in perfection, the seed must be had from abroad, as it soon degenerates in this country. Early London hollow. Musk is excellent at any period, but is apt to perish in frosty weather.

For Autumn, &c.—Large hollow sugar-loaf; large oblong hollow; long-sided hollow, and any of the preceding; red Dutch for pickling.

The cabbage is propagated by seed, the sowing of which commences with the year. Towards the end of January, on a warm border, or under a frame, a small portion of the early and red cabbages may be sown, to come first in succession after those which were sown in the August of the preceding year. A sowing may be repeated after intervals of a month during February, and until the close of July of the second or larger class, and from May to July of the third class of varieties. In August a full and last crop must be sown of the first class, as well as of the second, both to plant out in October, November, and December, as to remain in the seed-beds for final removal in the February and two succeeding months of the next year: this sowing is best performed during the first or second week of the month; if sown earlier, they are apt to run in the spring; and if later, will not attain sufficient strength to survive the winter. By these various sowings, which, of course, must be small ones for a private family, a constant supply is afforded throughout the year. The seed is inserted broadcast rather thin, and raked in evenly about a quarter of an inch deep. The bed is advantageously shaded with mats, and occasionally watered until the plants are well above ground; and the waterings may afterwards be beneficially repeated two or three times a week until they are ready for removal, if dry hot weather continues. The seedlings arising from these various sowings, when of about a month's growth, or when they have got four or five leaves an inch or so in breadth, are, by those who are advocates for transplanting, pricked out in rows four or five inches asunder each way; they must be shaded and watered until completely established: those of the August sowing that are pricked out are to remain until the next spring, and those which are left in the seed-bed are employed for planting in October and two following months.

When of six or eight weeks' growth, they are of sufficient size for planting, which they are to be in rows from one and a half to two and a half feet asunder each way; the smaller early kinds being planted the closest. The red cabbage, the principal plantation of which should be made in March for pickling in September, is benefited by having the distances enlarged to three feet. They must be well watered at the time of removal, and frequently afterwards, until fully established, in proportion as dry weather occurs. They must be frequently hoed to keep under the weeds, as perhaps no plant is more injured by them than the cabbage; and as soon as their growth permits it, the earth should be drawn round the stems of the plants. To promote the cabbaging of the plants, when requisite, it is useful to draw the leaves together with a shred of bast-mat, which forwards it about a fortnight. If any plants advance to seed whilst very young, the deficiencies should be immediately filled up. The stems of the summer and autumn crops, if left after the main head has been cut, will produce numerous sprouts during those seasons, and continue to do so throughout the winter. For the production of seed in October, which is the preferable season, and from thence until the close of February, some of the finest and best cabbage plants must be selected; or in default of these, though not by any means to be recommended, such of their stalks as have the strongest sprouts. They must have the large outer leaves removed, and then be inserted up to their heads, in rows three feet asunder each way. Each variety must be planted as far from any other as possible, as indeed from every other species of brassica; and this precaution applies equally to those which will be subsequently dwelt upon. The red cabbage especially must be kept distinct. Some plants of the early varieties should be planted in sheltered situations, as in severe winters they are apt to run prematurely.

Frame Seedlings.—The first sowing of the year in a hotbed must be carefully attended to. The heat must never exceed 55°, nor sink more than two or three degrees beneath 50°, which is the most favourable minimum; otherwise the plants will be weak and tender, or checked and stunted. Air should be admitted freely in the day, and the glasses covered, as necessity requires, at night with matting; the other offices of cultivation are the same as for plants raised in the open ground.

Coleworts.—One of the Latin names for cabbage is *caulis*, and from this is derived cale or cole and colewort. Coleworts now merely signify cabbages cut young, or previously to their hearts becoming firm, the genuine colewort or Dorsetshire cale being nearly extinct. The varieties of cabbage
principally employed for the raisi
worts are the large York and suga
they afford the sweetest; but the ea
and East Ham are also employed, a
casionally the Battersea, imperial,
and early London hollow. Wh
coleworts are in request, the great
varieties should never be employed

Sowings may be performed d
middle of June and July, to be
at the end of the latter month, f
planting in August, September,
tober, for a continual supply in S
until the close of March. A fou
be made the first week in August,
ceeding the others in spring; b
sufficient extent, these various pl
may be made from the seed-bed
cabbage crops made at these severa
as directed under that head; as
object in growing coleworts is t
supply of greens sooner than can be
from the plantations of cabbages
form hearts.

The observations upon transpla
the directions for cultivating cabba
without any modification to colew
the distance at which the plants m
is much less: if the rows are a f
and the plants seven or eight inch
from each other, an abundant sp
lowed. As mentioned for cabb
heading is greatly forwarded by th
being drawn together so as to en
centre. They may be cut when t
are five or six inches in breadth.
preferable mode of taking them
up or cut every other one: these
are beneficial to the remaining pl
some, especially of the August-rais
may be left, if required, for cabba

Colewort, or Dorsetshire kale,
nearly superseded by the new ca
modern times. The wild colewort
ditches and moist places.

Savoy. (*Brassica oleracea*
The savoy, which is one of the
chief of our vegetable supplie
the winter, derives its name eit
being an introduction from that
Europe with which it bears
name, or, otherwise, is a corrupt
the French *savourer*. All its vari
be denominated hardy, being gene
dered more sweet and tender
though not all equally capable of w
ing the rigour of winter. There
varieties of savoy,—the yellow,
and the green; and of each of th
are likewise two sub-varieties,
and the oval-headed, the first of w
most permanent. Each variety
described by Mr. Morgan, garden

, Esq., of North Mimms. Like the
embers of this tribe, it is propagated
; the first sowing to take place at
e of February, the plants of which
y for pricking out in April, if that
is adopted, and for final planting at
of May for use in early autumn;
be repeated about the middle of
the plants to be pricked out in May
ing in June, to supply the table in
and early winter; lastly, the main
ist be sown in April and early May,
out and plant after similar intervals
uction in winter and spring. The
own broadcast thinly, and raked in
oned for other species of Brassica.
nts are fit for pricking out when
e four or five leaves about an inch
th; they must be set three or four
sunder each way, being both here
the seed-bed kept well cleared of
When finally removed, the plants
rst crops should be set out two feet
ch way from one another; but the
tanding crops are better at two feet
een inches. Both before and after
emoval they should be watered
tly, if the weather is at all dry;
application to be continued until
nts are well established. The only
lture required is the keeping them
f weeds by frequent broad-hoeing
earth drawn up two or three times
heir stems. For the production of
ch plants must be selected of the
varieties as are most true to their
ar characteristics, and as are not the
run. These, in open weather, from
November to the close of February,
ier, however, the better, may be taken
as little injury as possible to the
nd the large under leaves being re-
planted entirely up to the head in
o feet and a half each way, each va-
far from the other as possible. They
n May or June, and ripen their seed
y and August. (*G. W. Johnson's*
Garden.)

ALIA, SOW THISTLE-LEAVED.
a sonchifolia.) An annual, native of
st Indies. It grows a foot high,
ng an orange red-coloured flower in
Propagate from seed sown in March,
otbed under glass; pot each plant,
ep them out during summer. Water
ly.

TUS. (*Cactus speciosus.*) This beau-
cculent perennial plant is a native of
rica. It loves a mixture of light soil
ck rubbish to bloom its flowers well,
are very large, and of a magnificent
lour. The cactus requires a dry soil,
re it should only be slightly watered while in flower. It blooms in June. It will thrive very well in a warm room with a southern aspect, otherwise it requires a frame. Bruising the end of each fleshy leaf forces it into flower. Propagate from cuttings. When each cutting has been laid by a day or two till the cut end has dried, stick it in a pot of mould to strike. The strikes flower the third year.

CADDOW. A name given to the jackdaw in some of the northern counties.

CADE. A provincial term for a cag, cask, or barrel. A cade of herrings is a cask containing five hundred.

CADE-LAMB. A young lamb brought up in the house wholly by the hand.

CADIS, or PHRYGANEÆ, are flies commonly employed by the angler; the chief of which is the *P. grandis*, or stone-fly of the angler, which he employs both for trout and grayling. They come from an aquatic larva called a *cad-case*. (*Blaine's Dict.* p. 1007.)

CADMA. A term applied to the smallest of the pigs which a sow has at one farrowing, and which is commonly much less than any of the rest.

CAG, or KEG. A vessel of the barrel kind, containing four or five gallons.

CAHYS. A dry-measure of corn, employed in some parts of Spain, which is nearly equal to our bushel.

CAIRN. (Welsh *carn.*) A heap of stones.

CAKE. See OAT CAKE and RAPE CAKE.

CALAMINT, COMMON. (*Thymus Calamintha*, Smith.) This is a wild plant, growing in our hedges and dry places, flowering from June till autumn. It is eight or ten inches high; has roundish dark green leaves, and whitish flowers standing in whorls or little clusters surrounding the stalks, which are square and very much branched. Calamint should be gathered and dried just as it is coming into flower. This herb is grown in almost every garden; it is strong-scented, and of an agreeable odour. Coles says it preserves meat from taint.

Pennyroyal Calamint (*Mentha Pulegium*, *Eng. Flor.* vol. iii. p. 87.) is a medicinal herb, and should be planted in every herbalist's garden. It grows a foot high, with firm stalks, small leaves of a light green colour, and hairy, and small white purplish flowers. The pennyroyal calamint is more erect than its elder sister, and has a stronger but less pleasant smell. It must be dried with care, and given in infusion. It is a popular remedy for hysterics, and in deficiency of the periodical change in females; but the plant and its infusion is rarely ordered by professional men. A water arising from the distillation of the plant, to procure its volatile oil, is used as a vehicle for more important drugs; and the oil dropped on sugar and rubbed up with water as an oleosaccharum, is sometimes employed as a carminative and an antispasmodic, in doses of two to five drops. There is, also, an officinal spirit of pennyroyal, which is used for the same purposes as the oil.

CALANDRE. A name given by French writers to an insect of the *Scarabæus* or beetle tribe, which frequently does great injury in granaries. It has two antennæ or horns, formed of a great number of round joints, and covered with a soft and short down; from the anterior part of the head there is thrust out a trunk, which is so formed at the end that the creature easily makes way with it through the coat or skin that covers the grain, and gets at the meal or farina on which it feeds; the inside of the grain is also the place where the female deposits her eggs.

CALANDRINIA, LARGE-FLOWERED. (*Calandrinia grandiflora.*) A beautiful succulent plant, native of Chili, delighting in a warm sheltered situation in summer, but must be taken under cover in winter. A large pot is the best thing for it, as it is portable. Its large bright purple flowers keep blooming many weeks in succession, from the summit of its curious branches. It must be watered very cautiously, as it loves a dry soil. Propagate by cuttings, or from seed.

CALCAREOUS SOILS (from the Latin *calx*), are soils which contain carbonate of lime (chalk or limestone) in such a proportion as to give it a determinate character. Calcareous sand is merely chalk or limestone divided into pieces of the size of sand. This variety abounds on the seashore in some parts of the east of England, and is employed in Devonshire and Cornwall to a very large extent as a manure, especially about Padstow Harbour, from which bay many thousand tons are annually carted by the Cornish farmers, which they take free of toll, under a grant from Richard Duke of Cornwall, and another of the 45th of Henry III., A. D. 1261. (*Johnson on Fertilisers*, p. 17.) See CHALK; EARTHS, *their Uses to Vegetation;* and SOILS.

CALCEOLARIA, CRENATE-LEAVED. (*Calceolaria crenatiflora.*) An herbaceous plant, native of Chili, with rich dark green foliage. It should be brought up in pots in a shady situation, and kept under cover in winter. Propagated by seed, and by dividing the crown of the root. *Calceolaria diffusa* is half hardy, doing well in open borders, and flowering from July to October. It must be potted, and kept covered in winter. *Calceolaria Herbertiana* is a branching plant in constant flower, but requires protection in winter. It produces two crops of blossoms. Increased by cuttings. There are many varieties of calceolarias.

CALCOENSIS, HENRY. A prior of the Benedictine Order. His love of science and literature induced him to travel into France, Germany, and Italy, solely to enjoy an intercourse with the learned. He wrote a *Synopsis Herbaria*, and translated Palladius, *De Re Rustica*, into the Gaelic, about A. D. 1493.

CALENDAR. (Lat. *calendarium.*) See the respective months.

CALF, DISEASES OF. (Sax. cealꝼ, calꝼ; Dutch *kalf.*) See CATTLE. The most common diseases of calves are —

1. *Navel Ill.*—The best treatment for this dangerous disease is, 1st, to administer two or three doses (each about a wine-glassful) of castor oil (linseed oil does just as well, and is much cheaper); and, 2dly, cordials, which may be made of 2 drachms of caraway-seeds, 2 do. of coriander-seeds, 2 do. powdered gentian; bruise the seeds, and simmer them in beer or gruel for a quarter of an hour; give these once or twice a day.

2. *Constipation of the Bowels.*—For this doses of castor oil (or linseed oil), of 2 or 3 oz., are the best remedy.

3. *Diarrhœa, or Scouring.*—The farmer may *rely* on the following mixture. Let him keep it always by him; it will do for all sucking animals:—

Prepared chalk -	- 4 ounces
Canella bark, powdered	- 1 —
Laudanum - -	- 1 —
Water - -	- 1 pint.

Give two or three table spoonfuls, according to the size of the animal, two or three times a day.

4. *Hoose, or Catarrh.*—Good nursing, bleeding, and then a dose of Epsom salts, with half an ounce of ginger in it. (*Youatt on Cattle*, 557.)

CALKERS. A name given to the prominent or elevated part of the extremities of the shoes of horses, which are forged thin, and turned downwards for the purpose of preventing their slipping. It is sometimes written *calkins* or *cawkins*.

CALLUNA VULGARIS. The common heath or ling. It abounds in peaty soils. (See PEAT SOILS.) Its uses are considerable in some districts for litter, and, when young, sheep eat it. It is also shelter for grouse, and food for bees. See LING.

CALVES' SNOUT. Snapdragon. (*Antirrhinum Cymbalaria, Smith's Flor.* vol. i p. 131.) This plant grows in our garde and also upon the garden wall, delighti in high and airy situations. It is two f high. The stalks are round and thick, b tolerably upright. The leaves are narro

g. blunt at their ends, and of a bluish
colour. The flowers are red, large,
tanding in loose spikes on the top of
talks. The root is white, and ob-

LVING OF COWS. The treatment
calving is to keep the cow mode-
well, neither too fat nor too lean; re-
er that she commonly has the double
of giving milk and nourishing the
; dry her some weeks before calving;
er bowels be kept moderately open;
er in a warm sheltered place, or house
rather reduce her food; do not dis-
her when in labour, but be ready to
her in case of need; let her have warm
; avoid cold drinks. A pint of sound
ale in a little gruel is an excellent
l drink.

M. A provincial term for a mound
le earth.

MELLIA JAPONICA. A beautiful
reen greenhouse shrub; but if carefully
ded to it will blow in the open air. It
single, double, and semi-double flowers,
bruary and March; and they are red,
, blush-coloured, and various other tints.
t it under a south wall, in good rich
en mould mixed with sand; and shelter
uring winter with mats, or keep it in a
e pot. It cannot endure the broiling
-day sun. Propagate by cuttings, layers,
grafts; and water the plants plentifully
n in flower.

AMLET. (Fr. *camelot;* Ital. *ciambe-*
; Span. *camlote*; from the Gr. *καμηλωτή*.)
uff or cloth made of wool, silk, and some-
of hair combined, especially that of
and camels. The real oriental camlet
de from that of the Angola goat. No
ts are made in Europe of goat's hair
. France, Holland, Flanders, and Eng-
are the chief places where this manu-
re is carried on. The best are made
ngland, and those of Brussels stand next
pute. It has been occasionally written
lot and *camblet.*

AMMOCK. (Sax.) The name of a
l infesting arable, especially chalky soils,
rally known by the name of rest-harrow.
Rest-Harrow.

**AMOMILE, CHAMOMILE, COM-
N or SWEET.** (*Anthemis nobilis.* From
, on account of its abundance of
ers, or luxuriance of growth. Fr. *ca-*
ille; Lat. *chamomilla.*) A hardy per-
al, growing on open gravelly pastures
ommons, flowering from June to Sep-
ber, and well known for its use in me-
e. Cattle do not appear to touch any
of this plant. Most of what is brought
e London market is cultivated about
ham, in Surrey. Every part of the plant is intensely bitter, and gratefully aromatic, especially the flowers, whose stomachic and tonic powers are justly celebrated. (*Eng. Flora*, vol. iii. p. 456.) In gardens there are two varieties,—the common single and the double-flowering. They require a poor dry soil, otherwise they grow very luxuriant, and become not only less capable of withstanding severe winters, but also less powerful in their medicinal qualities. They will grow in any situation almost, but the more open the better. They are generally propagated by parting the roots, and by offsets, which may be planted from the close of February until the end of May; the earlier, however, it is performed the better: this is the most favourable season, but it may be practised in the autumn. They are also raised from seed, the proper time of sowing which is in any of the early spring months; but as the former mode is so easily practised and with much less trouble, it is generally pursued; though it is advisable after a lapse of several years to raise fresh plants, the old ones often declining in production after such lapse of time. Being shrubby, with extending lateral branches, they should not be planted nearer to each other than eighteen inches, as that also gives an opportunity to employ the hoe. Water must be given moderately at the time of planting, if dry weather, otherwise it is not at all required. If raised from seed, they require no further cultivation than to be kept free of weeds in the seed-bed; and when three or four inches high, to be thinned to about six inches apart; after which, they may remain thus until the following spring, then be thinned and remain, or be removed to the above-mentioned distance apart. A very small bed will supply the largest family. In July the flowers are generally in perfection for gathering; the period for performing it, however, must be governed by the aspect of the flowers themselves, as the best time is when they are just opened. Particular care must be taken to dry them thoroughly before they are stored; otherwise they will not keep. If seed is required, the only attention necessary is to leave some of the first opening flowers ungathered; the seed will ripen early in September, when the plant may be cut, and the seed dried, and rubbed out. (*G. W. Johnson's Kitchen Garden.*)

Camomile flowers, fresh or dried, are tonic. They contain *volatile oil*, *bitter extractive*, *tannic acid*, and *piperina*, a resinoid which was discovered in them by Dr. A. T. Thomson, and which, in conjunction with the volatile oil, explains their power of curing agues. The leaves and flowers dried are also anodyne applied to the bowels outwardly in fomentations. Camomile tea if strong promotes vomiting. The flowers of camomile distilled yield a fine blue oil, like that from yarrow, which becomes yellow by time. It is used for cramps, &c. The double flowers have not the same virtue which the single ones possess. The infusion is a useful stomachic in weakened states of the stomach, and as a general tonic. The strong warm infusion is a useful emetic in low states of the habit, and to promote the action of other emetics. Combined with any astringent, camomile is an antiperiodic and cures ague.

Smith (*Engl. Flor.* vol. iii. p. 457.) enumerates four other species. The sea camomile (*A. maritima*); annual, met with on the sea-coast, but rare; flowers smell like tansy, the leaves like mugwort. Corn camomile (*A. arvensis*); annual or biennial, in cultivated fields, as well as waste ground, chiefly on a gravelly soil. The herbage has little or no smell, but the flowers are pleasantly scented. The stinking mayweed, or camomile (*A. Cotula*); an annual, found in the same situations as the last. Every part of the plant is fetid and acrid, blistering the skin when much handled, which Dr. Hooker justly attributes to the minute resinous dots sprinkled over its surface. And the ox-eye camomile (*A. tinctoria*), found sometimes in stony mountainous places, growing on a bushy stem eighteen inches high. The flowers afford a fine yellow dye, for which, Linnæus says, they are much used in Sweden. There are several handsome exotic species nearly akin to this.

CAMOMILE, WILD, or FEVER FEW. (*Matricaria Chamomilla.*) Found in cultivated and waste ground, on dunghills, and by road sides; very common about London. Root annual, rather large and woody; flowering from May till August; stem a foot high; flowers numerous, about the size of the common sweet camomile, and with some portion of the same scent, of which the herbage, though faintly, partakes. The greatest part of the oil of chamomile found in the shops is procured from this plant.

CAMP. Provincially, a hoard of potatoes, turnips, &c.

CAMPANULA, THE PYRAMID. (*Campanula pyramidalis.*) A perennial of great beauty; native of Savoy; it does not like manure, but thrives well in simple mould. It blows its pyramid of sky-blue flowers in July and August, and is propagated by seed, and by parting the root; it suits any situation. The seed should be sown in spring, and covered with a hand-glass: transplant the seedlings into a nursery bed, to remain till the following spring; then plant out. They rise four or five feet in height, and are very ornamental. There are many varieties of campanula, such as
the purple dwarf, great-flowered, &c.
panula Medium (*Canterbury bell*) is
some biennial, native of Germany,
well in any soil. It blows its pe
bell-looking flowers abundantly in J
July; they are white, and also
colour. Cut off the flowers as the
and others will arise; weaker, of co
continuing later in flower. See CANT
BELLS.

CAMPION. See CATCH-FLY.

CAMPION, CORN. See COCK

CAMPION, ROSE. (*Agrostem*
naria.) A plant originally fro
growing one or two feet high, which
bright red flower from June to Sep
it is hardy, but loves a warm
Propagate by seed sown as soon as i
and planted out the following sprin
varieties which blow white and
flowers.

CANADA ONION. See ONIO

CANARY-GRASS, CAT'S TA
CAT'S TAIL.

CANARY-GRASS, manured. (
canariensis.) Is cultivated in a few
the south of England, and chiefly in
of Thanet. The plant (says Prof.
easily raised, but it is of little ec
importance; it is a native of the
islands, but is found frequently wild
tivated and waste ground, and has
become naturalised. From Mr.
experiments, it appears, that at the
flowering, the produce of this grass
from a rich clayey loam, on a tenaci
soil, was 54,450 lbs; which yielded
produce 17,696 lbs. 4 oz., nutritive
1,876 lbs. 2 oz. The herbage is b
nutritive, and the plant cannot be
mended for cultivation, but for th
only, which are principally in deman
neighbourhood of large towns, as
small singing birds, particularly
whence it derives its name. The
is generally from 3 to 5 quarters an a
the actual price is from 40*s.* to 42*s.*
The straw or haulm is a most excellen
for horses. (*Hort. Gram. Wob.*
Low's El. Prac. Ag. p. 266.; *Brit. H*
ii. p. 329.)

The reed canary-grass (*Ph. aru*
Smith's Engl. Flora, vol. i. p.
very common in ditches, pools,
margins of rivers. At the time of
ing, the produce from a black san
incumbent on clay was, —

		lbs
Green produce per acre		- 27,2
Dry produce	—	- 12,2
Nutritive matter	—	- 1,7

On a strong tenacious clay, the
was, —

	lbs.	oz.
duce per acre	- 34,031	0
ice —	- 17,015	8
matter —	- 2,126	15

, it appears to be much more
n a tenacious clay soil than on
loam; the superior nutritive
h this grass possesses recom-
efore to the notice of occupiers
. The foliage cannot be con-
e, when compared with other
h afford a produce equal in
ry straw is a much coarser food
made from this grass, and the
y be met by reducing this hay
he striped reed canary-grass has
found in a wild state; it is cul-
gardens for the beauty of its
es:—the common wild variety
distinguishing feature, it grows
height than the striped-leaved
es not appear to be eaten by
birds are fond of the seeds. It
flower about the first and second
July, and ripens about the middle
(*Hort. Gram. Wob.* p. 359.)

ER, IN CATTLE. (Lat.; Sax.
A virulent swelling or sore.
the eye, or a perfect change of its
into a fleshy half-decomposed
that ulcerates and wastes away,
which fungous growths spring that
be checked, is a disease of occa-
currence in cattle. The remedy
extirpation of the eye, if it were
worth while to attempt it. (*Lib. of*
Cattle, p. 293.)

ITUFT. See CANDYTUFT.

LE. (Lat. *candela;* Sax. canꝺel;
le; Fr. *chandelle;* Welsh, *canwyll.*)
cylinder of tallow, wax, or sper-
wick of which is commonly of
eads of cotton spun and twisted
Candles were subject for a
period to an excise duty of 3½*d.*
t this was repealed in 1831.
candles ought to be made with
of sheep and ox tallow; care
to avoid any mixture of hog's
occasions a thick, black smoke,
h a disagreeable smell, and also
andle to run.

er, if far from any town, may
wn candles. The cotton for
wicks is sold, ready prepared,
hen it is intended to be used
a certain number of pieces of it
gth are to be cut, and stripped
hand to remove any knots or
They are next to be affixed
a rod about 3 feet long, leaving
es between each wick. The
n to be dipped into a vessel, large enough, and filled with fluid tallow; and this is to be repeated three times for the first layer or coat. They are then to be suspended in a rack over the vessel to drain and solidify; after which they are to be dipped twice, and again hung up to drain; and so on, successively, until they acquire the desired degree of thickness.

Candles ought never to be used until several weeks have elapsed after they are made; otherwise they are apt to gutter and run. (*M'Culloch's Com. Dic.; Willich's Dom. Encyc.*)

CANDLE-BERRY MYRTLE. (*Myrica Gale.*) A hardy shrub, native of Britain, which grows to four feet high, and bears a small red blossom in May and June. It loves heath mould, and is propagated by seed, or by dividing the roots. The American candle-berry myrtle (*Myrica cerifera*) blows in May, and is a native of North America. Propagated by suckers or seed. It grows four or five feet in height.

CANDOCK. See WHITE WATER LILY.

CANDYTUFT, BITTER. (*Iberis amara.*) In chalky fields, but rare. Stem herbaceous, or in some degree shrubby; whole plant smooth, of a nauseous bitter flavour. It displays oblong clusters of handsome brilliant white flowers, which have procured for it a place among hardy annuals in some gardens. (*Smith's Eng. Flor.* vol. iii. p. 181.)

CANDYTUFT, PURPLE. (*Iberis umbellata.*) An annual, native of the south of Europe, growing a foot high, blowing handsome purple flowers in June and July. Propagated from seed. It thrives in any soil.

CANE. A provincial term used to signify a hollow place, where water stands. It also implies a wood of alder, or other aquatic trees, in a moist boggy situation.

CANINE MADNESS. See HYDROPHOBIA.

CANKER, or ULCER. (Lat. *canker;* Sax. canceꞃe, or cancꞃe.) In the vegetable creation, a disease to which our apple, pear, elm, and other trees are subject.

"This disease," says Mr. G. W. Johnson, "is accompanied by different symptoms, according to the species of the tree which it infects. In some of those whose true sap contains a considerable quantity of free acid, as in the genus *Pyrus*, it is rarely accompanied by any discharge. To this dry form of the disease, it would be well to confine the term canker, and to give it the scientific name of *Gangræna sicca.* In other trees, whose sap is characterized by abounding in astringent or mucilaginous constituents, it is usually attended by a sanious discharge. In such instances, it might be strictly designated *ulcer*, or *Gangræna saniosa.* This disease has a considerable resemblance to the tendency to ossification, which appears in aged animals, arising from their marked appetency to secrete the calcareous saline compounds that chiefly constitute their skeletons. The consequence is an enlargement of the joints, and ossification of the circulating vessels, and other parts; phenomena very analogous to those attending the cankering of trees. As in animals, this tendency is general throughout their system; but, as is observed by Mr. Knight, 'like the mortifications in the limbs of elderly people,' it may be determined, as to its point of attack, by the irritability of that part of the system. This disease commences with an enlargement of the vessels of the bark of a branch, or of the stem. This swelling invariably attends the disease when it attacks the apple tree. In the pear, the enlargement is less, yet is always present. In the elm and oak sometimes no swelling occurs, and in the peach I do not remember to have seen any; I have never observed the disease in the cherry tree, nor any of the pine tribe. The swelling is soon communicated to the wood; which, if laid open to view, on its first appearance, by the removal of the bark, exhibits no marks of disease beyond the mere unnatural enlargement. In the course of a few years, less in number in proportion to the advanced age of the tree, and the unfavourable circumstances under which it is vegetating, the swelling is greatly increased in size, and the alburnum has become extensively dead: the superincumbent bark cracks, rises in discoloured scales, and decays even more rapidly than the wood beneath. If the caries is upon a moderately sized branch, the decay soon completely encircles it, extending through the whole alburnum and bark. The circulation of the sap being thus entirely prevented, all the parts above the disease of necessity perish. In the apple and pear, the disease is accompanied by scarcely any discharge; but in the elm this is very abundant. The only chemists who have examined these morbid products are Sir H. Davy and Vauquelin; the former's observations being confined to the fact, that he often found carbonate of lime on the edges of the canker in apple trees. (*Elem. of Agr. Chemistry*, 2d edit. p. 264.)

Vauquelin has examined the sanies discharged from the canker of an elm with much more precision. He found this liquor nearly as transparent as water, sometimes slightly coloured, at other times a blackish-brown, but always tasting acrid and saline. From it a soft matter, insoluble in water, is deposited upon the sides of the ulcer. The bark over which the transparent sanies flows attains the appearance of chalk, becoming white, friable, crystalline,
and effervescent with acids. A
exhibits the crystals in the forms
boids and four-sided prisms: w
liquid is dark-coloured, the bark
blackish, and seems as if coate
varnish. It sometimes is discharg
quantities as to hang from the
stalactites. The matter of which
composed is alkaline, soluble in w
with acids effervesces. The analy
dark slimy matter shows it to
pounded of carbonate of potassa an
product peculiar to the elm. T
matter deposited round the ca
composed of—

Vegetable matter - -
Carbonate of potassa - -
Carbonate of lime - -
Carbonate of magnesia -

Vauquelin calculated, from the
of this white matter that was fou
the canker of an elm, that 500 lb
of its wood must have been d
(*Annales de Chimie*, tom. xxi. p. 30
is no doubt that such a discharge
injurious to the tree; but the abov
chemist appears to have largely e
he calculated from a knowledge
amount of the saline constituent
healthy sap, whereas in its disea
these are much, and unnaturally i
I once was of opinion that thi
does not arise from a general
state of the tree; but that it is br
by some bruise or injury, exaspe
an unhealthy sap, in consequen
unfavourable soil, situation, and
but more extensive and more
examinations convince me, that th
is in the system of the tree; that i
are vitiated; and that disease will
to break out, independent of any
injury, so long as those juices
peccant and unaltered. This c
will be justified, I think, by the p
facts, as well as by those distributed
the following observations. The
not strictly confined to any particul
of the tree's age. I have repeat
ticed it in some of our lately in
varieties, that have not been graft
than five or six years; and a writ
Gardener's Magazine (vol. v. p. 3
that the trees in his orchard, thou
of four years' growth, are sadly
with the canker. Although you
are liable to this disease, yet thei
is the period of existence most o
to its attacks. It must be rememb

nsequently a young tree which
ed. If the tree from which
taken is an old variety, it is
lication of an aged individual.
y for a few years exhibit signs
vigour, owing to the extra
he more abundant supply of
pplied by the stock: but the
scion will, after the lapse of
gradually become as decrepid
t tree. The unanimous ex-
aturalists agrees in testifying
ganised creature has its limit
In plants it varies from the
of a few months to the long
s many centuries: but of all,
numbered; and though the
like the physician's skill, may
nward pace of death, he will
nanently delayed. In the last
life they show every symptom
panies organization in its old
nly a cessation of growth, but a
rmer developments, a languid
and diseased organs.

er, as already observed, attends
the old age of some fruit trees,
, the apple is most remarkably
"I do not mean," says Mr.
to assert that there ever was a
an apple tree did not canker on
ble soils, or that highly cultivated
were not more generally subject
ase than others, where the soil
it them; but I assert, from my
ence and observation within the
years, that this disease becomes
ly more fatal to each variety as
that variety beyond a certain
nses: that all the varieties of
hich I have found in the cata-
he middle of the seventeenth
unproductive of fruit, and in a
ility and decay." (*Some Doubts*
the Efficacy of Mr. Forsyth's
T. A. Knight, Esq. 1802.)

e individuals particularly liable
d, are those which have been
n excessively vigorous growth
years. I have in my garden
andard peach, which is now
n years old. The size and
its annual shoots, until within
ter of its existence, were un-
e. It is now grievously affected
Trees injudiciously pruned, or
n an ungenial soil, are more
tacked than those advancing
y circumstances. The oldest
rs the first attacked of those
ivated. The golden pippin,
isting variety of the apple, is
ly and seriously attacked than any other. The soil has a very considerable influence in inducing the disease. If the subsoil is a ferruginous gravel, or if it is not well drained,—if the soil is aluminous, and effective means are not adopted to free it of superabundant moisture,—the canker, under any one of these circumstances, is almost certain to make its appearance among the trees they sustain. If an old worn-out orchard is replanted with fruit-trees, the canker is almost certain to appear among them, however young and vigorous they were when first planted. How inducive of this disease is a wet retentive subsoil, if the roots penetrate it, appears from the statement of Mr. Watts, gardener to R. G. Russell, Esq. of Chequer's Court, in Buckinghamshire. A border beneath a south wall had a soil three feet and a half in depth, apparently of the most fertile staple; twice re-made under the direction of the late Mr. Lee, of the Vineyard, Hammersmith. In this, the trees, peaches and nectarines, flourish for the next three or four years after they are planted, but then are rapidly destroyed by the canker and gum. The subsoil is a stiff sour clay, nearly approaching to a brick earth; and the disease occurs as soon as it is reached by the roots of the trees. (*Gardener's Magazine*, vol. vi. p. 617.) Mr. Forsyth concluded that the soil is not always the source of the disease, because it universally and invariably appears, at first, in the branches, and proceeds thence towards the roots of the tree: but this is certainly a conclusion not warranted by the premises, because the acridity of the sap, whatever may be its source, would be likely to injure and corrode, in the first instance, those parts where the vessels are the most weak and tender; now these, past dispute, are in the branches. Moreover, we generally see the youngest branches the earliest sufferers. Pruning has a powerful influence in preventing the occurrence of canker; I remember a standard russet apple tree, of not more than twenty years' growth, with a redundancy of ill-arranged branches, that was excessively attacked by this disease. I had two of its three main branches removed, and the laterals of that remaining thinned carefully; all the infected parts, at the same time, being removed. The result was a total cure. The branches were annually regulated, and for six years the disease never reappeared. At the end of that time the tree had to be removed, as the ground it stood upon was required for another purpose. John Williams, Esq., of Pitmaston, from long experience, concludes, that the golden pippin, and other apples, may be preserved from this disease by pruning away, every year, that part of each shoot

which is not perfectly ripened. By pursuing this method for six years, he brought a dwarf golden pippin tree to be as vigorous and free from canker as any new variety. (*Trans. London Hort. Soc.* vol. vi. art. 64.)

All these facts unite in assuring us that the canker arises from the tree's weakness; from a deficiency in its vital energy, and consequent inability to imbibe and elaborate the nourishment necessary to sustain its frame in vigour, and much less to supply the healthy development of new parts. It matters not whether its energy is broken down by an unnatural rapidity of growth, by a disproportioned excess of branches over the mass of roots, by old age, or by the disorganization of roots in an ungenial soil; they render the tree incapable of extracting sufficient nourishment from the soil, consequently incapable of developing sufficient foliage, and therefore unable to digest and elaborate even the scanty sap that is supplied to them.

The reason of the sap becoming unnaturally saline appears to be that in proportion as the vigour of any vegetable declines, it loses the power of selecting by its roots the nourishment congenial to its nature. M. Saussure found in his experiments that the roots of plants growing in saline solutions absorbed the most of those salts that were injurious to them, evidently because the declining plant lost the sensitiveness and energy necessary to select and to reject; thus, when plants of *Polygonum Persicaria* and of *Bidens cannabina* were grown in a solution containing *sulphate of soda* (Glauber salt), *acetate of lime*, and *chloride of sodium* (common salt), they altogether rejected the *acetate of lime;* but when grown in a solution of *sulphate of copper* and *acetate of lime*, they imbibed the latter abundantly. Now, sulphate of copper M. Saussure found to be the most deleterious to the plants of all the salts, in a solution of which he plunged their roots. Supposing the portion originally in solution to be 100, the proportions of each absorbed were as follows:—

	Parts.
Chloride of sodium	10
Sulphate of soda	6
Acetate of lime	0
Sulphate of copper	34
Acetate of lime	31

M. Saussure also found that if the extremities of the roots were removed, the plants absorbed all solutions indiscriminately. (*Saussure's Récherches Chimiques sur la Vegetation*, 260.) An ungenial soil would have a debilitating influence upon the roots in a proportionate, though less violent degree than the sulphate of copper; and these, consequently, would absorb soluble bodies

more freely, and without that d
so absolutely necessary for a h
ation; so the other most ess
of nutrition, the leaves of t
plant, would promote and a
disease. These, reduced in
size, do not properly elaborate
I have always found that, un
cumstances, these stunted orga
aqueous particles of the sap
dantly, whilst their power of
greatly reduced. The sap, thu
quantity and increased in ac
to corrode and effect the vascu
the tree in the manner alrea
These facts afford us most imp
in attaining the desired objec
vention and cure of the diseas
luxuriance threatens its intr
best remedy is for the cultivat
one of the main roots of the
him to be particularly carefu
any fertile addition to the soil
range. On the contrary, it w
the exuberant growth shows
for the soil to be reduced in fe
admixture of one less fertile
drift sand. If there is an exces
the saw and the pruning k
gradually applied. It must
of weak vital powers, such
pippin, that will bear the gene
the annual shoots, as pursued by
A new vigorous variety would
in the following year in the
new wood.

Having completely headed
canker is generally prevale
thinned the branches, entir
every small one that is in
gree diseased, and cut away
parts of the larger, so as n
single speck of the decayed
over the surface of each w
mixture, whilst in a melted st
parts of tar and rosin, applying
immediately after the amputat
performed, taking care to sel
day. I prefer this to any com
a basis of cow-dung and clay
latter is always more or less
moisture, and is liable to injur
frost, causing alternations of
dryness to the wounds, that p
rather than their healing, by
of new wood and bark.
plaster seldom or never requ
Mr. Forsyth, the arch-advoca
plasters, finding they promo
applied to the wounds of an
trees, recommends this imp
cultivation to be postponed
Such a procrastination, howe

defer the pruning till bleeding is
equence. If a resinous plaster is
l, it excludes the wet, and obviates
ction to autumnal pruning. Mr.
s treatment of the trunks and
of the trees, namely, scraping
m all the scaly dry exuviæ of the
to be adopted in every instance: he
nds them to be then brushed over
hin liquid compound of fresh cow-
apsuds, and urine. But I very
efer a brine of common salt: each
a gentle stimulus, which is their
urce of benefit, and the latter is
ficacious in destroying insects, and
t, like the other, obstruct the per-
y vessels of the tree. The brine is
geously rubbed in with a scrubbing
painter's brush. Some persons re-
d a liquid wash, containing, as pro-
ingredients, quicklime and wood
which, as the disease arises from an
alescent state of the sap, cannot but
jurious, and aggravate the disease.
syth's composition, used as a plaster
wounds made when cankered matter
n extracted, was —

1 bushel of fresh cow-dung,
bushel of lime rubbish,
bushel of wood ashes,
bushel of finely-sifted sand.

Knight well observed of this quackery
hich Forsyth was rewarded with a
f money), that "it afforded a much
proof that he was paid for a discovery
at he made one." (*G. W. Johnson*;
ourn. of Agr. vol. viii. p. 470.; J.
ibid. vol. ii. p. 379.; A. Drummond,
Canker in the Larch, *ibid.* p. 221.)

r in dogs. A diseased state of the
the ears, which is cured by the
caustic ointment, well rubbed
cracks: — White vitriol and alum,
m each, reduced to a fine powder,
d with 4 oz. of hog's lard. This
succeeded by a healing ointment,
palm oil 3 lbs., resin 1 lb., melted
and 1 lb. of finely-powdered cala-
d. The canker ointment may be
but if it has no effect, a stronger
formed of 1 scruple nitrate of
d 1 oz. lard, may be applied.
Farriery, p. 352.)

in horses is a separation of the
the sensible part of the foot, and
ing of fungous matter instead of
upying a portion of, or even the
the sole and frog. (*The Horse,*
b. of Useful Knowledge.) The
et of the treatment of canker con-
use of superficial caustics or sti-
-pressure as firmly and as equably
e made, and the careful avoidance of all greasy applications, and all moisture, either applied immediately to the foot, or suffered to penetrate to it through the dressing. (*Clater's Farriery*, p. 324.)

CANKERED. A word sometimes used to signify mildewed or blighted.

CANKERS. A local name in some parts of the country for caterpillars.

CANSH. A provincial word sometimes applied to a small pile of faggots.

CANTER. (Said to be an abbreviation of Canterbury gallop, and derived from the pilgrims riding to Canterbury on easy ambling horses. — *Todd's Johnson.*) A well-known pace of the horse, which is not, generally, a natural pace. When the horse is excited to move his station from one place to another, he performs it with a velocity proportionate to the exciting cause. Thus, he changes from the walk to the trot, and from the trot to the gallop, according to his inclination. In each of these changes he acquires an addition of speed; but, as the trot is equal in speed to the canter, he seldom adopts the canter, but changes to the gallop, when he wishes to accelerate his motion. The horse is taught to perform the canter by shortening the gallop. The canter is to the gallop very much what the walk is to the trot, though probably a more artificial pace. The exertion is much less, the spring less distant, and the feet come to the ground in more regular succession: it is a pace of ease, quite inconsistent with any exertion of draught. (*Lib. Use. Know., The Horse*, p. 413.) Some persons, and among them Nimrod, do not consider this pace injurious to horses. "A canter," he observes, "is much more easy, as well as safer to the rider, than a trot; the horse having his haunches more under him in the canter than when he trots, is thereby more likely to recover himself in case of making a mistake, which the best is sometimes subject to. Fast trotting also distresses a horse more than cantering, because, in the one, he is going at the top of his speed, and in the other much below it." (*Blaine's Ency. of Rural Sports*, p. 297.)

CANTERBURY-BELLS. Throatwort. (*Trachelium majus.*) This very beautiful flower is cultivated in our gardens, and looks magnificent, with its large drooping bells, in broad borders or shrubberies. (See CAMPANULA.) The wild plant grows by the road side and in pastures. It is known by its thick, upright, hairy stalks; its dusky green leaves, standing upon long footstalks, broad at their base, narrow at their point, indented sharply at their edges, and its large blue flowers growing in clusters of ten or twelve together, at the top of each branch. The soil changes the colour of the flowers. In rich ground, they are deep and beautiful blue; in poor soils, they will become reddish, white, or very pale blue. An infusion of the leaves, sharpened with a few drops of spirit of vitriol, and sweetened with honey, makes an admirable gargle for sore throats; but it is in the acid, not the herb, which is beneficial. The plant is by many people known by the name of *Throatwort*.

CAPERCALLIE. (*Tetrao Urogallus*, Linn.) The wood-grouse. This bird is also known as the cock-of-the-wood and giant-grouse, from his great size and gallant bearing. Its name is also variously written capercaly, capercalzie, &c. This bird was formerly the noblest of the British feathered game, and tolerably abundant in the primeval forests of Scotland and of Ireland. Its great size and beauty, however, have led to its gradual extermination. Some attempts have been recently made by Sir T. F. Buxton and other gentlemen to re-introduce this species of grouse by importing birds from Sweden, and it is to be hoped they will succeed in again naturalising and propagating the species; but the bird is extremely shy, and shuns the abode of men. Sir T. F. Buxton has presented the Marquis of Breadalbane with as many as thirteen cock capercallies and twenty-nine hens. Bewick states the capercallie to be as large as a turkey; viz. about 2 feet 9 inches in length, weight from 12 to 15 lbs. Bill very strong, convex, of a horn colour. Over each eye, a naked skin of a bright red colour; eyes hazel; general plumage black mixed with grey; legs very stout, covered with brown feathers. Female considerably less than the male, and differs greatly in colour; throat red; breast pale orange; belly barred with orange and black; back and wings mottled with reddish brown; tail deep rust colour. Eggs 8 to 16.

The cock has a peculiar crow, which he utters chiefly in the morning; and which is so loud, as to be heard at the distance of many miles. (*Blaine's Enc. Rur. Sports*, pp. 810—816.)

CAPES. A provincial word applied to the ears of corn broken off, either wholly or in part, in thrashing; as well as to the grain to which the chaff adheres.

CAPITAL. (Lat. *capitalis*.) The capital required by a farmer, to a great extent, varies with the soil and country in which he is placed; all practical observations in this place, therefore, can only be of a general nature. The first and best direction, however, to a farmer must be, "do not take more land than your capital will enable you to farm well." For this purpose, the observations of the author of the *British Husbandry*, vol. i. p. 41., may very well be introduced in this place. "Most far are anxious for large occupations, and m are thus betrayed into the error of ren a greater quantity of ground than they the means of managing to advantage; s in the delusive hope of acquiring t means by future savings; others, from vanity of holding more land than neighbours: hence arises deficiency of s imperfect tillage, and scanty crops; wit the consequent train of rent in arrear, ill-paid, and debts unsatisfied—distress, and final ruin. Whereas, he who is dently content to commence with only a number of acres as he has the pow cultivating with proper effect, is certa obtaining the full return from the while, not being burthened with more than he can profitably employ, his en ments are within his means, and thus, enjoying present ease of mind, he lay surest foundation for his future prosp And, as it is well observed (*Quart. Jou Agr.* vol. iii. p. 452.), "Or if, to sa pearances, he borrows money to com his necessary arrangements, his condi not improved; because the interest h have to pay for the borrowed mone operate as an additional yearly ren thus take from him all the advantages he was led to expect he would enjoy a moderate one." Under the he PRAISEMENT will be found the amo the valuation of the crops, and other commonly paid by the incoming outgoing tenant on a farm of 309 amounting to 1702*l*. This, however, considerably according to the Cu COUNTIES, which see. To this m added the expenses incurred of stock farm for the first year. Wages, of family, rent, taxes, rates, &c. On of 500 acres, Professor Low (*Prac.* 674.) estimates the capital required first year to be (in Scotland)—

	£	
1. Implements - -	470	4
2. Live stock - -	1423	15
3. Seeds - -	273	0
4. Manure - -	516	10
5. Labour, &c. -	528	17
6. Maintenance of horses	243	7
7. Burdens - -	31	15
	3488	8
Furniture of house -	200	0
Family expenses, 1½ years	150	0
	3838	
From this he deducts for produce sold in this time -	995	17
Required net capital -	2842	1

or 5*l*. 13*s*. 8¼*d*. per acre. In this calcul he supposes that no rent is paid ti crop is reaped. The estimate for the c

required for a Scotch farm of 500 acres (allowing nothing for payments to outgoing tenant) is, according to a statement in the *Quart. Journ. of Agr.* vol. iii. p. 475., as follows:—

	£	s.	d.
Value of implements for farm work - -	228	2	2
— do. live stock - -	43	19	4
— do. barn work - -	17	14	4
— Thrashing-machine - - -	170	0	0
— Horses - - - - - -	450	0	0
— Cattle - - - - - -	511	0	0
— Sheep - - - - - -	420	0	0
— Other live stock - - - - -	7	0	0
— Grass seeds - - - - -	87	10	0
— Tares - - - - - -	6	8	0
— Peas - - - - - -	4	0	0
— Turnips - - - - - -	12	15	0
— Potatoes - - - - - -	2	16	0
— Corn - - - - - -	215	6	3
— Labour - - - - - -	865	6	10
	3041	17	11
Rent 500 acres, at 40s. - - -	1000	0	0
	4041	17	11
From which, however, deduct the value of the following articles, derived from the farm before the period of paying the second half year's rent, viz.			
Profit on 20 fat cattle, 5l. each - -£100			
Wintering 20 kyloes for 24 weeks, at 1s. 6d. per week - - - 30			
Sold 80 dinmonts and gewmers at 25s. each, and 20 draft ewes at 30s. each 130			
Profit on turniping 120 hogs 24 weeks, at 3d. per head per week - - 36			
Sold 14 pigs - - - - 14			
Produce of 4 cows over what required by family - - - - 10			
Wool sold - - - - 152			
——	472	0	0
	3569	17	11

At p. 658. of *Low's Prac. Agr.* will be found a catalogue of the various implements of a farm of 500 acres, from a thrashing machine worth 100*l.* to a grease-pot valued at 1*s.* 6*d.*, amounting altogether to 474*l.* 4*s.* 4*d.* And this includes hardly a single article that the young farmer can well do without. As a general rule on the chalks of Hampshire, they deem 5*l.* per acre to be a sufficient capital; but on some of the rich highly cultivated soils of Surrey, Kent, and Essex, 10*l.* per arable acre is not too much. Grazing farms require less in proportion than arable lands.

CAPO. A term used in Cheshire, and some other counties, to signify a working-horse.

CAPON. (Sax. capun; Fr. *chapon;* from Lat. *capo.*) A cock which has been castrated as soon as left by the hen, or as soon as he began to crow. Capons are useful to lead chickens, ducklings, young turkeys, pheasants, or partridges, as they do it better than hens.

CAPONTAIL GRASS. See FESCUE.

CAPILLARY VESSELS OF VEGETABLES. The fine hair-like vessels that assist in the absorption and circulation of the juices of plants.

CAPS. A term applied to the head sheaves of corn-shocks.

CAPSICUM. (Supposed either from *κaπτω, mordeo*, to bite; or from *capsa*, a chest.) *Capsicum annuum.* Of this there are five varieties. 1. Long-podded. 2. Heart-shaped. 3. Short-podded. 4. Angular-podded. 5. Round short-podded. Of the *Capsicum cerasiforme* there are three varieties. 1. Cherry-shaped. 2. Bell-shaped, or Ox-heart. 3. Yellow-podded. The soil best suited for them is a rich, moist, mouldy loam, rather inclining to lightness than tenacity. They must have the shelter of a reed fence or wall, but fully open on the southward to the sun, consequently they are generally placed within the enclosure erected for the hot-bed department. They are propagated by seed, which must be sown towards the end of March, or beginning of April, in a hot-bed of moderate size, with the shelter of a frame; but in default of a stove, hot-bed, or frame, they may be raised under hand-glasses on a warm border; the sowing, however, being deferred until settled warm weather in May. The seed must be covered a quarter of an inch deep with mould. When the plants have attained six leaves, in about a month after sowing, they must be thinned to four inches apart, and those removed should be planted also in a moderate hot-bed at a similar distance, being shaded from the meridian sun, and moderately watered until they have taken root. During the whole of their continuance beneath a frame, air must be admitted as freely as is possibly allowable, to prevent their being drawn and weakened; and as May advances, they must be accustomed gradually to an uncovered situation, by lengthened absence of the glasses during the day, and by degrees leaving them open of an evening; this prepares them for their final removal, at the close of that month, or early in June. Those raised in a border beneath hand-glasses must also be thinned as directed above, and those removed planted in a similar situation, or, in default of hand-glasses, beneath a paper frame or matting. The same may be adopted for the plants from the hot-beds, if all other conveniences are wanting. When planted out finally, they are to be set two feet asunder, screened from the sun, and watered every other evening until they have taken root. The watering may be continued occasionally in dry weather, throughout their growth, which greatly improves their vigour, and the fineness of the fruit. They flower during July or the beginning of August, and the pods are ready to be gathered for pickling at the close of this last month, or early in September. For the production of seed, a plant bearing some of the forwardest and finest fruit, of each variety, and grown as far apart as may be, must be preserved, that it may be ripe before the frosts commence, the first of which usually kills the plants. When completely ripe, the pods are cut and hung up in the sun, or in a warm room, until completely dry, in which state they are kept until the seed is wanted for sowing. (*G. W. Johnson's Kitchen Garden.*)

The capsicum loses some of its aromatic odour by drying, its taste, both recent and dry, is hot and acrid, depending on a fixed acrid oil, not volatile and distinct from that oil which gives the odour to the fresh pod. Capsicum is used as a condiment in cookery; it is more excitant than pepper; but its effects are less permanent. A dessert spoonful of dried capsicum powdered, and infused in eight ounces of boiling water, strained and acidulated with fifty drops of muriatic acid, forms an excellent gargle in malignant or putrid sore throats.

CAR. A provincial word applied to any low marshy ground or fen, used in contradistinction to *ing*, which implies being pastured.

CARAWAY, or CARRAWAY. (Fr. and It. *carvi;* Lat. *carum carui.*) A naturalized biennial plant, with a taper root like a parsnip, but much smaller; stem about two feet high, growing wild in meadows and pastures. This plant is extensively cultivated in several parts of Essex and some other counties, for the sake of its seeds, which are in daily use as a grateful and wholesome aromatic, and are largely consumed in confectionary and medicinal preparations; but its root was formerly much esteemed when boiled, and it is not easy to account for its falling into disuse. The seeds, which are greyish brown, and ribbed, are too well known to need description. They should be chosen large, new, of a good colour, not dusty, and of a strong agreeable smell. Caraway is sometimes sowed with coriander and teasel, and harvested the second year. The produce of this seed has often been very great; even as much as 20 cwt. per acre, which always finds a market in London. On account of their aromatic smell, and warm pungent taste, the seeds of caraway may be classed among the first stomachics and carminatives of our climate. To persons afflicted with flatulency, and liable to colic, if administered in proper quantities, they generally afford considerable relief. Their virtue depends on a volatile oil, which is procured in a separate state, by distillation with water. The water retains some of the oil, and is used as a vehicle for other medicines.

Caraway delights in a deep, rich, moist loam. The ground for this, as well as other deep-rooting plants, is advantageously dug two spades deep. An open situation is most suitable to it; but in extensive orchards, where the trees are far apart, it may be grown with success. It is propagated by seed, which may be sown in March or April, either broadcast and raked in, or in drills six inches apart; in either case being performed thin, and buried about half an inch deep. When well distinguishable, the plants must be thinned to six inches apart, and carefully hoed. The hoeing must be several times repeated in the early stages of their growth, to extirpate the weeds, which at a later period cannot be conveniently got at. The plants flower in June, and ripen their seed at the close of summer. (*G. W. Johnson's Kitch. Gard.; English Flora,* vol. ii. p. 86.; *M'Culloch's Com. Dict.; Willich's Dom. Encyc.; Brande's Dict. Science.*)

CARBERRY. A provincial name, in some places, for the gooseberry.

CARBON. (Fr. *carbone;* Lat. *carbo.*) A hitherto undecompounded combustible body, which enters into the composition, in some form or other, of all vegetable substances. It is readily obtained in the form of *charcoal* by heating wood (and any kind of wood will answer the purpose) red hot, covered with sand, in a crucible. The covering with sand is added to prevent the wood undergoing combustion by coming in contact with the atmosphere. In this state, when reduced to powder, charcoal constitutes an excellent manure for most soils, either when applied by itself, or mixed with decomposing animal and vegetable substances. In such cases it absorbs a considerable volume of the gases which such substances constantly emit. Thus, reckoning the bulk of the charcoal to be 1, it absorbs of

	Volumes.
Ammoniacal gas -	- 90
Sulphuretted hydrogen -	- 55
Carbonic acid gas -	- 35

When burnt, charcoal unites with the oxygen of the atmosphere, and forms, in the state of carbonic acid gas, a very important portion of the gases required by all plants for their healthy vegetation. (See GASES, THEIR USE TO VEGETATION.) Carbon constitutes about 42·47 per cent. in sugar, 41·906 per cent. in gum, 43·55 per cent. in wheat starch, 52·53 per cent. in the wood of the oak, and 51·45 in that of the beech; 46·83 in pure acetic acid or vinegar, 36·167 in tartaric acid, and 41·369 in the citric. In the state of carbonic acid gas, and in various organic matters, it is found in all cultivated soils, in all waters, and in the atmosphere; and in each situation, as will be more particularly described under the head GASES, it is absorbed by and becomes the food of plants.

NATES. A peculiar class of
l by the combination of carbonic
ith various earths, alkalies, and
ides. The composition of those
only met with by the farmer is
—

	Acid.	Base.
f lime, *chalk*, *lime-*		
- -	- 66·2	33·8
magnesia -	- 68·75	31·25
of potash -	- 46·19	53·81
soda -	- 40·14	59·86
ammonia -	- 56·41	43·59

IIC ACID GAS. A peculiar
e as that emitted by fermenting
er liquors; it is inhaled by, and
the food of, plants. It is com-
bon 72·73, oxygen 27·27. See
R USE TO VEGETATION.
ortant to know, that carbonic
oisonous, if it be attempted to
l. If, for example, a person
o a tun where fermented liquor
bottom, and an atmosphere of
id gas floating over it; as soon
th is immersed in it, he is suf-
he same manner as if his mouth
were closed. He dies from the
mospheric air in the lungs, and
tion of black blood through the
is is the manner also in which
s when persons descend into old
ellars that have been long closed.
as is diluted with air, as for in-
n a person dies by burning char-
hafing-dish in a bed-room, he is
ed; but he dies from the sedative
the diluted carbonic acid, which
on the nervous system. When
nts happen, persons should not
bring out the bodies, until a
pure lime mixed with water to
s of milk, has been thrown into
ll, or cellar; or in the event of
burning charcoal, until a current
een sent through the apartment.
should be laid on their backs,
eads moderately elevated; cold
ed on the chest, and frictions
ver the whole body; and the
edical practitioner quickly pro-

SE, usually written CARCASS.
se; Ital. *carcasso*; Span. *carcai-*
Lat. *carcaissum*.) A term given
of the horse and of some other

AL, SCARLET. (*Lobelia*
An herbaceous hardy plant,
Virginia. It blows its scarlet
uly, and again in October. It
earth and shade, and the root
parted every spring. Ripen the flower intended for seed under a glass hung over it, for it rarely ripens in this climate without assistance.

CARDOON, or CHARDON. (Span. *cardo*, an artichoke; Lat. *Cynara Cardunculus*.) A kind of wild artichoke, which is principally confined to garden culture, as it has not yet been employed as an article of food for any sort of live stock.

The stalks of the inner leaves, when rendered tender by blanching, are used in stews, soups, and salads. A light rich soil is most suitable to this vegetable, dug deep and well pulverized. The situation must be open, and free from trees, for, like the artichoke, it is impatient of confinement. It is propagated by seed, which may be sown at the close of March; but, for the main crop, not until the early part of April; those plants raised from earlier sowings being apt to run at the close of autumn: for a late crop, a sowing may be performed in June. The best practice is to sow in patches of three or four rows, four feet apart each way, to be thinned finally to one in each place, the weakest being removed. The seedlings are nearly a month in appearing. If, however, they are raised in a seed-bed, they will be ready for transplanting in about eight or ten weeks from the time of sowing, and must be set at similar distances as are specified above. The plants of the first sowing are generally three weeks before they make their appearance; those from the later ones, about two. If, after a lapse of these times, they do not appear, it should be ascertained if the seed is decayed, and in that case the sowing may be renewed. The seed must be sown rather thin, and covered with about half an inch depth of mould. When about a month old, the seedlings, if too crowded, must be thinned to four inches apart; and those removed may be pricked out at a similar distance, if there is any deficiency of plants. When of the age sufficient for their removal, they must be taken up carefully, and the long straggling leaves removed. The bed for their reception must be dug well and laid out in trenches as for celery, or a hollow sunk for each plant; but as they are liable to suffer from excessive wet, the best mode is to plant on the surface, and form the necessary earthing in the form of a tumulus. Water must be applied abundantly at the time of planting as well as subsequently, until they are established; and also in August, if dry weather occurs, regularly every other night, as this is found to prevent their running to seed. The only other necessary point to be attended to is, that they may be kept free from weeds during every stage of their growth. When advanced to about eighteen inches in height, which, according to the time of sowing, will be in August, and thence to October, the leaves must be closed together by encircling them with a hay-band, and earth placed round each plant, a dry day being selected for performing it. As they continue to grow, fresh bands and earth must be constantly applied, until they are blanched to the height of two feet, or about two thirds of their stems. They will be fit for use in eight or ten weeks after the earthing first commences. Care must be had in earthing them up, to prevent the earth falling in between the leaves, which is liable to induce decay. The surface of the soil should likewise be beaten smooth, to throw off the rain. In severe weather their tops should be covered with litter, it being removed as invariably in mild weather: by this treatment, they may be preserved in a serviceable state throughout the winter. For the production of seed, which in this country seldom comes to maturity except in dry seasons, a few plants should be set in a sheltered situation, of the April sowing; of course not earthed up, but allowed the shelter of mats or litter in frosty weather. In the spring, the ground may be dug round them to destroy weeds, as well as to encourage the growth of the roots. The flowers make their appearance about the beginning of July, and the seed is ripe in September. (*G. W. Johnson's Kitchen Garden.*)

CAREX. See SEDGE.

CARLICK. A provincial term applied in some places to charlock.

CARLINE THISTLE. See THISTLE.

CARNATION, or CLOVE PINK. (Lat. *carnes; Dianthus Caryophyllus.*) A beautiful and odoriferous perennial, blowing in July and August, and cultivated in beds or in pots. The wild *D. Caryophyllus* is the origin of our fine garden carnations. (*Smith's Eng. Flor.* vol. ii. p. 287.) There are three distinct varieties; the flake, the bizarre, and the picotée. The flake has two colours only, with large stripes; the bizarre is variegated with irregular stripes and spots, of not less than three colours; and the picotée has a white ground, spotted with every variety of scarlet, red, purple, and pink. They love a light, rich earth mixed with sea sand, and never bloom very handsomely without a proportion of the latter. Carnations are propagated by layers, pipings, and from seed, which produce new sorts. There is an immense collection of fine prize carnations, well known to the public, too lengthy to insert here; but they are easily procured at a reasonable price. If you raise flowers from seed, sow it in pots of light earth in April; cover the seed very lightly with mould filtered through the fingers; shade the seedlings
from the sun, and prick them out when
seedling has six leaves. Pot or plant
blowing in autumn. They will not
well if moved in the spring. Carna
must be sheltered from excessive rains
hard frosts, and they should be place
warm sunny borders.

CARNATION GRASS. In agricul
a term applied to some grasses, as the
grass (*Aira*), probably from their ha
this kind of colour in their flowers.
coarse species of carex is so named i
north of England and Scotland.

CARP. (Fr. *carpe.*) The common
(*Cyprinus Carpio*, L.) appears to be a n
of the lakes, ponds, and some of the
rivers of the southern part of Europe. T
are more than thirty known species, of w
at least a dozen are objects of the an
pursuit. The length of the fish is twelve
teen or sixteen inches; but in warmer cli
it often arrives at the length of three or
feet, and to the weight of thirty or even
pounds. Colour yellowish olive; head l
scales large, rounded, and very distinct.
worms and water insects. The carp
extremely prolific fish, and attains to a
great age. Angling for carp is from
bruary to end of September; in sta
waters, such as meres, ponds, canal b
&c., they seldom take a bait well until
Quaint old Isaac Walton denominate
carp, "the queen of rivers; a stately, a
and a very subtil fish." The baits for
are worms, larvæ, grain, and pastes. I
early summer months, the worm may b
ried with caddies, caterpillars, beetles, g
hoppers, wasp-grubs, and turnip-w
To these, in the order of season, su
gentles. Fruit and vegetables have
sometimes employed, but not successful
sweet paste is, however, strongly re
mended. (*Blaine's Encyc. of Rural S*
pp. 1064–7.; *Walton's and Cotton's A*
p. 142.)

CARPET. (Dutch, *karpet;* Ital. *ca*
ta.) A covering for floors, &c., man
tured of wool, or other materials, w
with the needle or by the loom. Carpet
generally composed of linen and wo
but the Kidderminster or Scotch carpet
entirely fabricated of wool. Persian
Turkish carpets are the most este
In England carpets are principally m
factured at Kidderminster, Wilton, C
cester, Worcester, Axminster, &c.; a
Scotland at Kilmarnock. Those ma
Axminster are believed to be very
if any thing, inferior to those of
and Turkey. (*M'Culloch's Com.*
Willich's Dom. Encyc.; Brande's Di
Science.)

CARPET-WAY. A green strip, b

ay of turf, left unploughed in an
ld.
AWAY. See CARAWAY.
IAGE. (Fr. *cariage*.) A general
lied to carts, waggons, and other
employed in conveying passengers,
rchandize, &c. from one place to
and which are usually constructed
or four wheels. Wheel carriages
into use about 1381; they were
rlicotes, and were little better than
cots (*cotes*) placed upon wheels.
re, in irrigation, is a conduit
imber or brick: if the latter, an
rned over the stream that runs
and the sides bricked up; if the
hich it commonly is, it is con-
with a bottom and two sides, as
as high as the main it lies in. It
nade very strong, close, and well-
Its use is to convey the water in
over another which runs at right
h it; its depth and breadth are of
limensions with the main it belongs
gth is in proportion to the breadth
in it crosses. It is the most ex-
nveyance belonging to the irrigat-
d.
IAGE DRAIN. See DRAINS.
OT. (Fr. *carote*.) A well-known
r biennial root, common alike to
and the garden. The wild carrot,
nce all those now commonly cul-
me, is a native of England, found
chalky hills. The kinds now pre-
field culture are the long red, the
m, and the orange. It is a crop
r the heavier description of soils,
ing more and more cultivated in
try; for its produce is not only
t it can be grown on lands not
turnip culture; for although the
adapted to it are deep sandy loams,
n be grown successfully on sands
s. The carrot delights, however,
soil, and thus land intended for it
lly be ploughed too deep. It is
trench plough or subsoil for it;
olland they are even at the pains
with the spade the furrows made
lough. It may be sown, like the
n ridges, by the drill or otherwise,
cast. The seed should be of the
season's growth; if mixed a fort-
fore sowing with two bushels of
nould, kept wetted and turned over
wice, they will grow all the better
Board of Agr. vol. vii. p. 70—299.);
eps the seed from clinging together.
Roy. Agr. Soc. of Eng. p. 40.) The
proper to be sown per acre (April
st period) is two pounds by the
l about five when sown broadcast.

The plants should be hoed out like turnips, and dug up in October for storing; but they may be left in the ground if preferred, and dug up as they are wanted. They may be stored either in a building covered with straw or haulm, or in pits piled in heaps four feet deep. (*Brit. Husb*. vol. ii. p. 287.) The common produce is from 280 to 450 bushels per acre—9000 lbs. (*Com. Board of Agr*. vol. vi. p. 141.) It is admirable food for all kinds of stock. (*Low. Agr*. p. 326.) Either the tops mown off green, which is said not to injure the roots (*Com. Board of Agr*. vol. v. p. 211.), or the roots, for horses, half a bushel a day, sliced in chaff, is admirable food. (*Youatt on the Horse*, p. 358. 392. 213.; *Brit. Husb*. vol. i. p. 125.) 1000 parts of the carrot contain 98 of nutritive matter. (*Davy's Lect*.) It should be well manured with either farm-yard dung (20 cubic yards per acre); or pigeons' dung is excellent (*Quar. Jour. of Ag*. vol. v. p. 144.); or a mixture of salt, 6½ bushels, and soot 6½, trenched in (*Sinclair; Johnson on Salt*, 31. 146.; *Rev. E. Cartwright, Com. Board of Agr*. vol. iv. p. 376.); or sea-weed trenched in fresh as collected from the shore (*Quar. Jour. of Agr*. vol. vii. p. 268.); or turf trenched in deep (*Com. Board of Agr*. vol. iv. p. 191.); or street sweepings, mixed with one third of pigs' dung and 20 hogsheads of liquid manure. (*Flem. Husb*. 40.) The white or Belgian carrot has been recently tried as a field crop with considerable success; Sir C. Burrell having grown of this variety in 1840, "on a very indifferent field," 1000 bushels per acre (*Brit. Farm. Mag*. vol. iv. p. 464.); Lord Ducie, 26 tons 3 cwt.; and from 20 to 32 tons by Mr. Harris; and in Jersey 38 tons per acre. It is described in the *Report of the Yoxford Farmers' Club* as well adapted for strong or mixed soil lands, as keeping well, and as excellent food for horses. (*Journ. of Royal Agr. Soc*. vol. ii. p. 42.)

CARROT, THE GARDEN. (*Daucus Carota*; as some imagine from *δαιω*, though its taste is far from being pungent. Perhaps from *δασυς*, on account of the thickness of its root.) There are a considerable number of varieties of the carrot, which are divided by horticulturists into two families: those with a regular fusiform root, which are named *long carrots*; and those having one that is nearly cylindrical, abruptly terminating, but continuing with a long slender tap-root, which are denominated *horn carrots*. The first are employed for the main crops; the second, on account of their superior delicate flavour, are advantageously grown for early use. They are likewise commonly recommended for shallow soils. Horn carrots,—early red horn, common early horn,

long horn: this last is the best for the summer crop. Long carrots,—white, yellow, long yellow, long red, Chertsey or Surrey, superb green-topped or Altringham: the two last are the best for main crops. Carrots should have a warm, light, sandy, fertile soil, dug full two spades deep, as they require to be deeper than any other culinary vegetable. With the bottom spit it is a good practice to turn in a little well-decayed manure; but no general application of it to the surface should be allowed in the year they are sown. A spot should be allotted them which has been made rich for the growth of crops in the previous year, or else purposely prepared by manuring and trenching in the preceding autumn. The fresh application of manure is liable to cause their growing forked, and to expend themselves in fibres, as well as to be worm-eaten. If, however, the want of manure must be obviated at the time of sowing, it should be used in a highly putrescent state, and but in small quantities, finely divided and well mixed with the soil. If the soil is at all binding, it should be well pulverized by digging very small spits at a time, &c. Mr. Smith of Keith Hall, N. B., recommends pigeons' dung as the best manure for this crop: it not only prevents the maggot, but causes them to grow finer. He applies it in the same proportion as is usually done of stable manure. (*Mem. Caled. Hort. Soc.* vol. i. p. 129.) Carrots are propagated by seed. The first sowing for the production of plants to draw whilst young should take place in a moderate hotbed during January, and in a warm border at the conclusion of February or early in March. At the close of the last month, or more preferably in the early part of April, the main crop must be inserted; though, to avoid the maggot, it is even recommended not to do so until its close. In May and July the sowing may be repeated for production in autumn; and lastly, in August, to stand through the winter, and produce in early spring. For sowing, a calm day should be taken advantage of; and, previous to commencing, the seeds should be separated by rubbing them between the hands, with the admixture of a little sand; otherwise, by reason of their adhering by the hairs that surround their edges, they are clotted together, and cannot be sown regular. The surface of the bed should likewise be laid smooth; otherwise, in raking it, the seed will be drawn together in similar heaps. To avoid this, before raking, it may be gently trod in. The seed should be sown thin, and the beds not more than four feet wide, for the convenience of after-cultivation. The larger weeds must be continually removed by hand; and when the plants are seven or eight weeks o
when they have got four leaves two or
inches long, they should be thinned;
intended for drawing young to four
inches apart, and those to attain the
growth to eight or ten; at the same
the ground must be small-hoed, which
ration should be regularly performed
three or four weeks, until the growth
plants becomes an effectual hindrance
growth of the weeds. The crop to
through the winter should, in frosty we
be sheltered with a covering of litter,
frost occurs with much severity, it oft
stroys them. The hotbed for the first s
of the year must be moderate, and e
about sixteen inches deep; two or
linings of hot dung, as the heat dec
will be sufficient to bring them to a
fit for use. These are the first in produ
but are closely followed by those tha
withstood the winter. The tempe
must never exceed 70°, or fall lower
65°: if it rises higher, it is a certain
of weakness; if lower, it checks the ad
of the root. They need not be thin
more than three inches apart.

At the close of October, or early i
vember, as soon as the leaves change
the main crop may be dug up, and
alternate layers, with sand, in a dr
house; previous to doing which, the
and any adhering earth, must be re
A dry day should always be chosen for
them up.

For the production of seed, it is by
the best practice to leave some where
If, however, this is impracticable, so
the finest and most perfect roots shou
selected, and their tops not cut so cl
those for storing; these likewise mu
placed in sand until February or M
though some gardeners recommend Oc
or November, then to be planted ou
feet asunder in a stiff loamy soil.
left where grown, or those planted
close of autumn, must, during frosts,
the protection of litter; it being inva
removed, however, during mild we
As the seed ripens in August, which is k
by its turning brown, about the end o
gust each umbel should be cut; for i
waited for until the whole plant d
much of the seed is often lost during s
weather. It must be thoroughly dri
exposure to the sun and air, befor
rubbed out for storing. For sowin
seed should always be of the pr
year's growth; if it is more than two
old, it will not vegetate at all. (
Johnson's Kitchen Garden.) The
carrot forms a good poultice in fou
cancerous ulcers.

CARROT, WILD. (*Daucus Carota.*) This common plant is abundant in pastures, and about our hedges, in a gravelly soil. It is a biennial plant, flowering in June and July. Its root is small, slender, aromatic, and sweetish. It grows two feet high, branched, erect, leafy; the stalks are firm and striated; the leaves are divided into fine and numerous partitions, of a pale green colour, being also hairy. The flowers are in large umbels, with large, pinnatifid involucres, and undivided involucels, small and white, except the central flower, which is red; and they are succeeded by rough seeds. This is one of those plants in which we are able to perceive design. The seeds require to be protected, to produce which all the flower-stalks become incurvated, making the umbel hollow, or giving it the aspect of a cup or nest. The seed is medicinally used; it is a powerful diuretic. An infusion of the seeds in white wine is very restorative in hysterical disorders.

CARRUCAGE. (From *caruca*, an old name for the plough.) In husbandry, denotes the ploughing of ground, either ordinary, as for grain, hemp, flax; or extraordinary, as for woad, dyer's weed, rapeseed, &c.

CARRUSATE. A term that anciently denoted the quantity of arable land capable of being tilled in one year with one plough.

CARRYING. A term used in horsemanship. A horse is said to carry low, when, having naturally an ill-shaped neck, he lowers his head too much. This fault may be remedied by a proper bridle. A horse is said to carry well, when his neck is raised or arched, and he holds his head high and firm, without constraint. *Carrying in the wind*, is applied to horses which frequently toss their noses as high as their ears, and do not carry their heads handsomely.

CARSE. A provincial term applied to such lands as lie in the hollows near large rivers or estuaries of the sea, and have a deep rich soil. The carse of Gowrie, in Scotland, yields the heaviest crops of grain north of the Tweed. Such lands are either of the deep clayey loamy kind, or alluvial soils in a state of aration.

CART. A vehicle constructed with two or more wheels, and drawn by one or more horses. Half a century since, Lord Robert Seymour advocated the cause of the single-horse cart: he observed, that the advantages of single-horse carts are universally admitted, wherever they have been attentively compared with carriages of any other description. By his own observation he was led to think that a horse, when he acts singly, will do half as much more work as when he acts in conjunction with another; that is to say, that two horses will, separately, do as much work as three conjunctively: this arises, he believes, in the first place, from the single horse being so near the load he draws; and, in the next place, from the point or line of draught being so much below his breast — it being usual to make the wheels of single-horse carts very low. A horse harnessed singly has nothing but his load to contend with; whereas, when he draws in conjunction with another, he is generally embarrassed by some difference of rate, the horse behind or before him being quicker or slower than himself; he is likewise frequently inconvenienced by the greater or lesser height of his neighbour: these considerations gave, he conceived, a decided advantage to the sort of cart he recommended. If any other is wanted, that of the very great ease with which a low cart is filled may be added; as a man may load it with the help of a long-handled shovel or fork, by means of his hands only: whereas, in order to fill a higher cart, not only the man's back, but his arms and whole person must be exerted. To the use of single horses in draught he has heard no objection, unless it be the supposed necessity of additional drivers created by it: the fact, however, is, that it has no such effect; for horses once in the habit of going singly, will follow each other as uniformly and as steadily as they do when harnessed together; and accordingly we see, says he, on the most frequented roads in Ireland, men conducting three, four, or five single-horse carts each, without any inconvenience to the passengers: such, likewise, is the case in this country, in which lime and coal are generally carried. (*Young's Ann. of Agr.* vol. xxvii. p. 337.) And he might likewise have added, the single-horse carts in some of the northern counties, where one man manages two or three, and sometimes more.

The subject of carts has recently engaged the attention of the Royal Agricultural Society of England. Mr. Baker of Gloucestershire says, in their *Journ.* vol. i. p. 429., "My land is on a stiff clay; my carts are on six-inch wheels, and made to hold half the quantity that my neighbours carry in theirs. My land is hilly; my carts generally go with one horse; but up hill, when loaded, another is put on before, which comes down the hill with the next returning cart. Thus, on a level ground, with two carts and two, or perhaps with three horses, I take out the same quantity of dung that my neighbours carry in their carts with never less than three horses, and sometimes with four." And in the *Journ. of the Roy. Agr. Soc. of Eng.* vol. ii. p. 73., is a very good article by Mr.

Hannam of Burcott, illustrated by engravings of the one-horse cart, and of a new one of his own construction. "The counties of Cumberland and Westmoreland," he observes, "have universally and immemorially used the one-horse cart. They have no other carriage for any kind of agricultural produce, and never is the addition of another horse on any occasion seen." The practice, apparently originating in economy, has long since spread into Dumfriesshire; and, according to Mr. Wilkie of Uddingston, it is all but universal at the present moment throughout the west of Scotland. "My dung-carts," he adds, "are taken from the improved Cumberland cart, which measures 60 inches long × 47½ inches wide × 17 inches deep = 1 cubic yard = 21 bushels; and it tilts with a spring key-stick, which adjusts itself as the horse moves forward; the wheels are about 4 feet 6 inches high, and are set so far apart as to conveniently span two 27-inch ridges; it weighs 8 cwt." There are a variety of carts peculiar to different counties, most of which are described, and drawings given, in *Brit. Husb.* vol. i. p. 159.; from the heavy one-horse cart of the vicinity of London, to the light simple Irish or Yarmouth car, as well as the improved car first introduced into Leicestershire by Bakewell.

CARTER. An inferior sort of farm servant, who has the care of driving and foddering the team. He should always be chosen as steady, regular, sober, and trustworthy as possible, and be perfectly gentle and humane in his disposition. It is of great importance to the farmer to have a carter with these qualifications; for otherwise his horses may be ill-treated, neglected, overworked, or overfed, and much fodder wasted. (*Brit. Husb.* vol. i. p. 170.) Leonard Mascal, nearly two centuries since, told the carter of his day to "have patience in moderate useing of his horses; and at all other times he ought to bear a love alwayes to his cattel, that his cattel may love him, not fearing him too much; let him never use to beat them with the stock of his whip, but whip them with the lash, and use them to the sound thereof, and yet not often for dulling of them."

CART HORSE. See Horse.

CART LADDER. A kind of rack, placed occasionally at the head and tail of a cart, to make it hold a larger quantity of hay, straw, &c.

CART LODGE. A small outhouse for sheltering carts from the weather. Farmers should be very careful to place their carts, &c. under proper shelter, when out of use, as they will last much longer by this means than if left exposed in the yard to the effects of the weather; for, as they are thus sometimes wet, and sometimes dry, they soon rot, and become unfit for use. The dust and dirt should also be constantly washed off before they are laid up. There are some excellent observations on the necessity of care in the preservation of agricultural implements by Mr. Crosskill of Beverley. (*Journ. of Roy. Agr. Soc.* vol. ii. p. 150.) He advises that the implements should all be placed under the care of one workman on the farm, who should be encouraged to feel a pride in showing his master's implements in fine order.

CART-SICK, or SINK. A term used in some of the northern counties to signify the rut, furrow, or channel made by the wheels of the cart.

CARTWRIGHT, THE REV. EDMUND. An able and enthusiastic experimental farmer and mechanical genius. Born in Nottinghamshire in 1743, and died at an advanced age in 1824. There are various papers of his in the *Communications to the Board of Agriculture*, and also upon the mildew. (*Johnson on Salt*, p. 52.) He was one of the early members of the Board of Agriculture.

CARUE. A term signifying sour. Thus, to carue, implies to grow sour, and is generally applied to cream.

CARY'S CATTLE GAUGE. An instrument made in the form and on the principle of a slider rule, for ascertaining the weight of live cattle, which is indicated in stones of 8 lbs. and 14 lbs. (See *Brit. Husb.* vol. ii. foot note at p. 393.)

CASINGS. A provincial term, signifying dried cow's dung, which is used in several parts of the country for fuel.

CASK. A vessel of capacity, for holding different sorts of liquids, or other matters. See Barrel.

CAST. A term applied to a swarm or flight of bees (see Bees); and to poultry when they lose their feathers or moult. It is also used to denote the changing of the hair and hoofs of horses. Horses cast or shed their hair at least once a year. Every spring they cast the winter coat, and gain a summer one; and sometimes in the end of autumn they put on their winter hair, in case they have been ill-fed, curried, or clothed, or kept in a cold stable. Occasionally they cast their hoofs: when this happens, let them be turned out into a pasture.

CASTANEA VESCA. The sweet chestnut. See Chestnut.

CASTING. The operation of throwing a horse down, which should be performed with great care on straw. Take a long rope double it, and cast a knot a yard from the

n regard to animals, the operation
in males, and spaying in females.
ion may be performed at any age,
eneral, the earlier the better.
between two and eight months;
before they are twenty-one days
rses, between four and twelve

(*Felis Catus.*) Of this animal
twenty-one species. The do-
is merely the tamed wild cat.
sually breeds before she is a year
d of gestation fifty-five days; at-
ge of twelve years. They delight
s valerian and catmint, but dislike
llick's *Dom. Encyc.*)

PA. (*Bignonia Catalpa.*) A shrub
irty or forty feet high; its beau-
ulous flowers bloom in August. It
uliarly large bright green leaf;
, and does not blow in wet sum-
is tolerably hardy; easily raised
s or seed.

ACT. In farriery, a disease in
f horses, in which the crystalline
rendered opaque, and the vision
r destroyed. The only certain
cure in these complaints is to
e lens by means of extracting or
By the first mentioned operation,
is made into the eye, and the
ns taken out: by the second it is
by the point of a couching needle
the eye; and being carried to the
of the chamber of the eye or vi-
nour, it is left there to be absorbed.
peration is the more effective, but
hazardous of the two, owing to the
ion which succeeds. The second
and sometimes fails; but it is free

GOOSE-GRASS. (*Galium Aparine, Eng. Flor.* vol. i. p. 210.) An indigenous weed, growing in hedges, and by road sides. See HARIFF.

CATCH-WORK. A term employed in irrigation for the works for throwing the water over such lands as lie on the declivities of hills.

CATCH-WORK MEADOW. That sort of meadow which is formed by turning the water of a spring or small rivulet along the side of a hill or declivity, so as to water the lands between the cut, or *main carriage*, and the original water-course, which in this case becomes the main drain. See IRRIGATION.

CATERPILLAR. The name given to the larva state of butterflies and moths.

CATKIN. A name given to such amentaceous flowers as consist of a great number of chaffy scales and flowers, dispersed along a slender thread-like axis or rachis, hanging downward, in the form of a rope or cat's tail. It is the male flower of the trees which produce them, as the birch, beech, pine, fir, poplar, walnut, hazel, &c. They drop as soon as the pollen is shed.

CATMINT, or NEP. (*Nepeta Cataria, Smith*, vol. iii. p. 70.) This is a common plant, growing in borders of fields, and in moist places, flowering in June and July. It grows a yard high, with broad whitish leaves, and white flowers, not unlike mint. The plant has a strong and rather unsavoury smell. It is easily recognized by its hoary, square, and erect stalks; its leaves slightly indented on the edges, of a whitish green on their outside, and almost perfect white underneath; and its flowers growing in spiked clusters around the stalk at

CAT'S-FOOT. A term sometimes provincially applied to ground-ivy.

CAT'S-MILK. A common name for the plant wartwort, which see.

CAT'S-TAIL, or TIMOTHY GRASS. (*Phleum pratense.*) This grass flourishes best in moist deep loams. Perennial, native of Britain. At the time of flowering, in the end of June, Sinclair found the produce per acre was, from a clayey loam, 40,837 lbs.; of nutritive matter 1595 lbs. This is a great American grass, and is called Timothy from Mr. Timothy Hanson, who first introduced its seeds from New York to Carolina. Seeds ripe in July. It produces an abundance of early feed, but its product of aftermath is poor.

The smaller Meadow Cat's-tail. (*Phleum minus.*) Indigenous to England, on tenacious soils. Its produce per acre when flowering on a clayey loam, 14,973 lbs.; of nutritive matter, 511 lbs.

The Bulbous-jointed Cat's-tail Grass. (*Phleum nodosum.*) Perennial; native of Britain, but rare; found on a clayey soil at Woburn. Flowers in beginning of July. Seeds ripe at the end of the same month. The produce per acre, when in flower, from a clayey loam, 12,251 lbs.; of nutritive matter, 478 lbs.

Purple-stalked Cat's-tail Grass. (*Phleum Boehmeri.*) Indigenous and perennial; grows best on a sandy loam. Flowers in July. Produce per acre from a silicious sand, when in flower, 6806 lbs.; of nutritive matter, 239 lbs. (*Sinclair's Hort. Gram.* p. 195—199. 317.; *Smith's Bot.* vol. i. p. 75—78.; *Ibid.* vol. iv. p. 71—73.)

CATTLE. Under this head I propose to include the ox tribe, *Bovidæ*, of the class Mammalia, having teats or *mammæ;* these are of the order *Ruminantia*, or ruminating, or cud-chewing animals. Of this tribe there are eight species: — 1. *Bos Urus* or *Auroch*, the ancient bison; 2. *B. Bison*, the bison, or American buffalo; 3. *B. moschatus*, or musk ox; 4. *B. frontalis*, or gayal; 5. *B. grunniens*, or grunting ox; 6. *B. caffer*, or buffalo of Southern Africa; 7. *B. Bubulus*, or common buffalo; 8. *B. Taurus*, or common domestic ox. That the ox has been domesticated, and in the service of man from a very remote period, is quite certain. We learn from *Gen.* (iv. 20.) that cattle were kept by the early descendants of Adam. Preserved by Noah from the flood waters, the original breed of our present oxen must have been in the neighbourhood of Mount Ararat; and from thence, dispersing over the face of the globe, altering by climate, by food, and by cultivation, originated the various breeds of modern ages. That the value of the ox
tribe has been in all ages and
highly appreciated, we have abund
dence. The natives of Egypt, In
of Hindostan seem alike to have pl
cow amongst their deities; and, ju
her usefulness to all classes, no anin
perhaps have been selected whose
mankind is greater. Of the old
British cattle, some remains of w
yet to be found in Chillingham
Northumberland, in a state of toler
rity, and in one or two other
Great Britain, improved by judi
accidental crossings, came most of
dern breeds. George Culley, in his
work on cattle, describes these al
as being of a creamy white, wi
muzzles, white horns with black ti
ing upwards. The cows weighi
twenty-five to thirty-five stone. T
for a week or ten days their c
some sequestered place; and the
they are disturbed, put their head
ground, and lie close like a hare
wildness prevents the introduction
into any situation not surrounded
walls; and the mode in which th
wont to be killed by the keepers
rifle ball. See also two excellent
Dr. Knox on the wild ox of
(*Quart. Journ. of Agr.* vol. ix. p. 36
on the ox tribe, in connection with
cattle of the Hamilton and Chi
breeds, by the Rev. W. Patric
p. 514.).

In nearly all parts of the earth
employed for their labour, for th
and for food. In southern Africa
as much the associates of the Caffr
horse is of the Arab. They share
and assist him in tending his her
are even trained to battle, in wh
become fierce and courageous. In
Africa the proudest ebony beauti
be seen on their backs. They hav
the plough in all ages; in Spain
trample out the corn; in India
water from the deepest wells to irr
thirsty soils of Bengal. When C
vaded England they constituted
riches of its inhabitants (*Cæsar*, lib.
and they yet form no inconsidera
in the estimate of this country's al
riches. According to the estimat
Youatt, to whom in this and othe
on live stock I am so much indeb
Cattle, p. 9.), it would seem that
head of cattle are consigned to the
every year in the United Kingdom,
value of the entire national stoc
kinds of cattle, sheep, and pigs,
opinion, amounts to nearly 120,
sterling. An excellent paper on t

ral history of the domestic ox and
l species, by Professor Wilson
Journ. of Agr. vol. ii. p. 177.), may
lted with advantage by those who
more information on this head.

eeds of cattle in England are re-
for their numerous varieties,
y the almost endless crossings of
d with another, often producing
of the most mongrel description,
h are rather difficult to describe.
this place touch upon the prin-
ieties; and in these we should, in
or the chief points of excellence,
s Mr. Youatt well observes, "wide
girth about the heart and lungs,
only about these, but above the
the ribs must we have both depth
dness, the *hooped* as well as the
rel is essential. The beast should
bbed home; there should be little
ween the ribs and the hips. This
nsable in the fattening ox, but a
and drooping of the belly is ex-
n the cow. It leaves room for the
nd if it is also accompanied by
milk veins it generally indicates
e in the dairy. This roundness
h of the barrel, however, is most
eous in proportion as it is found
the point of the elbow, more
tween the shoulders and legs;
down between the legs, than up-
owards the withers, for it di-
the heaviness before, and the com-
bulk of the coarser parts of the
which is always a very great con-
n.

loins should be wide, for these are
e parts; they should seem to extend
the back; and although the belly
ot hang down, the flanks should be
nd deep; the hips large, without
gged, round rather than wide, and
when handled, plenty of muscle
The thighs full and long, and
ewed from behind close together.
short, for there is almost an inse-
connection between length of leg
tness of carcass, and shortness of
propensity to fatten. The bones
legs and of the frame generally
e small, but not too small; small
or the well-known accompaniment,
nsity to fatten; small enough to
e consumer, but not so small as to
delicacy of constitution and lia-
disease. Finally, the hide, the
ortant thing of all, should be thin,
o thin as to indicate that the animal
re no hardships, movable, mellow,
too loose, and particularly well co-
th fine and soft hair."

On the points by which live stock are judged, some very excellent papers have appeared in the *Edin. Quart. Journ. of Agr.* by Mr. James Dickson, cattle-dealer of Edinburgh. He very truly observes (vol. v. p. 159.) that, "were an ox of fine symmetry and high condition placed before a person not a judge of live stock, his opinion of its excellences would be derived from a very limited view, and consequently from only a few of its qualities. He might observe and admire the beautiful outline of its figure, for that would strike the most casual observer. He might be pleased with the tint of its colours, the plumpness of its body, and the smoothness and glossiness of its skin. He might be even delighted with the gentle and complacent expression of its countenance:—all these properties he might judge of by the eye alone. On touching the animal with the hand, he could feel the softness of its body occasioned by the fatness of the flesh. But no man not a judge could rightly criticise the properties of an ox farther. He could not possibly discover without tuition those properties which had chiefly conduced to produce the high condition in which he saw the ox. He would hardly believe that a judge can ascertain merely by the eye, from its general aspect, whether the ox were in good or bad health; from the colour of its skin, whether it were of a pure or cross breed; from the expression of its countenance, whether it were a quiet feeder; and from the nature of its flesh, whether it had arrived at maturity. The discoveries made by the hand of a judge might even stagger his belief. He could scarcely conceive that the hand can feel a hidden property. The touch, which of all tests is the most surely indicative of fine quality of flesh and of disposition to fatten, can find whether that flesh is of the most valuable kind; and it can foretel the probable abundance of fat in the interior of the carcass. In short, a judge alone can discriminate between the relative values of the different points, or appreciate the aggregate value of all the points of an ox. These '*points*' are the parts of an ox by which it is judged." The first point to be ascertained in examining an ox is the purity of its breed, whatever that breed may be, for that will give the degree of the disposition to fatten of the individuals of that breed. The purity of the breed may be ascertained from several marks: the colour or colours of the skin of a pure breed of cattle, whatever those colours are, are always definite. The colour of the bald skin on the nose and round the eyes, in a pure breed, is always definite, and without spots. This last is an essential point. When horns exist, they should be smooth, small, tapering, and sharp-pointed, long or short according to the breed, and of a white colour throughout in some breeds, and tipped with black in others. The shape of the horn is a less essential point than the colour. Applying these remarks on the different breeds in Scotland, as illustrations of the points which we have been considering, we have the definite colours of white and red in the short-horns. The colour is either entirely white or entirely red, or the one or the other predominates in their mixture. The skin on the nose and around the eyes is uniformly of a rich cream colour. The Ayrshire breed, in its purity, is also distinguished by the red and white colour of the skin, but always mixed, and the mixture consists of spots of greater or smaller size not blended together. The colour of the skin on the nose and around the eye is not definite, but generally black or cream coloured. In other points, those two celebrated breeds differ from one another more than in the characters which I have just described. In the West Highland, Angus, and Galloway breeds, the colour of the skin of the nose and around the eyes is indicative of the pure blood of black-coloured cattle; but a cream-coloured nose may frequently be observed amongst the other colours of skin. The characters above given will certainly apply to the purity of the blood in the short-horn and Ayrshire breeds, if not to the West Highlanders.

" The second *point* to be ascertained in an ox is the form of its carcass. It is found that the nearer the section of the carcass of a fat ox, taken longitudinally vertical, transversely vertical, and horizontally, approaches to the figure of a parallelogram, the greater quantity of flesh will it carry within the same measurement. That the carcass may fill up the parallelogram as well as its rounded form is capable of filling up a right-angled figure, it should possess the following configuration:—The back should be straight from the top of the shoulder to the tail. The tail should fall perpendicularly from the line of the back. The buttocks and twist should be well filled out. The brisket should project to a line dropped from the middle of the neck. The belly should be straight longitudinally, and round laterally, and filled at the flanks. The ribs should be round, and should project horizontally, and at right angles to the back. The hooks should be wide and flat; and the rump, from the tail to the hooks, should also be filled and well filled. The quarter from the itch-bone to the hook should be long. The loin bones should be long, broad, and flat, and well filled; but the space betwixt the hooks and the short ribs should be rather short and well arched over, with a thicknes
the hooks. A long hollow
to the short ribs indicates
tion and an indifferent thr
loin to the shoulder-blade
of one breadth, and from
taper a little to the front
The neck-vein should be w
to complete the line from
brisket. The covering on th
should be as full out as the
middle ribs should be well f
the line from the shoulders
along the projection of th
ribs, these constitute all
are essential to a *fat* ox.

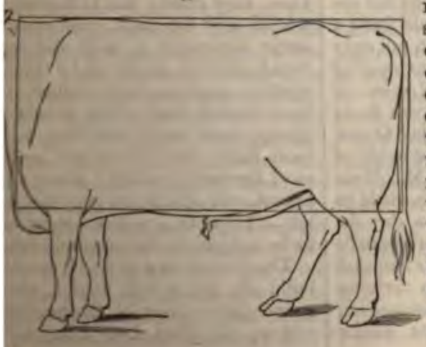
" The first of the *points*
lean ox, is the nature of th
thick bone indicates both a
an inferior description of fl
when seen on a side view,
viewed either from behin
animal, indicates the oppo
a round bone. The who
carcass should bear a sma
bulk and weight to the flesh,
only required as a support
texture of the bone should
and hard. The bones of th
fine and clean, and only c
and muscle, and not with
flesh, which always give
dull appearance to an ox.
and hock should also be c
muscle to endure travellin
indicate bad feeders. Th
should be contrary to that o
from the back of the head
the neck. A full, clear, an
is another *point* to be consi
is a nice indication of good
always attendant on fine bo
sion of the eye is an excelle
properties in the ox. A
clearly indicates a slow fe
eye, shewing much white,
restless capricious dispositi
compatible with quiet fe
complacent' expression of
strongly indicative of a sw
disposition, and of course
The eye is frequently a fait
state of the health. A ch
accompanies good health:
one proves the probable e
internal lingering disease;
eye, however, arising from
is quite different in charact
or constitutional phlegmati

" The state of the skin is
be ascertained; the skin
technically and emphaticall
—a criterion second to no

ding properties of an ox. The touch
good or bad, fine or harsh, or, as it
termed, hard or mellow. A thick
n, which is generally covered with a
t, hard, short hair, always touches
d indicates a bad feeder. A thin,
papery skin, covered with thin silky
ing the opposite of the one just de-
does not, however, afford a good touch.
in is indicative of weakness of con-
n, though of good feeding properties.
t touch will be found with a thick
in, floating as it were on a layer of
yielding to the least pressure, and
g back to the finger like a piece of
ick, chamois leather, and covered
ick, glossy, soft hair. It is not unlike
f fine soft moss, and hence, such a
not unfrequently styled 'mossy.' A
dge of touch can only be acquired
practice; but after having acquired
of itself a sufficient means of judging
feeding quality of an ox, because,
resent, the properties of symmetrical
ne bone, sweet disposition, and purity
d are the general accompaniments.
are the essential points in judging
tle, but there are other and important
rations in forming a thorough judg-
f the ox. The head should be small
t on the neck as if easily carried by
imal: this shows the animal to ad-
e in the market. The face long from
s to the point of the nose. The
oad across the eyes, contracted a
ove them, but tapering considerably
em to the nose. The muzzle fine
ll; the nostrils capacious; the ears
little erect, and transparent; the
t and light. A droop of the neck
top of the shoulder to the head in-
weakness of constitution, arising
from breeding too near akin. The
the knees should be rather short
and clean made; stand where they
bear the weight of the body most
easily, and wide asunder. The tail rather thick than otherwise, as that indicates a strong spine, and a good weigher. It should be provided with a large tuft of long hair. The *position* of the *flesh* is important: that part called the spare rib in Edinburgh, and the fore and middle ribs in London, the loins and the rump, or hook-bone, are of the finest quality, and are generally used for roasts and steaks; consequently, the ox which carries the largest quantity of beef on these *points* is the most valuable. Flesh of fine quality is actually of a finer texture than coarse flesh. The other desirable objects in a fat ox are a full twist, lining the division between the hams called 'the closing,' with a thick layer of fat, a thick flank, and a full neck bend; these generally indicate internal tallow. The last points generally covered with fat are the point of the shoulder-joint and the top of the shoulder: if these parts are, therefore, felt to be well covered, the other and better parts of the animal may be considered ripe. It is proper, in judging of the weight of a fat ox, to view his gait while walking towards you, which will, if the ox has been well fed, be accompanied with a heavy rolling tread on the ground. In this way a judge can at once come very near to its weight." (*Quart. Journ. of Agr.* vol. v. p. 167.) At the end of this paper will be found an account of the mode of ascertaining the weight of stock by admeasurement.

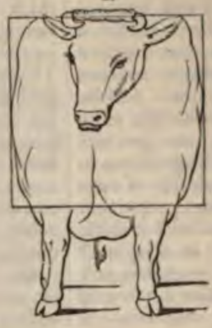
When we survey the frame of a short horn ox, adds Mr. Dickson (*Ibid.* vol. vi. p. 267.), we have a straight level back, from behind the horns to the top of the tail, full buttocks, and a projecting brisket; we have, in short, the rectangular figure, as represented in a side view by fig. 1. We have also the level loin across the hook bones, and the level top of the shoulder across the ox, and perpendicular lines down the hind and fore-legs on both sides, these constituting the square form when the ox is viewed before and behind, as represented in figures 2. and 3.; and we have straight parallel lines from the sides of the shoulders, along the outmost points of the ribs, to the sides of the hind quarters; and we have these lines connected at their ends by others of shorter and equal length, across the end of the rump and the top of the shoulder, thus constituting the rectangular form of the ox when viewed from above down upon the back, as represented by fig. 4.; the form of the short ox and heifer, in perfect accordance with the diagrams of the rule. Farther, I should be inclined to assert, though I have not directed my

1.

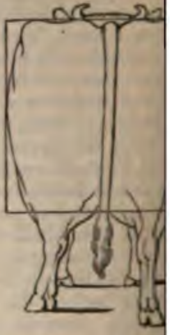


attention sufficiently to the fact, to be able to prove the assertion from examples, that the carcass of a full fed, symmetrical, short-horn ox, included within the rectangle, is in length double its depth, and in depth equal to its breadth; hence, figs. 2. and 3. are squares, and figs. 1. and 4. each two similar squares, placed in juxtaposition. The form of the short-horn breed is perfect according to this rule.

2.



3.



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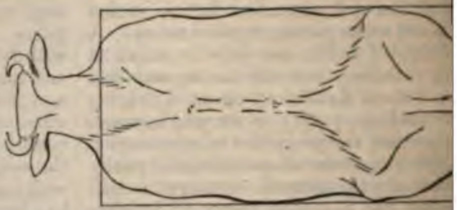


The cow goes with calf about forty weeks; and is often capable of breeding, when only a year old, but she should not be allowed to do so until she is above two years old. When the calves are intended for veal, January, February, and March are the best months for calving. On the question of breeding live stock in general, and upon the difficult question of the comparative influence of the male and female parents in impressing their offspring, a theme propounded by the Highland Society, there are some excellent papers by Mr. Boswell, Mr. Christian, and Mr. Mill (*High. Soc. Trans.* vol. i. p.17.), by the Rev. Henry Berry (*Brit. Farm. Mag.* vol. i.), and by Mr. Knight (*Trans. Roy. Soc.* 1809), in which they all seem to uphold the superior influence of the male; and on the selection of the male animal in breeding, there is a paper by Lord Spencer (*Journ. Roy. Agr. Soc.* vol. i. p. 22.); another on the gestation of cows (*Ibid.* 165.); and on the means of calculating the number of calves which will probably be produced by a herd of cows, by the same noble lord (*Ibid.* vol. ii. p. 112.); and on the detection of pregnancy in the horse and cow by Professor Youatt (*Ibid.* p.170.); on a method of obtaining a greater number of one sex at the option of the owner, in the breeding of live stock (*Quart. Journ. of Agr.* vol. i. p. 63.); on the rearing of calves, in which the writer recommends that skimmed milk should have a piece of red-hot iron plunged into it, not only to warm it, but to give an astringent quality (*Com. Board of Agr.* vol. iv. p. 382.); on the mode of fattening them in Strathaven there is an account by Mr. Aiton in the *Quart. Journ. of Agr.* p. 249., and of the mode of fattening them near London by Mr. Main (*Ibid.* vol. v. p. 608.) "Every cow is made to suckle her own calf three times a day for the first three or four days, and afterwards twice a day, and, in need, her bag is emptied by another calf. If a calf goes on thriving and well, it will be what is esteemed in England *prime veal* in about ten weeks and weigh from 17 to 20 stones of
each!"

The North Devon. — Of this breed
bull should have yellow horns, placed ne
too low nor too high, nor be too thick
growing gradually less towards the po
the eye clear, prominent, and bright
forehead small, flat, and indented; the
zle fine; the cheek small; the nose of a
yellow, the nostril high and open; the
thick, and the hair about the head c
The head of the ox is smaller, otherwi
does not differ materially from the sh
the bull; his action is free, and he is qu
in his movements than any of our
but his legs are apparently placed too
under his chest for speed, yet he pos
this property in an eminent degree; hi
are straight; the fore-arm is large and st
the bones of the leg, especially below
knee, very small; the tail is set on hi
a level with the back, rarely much elev
never depressed, is long and taper,
bunch of hair at the end; the skin is
elastic, mellow, and rather thin;
have smooth hair, which should be fin
glossy, some curly, and these are rathe
most hardy and fatten the best; red
most favourite colour; many, howeve
brown, and others are approaching to
nut. Those of a yellow colour are rep
to be subject to the *steat* (diarrhœa).

The Devon cow is much smaller tha
bull; she has a full, round, clear ey
countenance cheerful, the muzzle ora
yellow, the jaws free from thicknes

from dewlap. On all soils, except heavy, the Devon ox is very su- the plough, for its quickness of cility, good temper, stoutness, and It is always worked in yokes. Four en are considered equal in their three horses: they are commonly rom two years old until they are or six, and then in ten or twelve on grass and hay, they are fit for neither corn, cake, or turnips are r them during the first winter. en faster, and with less food, than rs; their flesh is excellent. Some ve experiments between the Devon cattle were made by the Duke of of which the following table gives : they were fed from November until December 10. 1798 : —

	First Weight.			Gained.		Consumed.		
						Oil Cake.	Turnips.	Hay.
	cwt.	qrs.	lbs.			lbs.	lbs.	lbs.
d	17	0	1	24	3	-	2700	487
	18	1	0	41	5	423	2712	432
	14	1	7	45	4	438	2668	295
	14	2	4	64	6	442	2056	442
	16	2	0	45	4	432	2655	392
er	15	2	14	40	2	434	2652	400

is much difference of opinion with the fitness of Devon cows for the being pretty generally asserted, that nowledged grazing qualities render it for the dairy, that their milk is deficient in quantity; but there are y superior judges who prefer them the dairy. Of the calves, those dropped about Michaelmas time rred to those which are calved in or February. They allow the calf hree times a day for a week; then n milk is given it for three weeks ien it has warm scalded milk mixed all portion of finely divided linseed l its meals are gradually lessened, ur months old it is entirely weaned. *On Cattle*, p. 7—25.)

ereford.—The oxen of Hereford- much larger than the Devon, and er red, some are dark yellow, and ndled; they generally have white llies, and throats. They have ides than those of Devonshire, and more hardy, and shorter in the nd leg; are higher, heavier, and in the chine; have more fat, and ler and wider across the hips; the nore muscular, the shoulders larger. 31.) Marshall long since described etty correctly as follows: — "The nce pleasant, cheerful, open; the broad; eye full and lively; horns per, and spreading; head small; ; neck long and tapering; chest deep; bosom broad, and projecting forward; shoulder-bone thin, flat, no way protuberant in bone, but full and mellow in flesh; chest full; loin broad; hips standing wide, and level with the spine; quarters long and wide at the neck; rump even with the general level of the back, not drooping, nor standing high and sharp above the quarters; tail slender, and neatly haired; barrel round and roomy, the carcass throughout deep and well spread; ribs broad, standing close and flat on the outer surface, forming a smooth even barrel, the hindmost large and of full length; round bone small, snug, not prominent; thigh clean, and regularly tapering; legs upright and short; bone below the knee and hough, small; feet of middle size; cod and twist round and full; flank large; flesh every where mellow, soft, yielding pleasantly to the touch, especially on the chine, the shoulder, and the ribs; hide mellow, supple, of a middle thickness, and loose; coat neatly haired, bright, and silky; colour of a middle red with a bald face, characteristic of the true Herefordshire breed."

"They fatten," says Mr. Youatt, "to a much greater weight than the Devons, and run from 50 to 70 score; a tolerable cow will average from 35 to 50 score; a cow belonging to the Duke of Bedford weighed more than 70; an ox of Mr. Westcar's exceeded 110 score. The Hereford ox fattens speedily at an early age. They are not now much used for husbandry, although their form adapts them for the heavier work, and they have all the honesty and docility of the Devon ox, and greater strength, if not his activity.

"The Hereford cows are worse milkers than those of Devon, but then they will grow fat where a Devon would starve. The beef is sometimes objected to from the largeness of the bone, and the coarseness of some of the inferior pieces, but the best sorts are generally excellent. Mr. Youatt gives an account of an experiment in feeding, made in the winter of 1828-9, between the Herefords and the improved short-horns, which, although by no means decisive of the merits of either breed, yet is worthy of notice by the grazier.

"Three Herefords and three short-horns were put together into a straw yard, Dec. 20. 1827, and each had, in the open yard, a bushel of turnips per day, besides straw, until May 2. 1828; they then were weighed, and sent to grass: —

No.	cwts.	qrs.	lbs.	No.	cwts.	qrs.	lbs.
1. Hereford	8	3	0	1. Short-horn	9	2	0
2. —	7	3	0	2. —	8	2	0
3. —	7	0	0	3. —	9	0	0

When taken from grass, November 3., they weighed —

No.	cwts.	qrs.	lbs.	No.	cwts.	qrs.	lbs.
1. Hereford	11	3	0	1. Short-horn	12	3	14
2. —	10	2	0	2. —	12	2	0
3. —	10	3	0	3. —	12	3	0

From this time till the 25th March, 1829, they consumed—

		Swedish Turnips. lbs	Hay. lbs.
The Herefords	-	- 46,655	5,065
The short-horns	-	- 59,430	6,779

They then weighed—

No.	cwts.	qrs.	lbs.	No.	cwts.	qrs.	lbs.
1. Hereford	13	0	14	1. Short-horn	14	2	0
2. —	12	0	0	2. —	14	1	14
3. —	12	0	0	3. —	14	2	14

making a difference in favour of the short-horns of 3 cwts. 3 qrs. 14 lbs.; but then they consumed more turnips by 12,775 lbs., and more hay by 1,714 lbs. When they were sold at Smithfield on the 30th of March, the short-horns realised 97*l.*, and the Herefords 96*l.*" (*On Cattle*, p. 34.)

The Sussex.—One of the best descriptions, says Mr. Youatt, that we have of the Sussex ox is given by that excellent agriculturist, Mr. Ellman. He speaks of the Sussex ox as having a small and well-turned head; and so it has, compared with many other breeds, and even with the Hereford, but evidently coarser than that of the Devon, the horns pushing forwards a little, and then turning upwards, thin, tapering, and long, not so as to confound the breed with the *long-horns*, and yet in some cases a little approaching to them. The eye is full, large, and mild in the ox, but with some degree of unquietness in the cow. The throat clean; and the neck, compared with either the long or short-horns, long and thin, yet evidently coarser than that of the Devon. The shoulder is the principal defect. There is more wideness and roundness on the withers; it is a straighter line from the summit of the withers towards the back; there is no projecting point of the shoulder when the animal is looked at from behind, but the whole of the fore-quarter is thickly covered with flesh, giving too much weight to the coarser and less profitable parts; but then the fore-legs are wider apart, straighter, and more perpendicular than in the Devon, and are placed more under the body than seeming to be attached to the sides. The fore-arm is large and muscular; the legs, though coarser than those of the Devon, are small and fine downwards, particularly below the fetlock. The barrel is round and deep. In the back; no rising spinal processes are to be seen, but rather a central depression; and the line of the back, if broken, is only done so by a lump of fat rising between the hips: the belly and flank are capacious; there is room before for the heart and lungs, and there is room behind in the capacious belly for the full exercise of its functions:
yet the beast is well ribbed hom
between the last rib and the
often very small, and there is
heaviness of the belly or flank.
of the Sussex ox are wide;
does not rise high, nor is it
ternally; but it is large and
and the space between the
filled up. The tail, fine and th
lower than in the Devon, yet
nearly as straight. The hind-
cleanly made, and if the thighs
straight without, there is plent
within. The Sussex ox has all
of the Devon, and the stre
Hereford, the propensity to fat
beautiful fine-grained flesh of b
sesses as many of the good qual
as can be combined in one frame.
them with the Herefords, a hea
but not fattening so profitably, o
kindly, is produced. When th
been crossed with the Devon, a
has resulted, but not gaining
while it is materially deterio
grazing properties. The col
Sussex ox is a deep chestnut r
bay. The black, or black and
rally indicate some strain in th
cross from the Welch. The
true Sussex ox is soft and
coat short and sleek. The Su
much of the farming labour o
of Sussex. From ten to twelve
usually kept on a farm of 150
These are fed with grass and st
begin to work, and then they
mixed with straw. There are, h
breeds: the coarser Sussex is a
the lighter, or true Sussex, is
fast as most cart-horses; of
proof was given by a Sussex o
four miles against time, over
race-course, in sixteen minu
farmers, if they have ten oxen
five or six every year, and
equal number to succeed them
will thus be broken in at thre
and fatted at five or six. Th
monly taken from work when
time is over, and turned into t
and thus prepared for winter
These are gradually accustom
constantly tied up. Some f
Ellman amongst the rest, are of
there is a saving of one fourth
stall-feeding, but many other fa
tain that the cattle fatten faste
confined to the yard. They
Smithfield, about 120 stones;
casionally attain to much grea
one of Mr. Ellman's weighed 21

The Sussex cow is not a fa

erality of farmers. She does not
for the dairy, for her milk, although
good quality, is far inferior in
to either the Holderness or the
cow. They are, moreover, what their
ance indicates, of an unquiet temper,
commonly restless and dissatisfied,
y if not bred on the farm on which
kept. They are, therefore, chiefly
breeders; are generally in fair con-
ven while milking; and no cows, ex-
Devon or Hereford, will thrive so
r being dried; they fatten even
an the ox. Nearly all the calves
d, adds Mr. Youatt—the males for
d the females for breeding or early
. By the best breeders, the bull
d every two years. (*On Cattle*,

elch.—The cattle of Wales are
of the middle-horns, and stunted
rowth from the poverty of their
Of these there are several vari-
e Pembrokeshire are chiefly black,
horns; are shorter legged than
Welch cattle; are larger than
ontgomery, and have round and
ses; have a lively look and good
gh short and rough, not thick;
arge bones, and possess, perhaps,
possible, the opposite qualities of
fair milkers, with a propensity to
e meat is equal to the Scotch.
thrive, says Mr. Youatt, where
e, and they rapidly outstrip most
they have plenty of good pas-
Pembroke cow has been called
nan's cow. The Pembroke ox
nd an honest worker, and, when
hard work, fattens speedily.
brought to London, and rarely
the butcher.

norganshire breed were patron-
rge III., and were held in great
They were, however, allowed
te during the period of the late
ve not since, in spite of the exer-
. David of Radyr, been entirely
The counties of Carmarthen,
Brecon, and especially Radnor,
e many excellent black cattle,
been materially improved of late
duction of other breeds, especi-
ssing with the Herefords. Of
es, the cattle are rather more
to the long-horns than those
h. In the counties of Anglesea,
and Merioneth, the chief atten-
farmer is directed to the rearing
In Denbigh, Flint, and Mont-
dairy is chiefly regarded. The
nglesea, says Mr. Youatt, are
black, with moderate bone, deep chest, rather heavy shoulders, enormous dewlap, round barrel, high and spreading haunches, flat face, horns long, almost invariably turning upwards; the hair coarse; the hide mellow; hardy, easy to rear, and well disposed to fatten when transplanted to better pastures than those of their native island. Attempts have been made, with little success, to improve the breed by crossing them with others; but it is difficult to find any other sufficiently hardy to withstand the climate and the privations of Mona. Many yearlings are brought from the island, and very few are kept in the island after they are three years old. They were formerly not castrated till they were a year old; this gave them a peculiar bull-like appearance. This operation, however, is now practised earlier. There is still with them, however, adds Mr. Youatt, a striking contrast with the mild intelligence of the Devon and the quiet submission of the Hereford. The Anglesea cows are not kept for the dairy to a greater extent than for home consumption. The cheese is negligently made, and, in consequence, poor and worthless. The cattle of the other Welch counties, bred amongst the rocks of Carnarvon, and the hills of Merioneth, Montgomery, and Denbigh, have little distinguishing features from other Welch cattle. They are small, hardy, and rapidly fatten, when transferred to richer pastures. The beef they produce is excellent. (*Ibid.* p. 58.)

The Scotch.—Of this valuable and improving race of cattle there are several varieties, all of which are thus classed by Mr. Youatt, and are to be considered as belonging to the middle-horns. Of these the chief varieties are,

1. The West Highlanders, which, whether we regard those found in the Hebrides or in the county of Argyle, seem to retain most of the aboriginal character. They have remained unchanged, or improved only by selection, for many generations, or, indeed, from the earliest accounts that we possess of Scottish cattle.

2. The North Highlanders are a smaller, coarser, and in every way inferior race, and owe the greater part of what is valuable about them to crosses from the western breed.

3. The north-eastern cattle were derived from, and bear a strong resemblance to the West Highlander, but are of considerably larger size.

4. The Fife breed are almost as valuable for the dairy as for the grazier, and yield to few in activity and docility.

5. The Ayrshire breed are second to none as milkers; many of the varied mingled breeds of the Lowlands are valuable.

6. The Galloways, which, scarcely a century ago, were middle-horned, and with difficulty distinguished from the West Highlanders, are now a polled breed, increased in size, with more striking resemblance to their kindred the Devons; with all their aptitude to fatten, and with a hardness of constitution which those of Devon never possessed.

The West Highlanders, or kyloes, as they are called (supposed to be from a corruption of a Gaelic word pronounced *kael*, signifying Highlands), are bred in great abundance in, and exported from, the Hebrides. The true bull of this breed is described by Mr. M'Neil of Islay as black; the head not large, the ears thin, the muzzle fine, and rather turned up; broad in the face; eyes prominent; countenance calm and placid; the horns should taper to a point, neither drooping too much nor rising too high, of a waxy colour, widely set at the root; the neck fine, particularly where it joins the head, and rising with a gentle curve from the shoulder; the breast wide, and projecting well before the legs; the shoulders broad at the top, and the chine so full as to leave but little hollow behind them; the girth behind the shoulder deep; the back straight, wide, and flat; the ribs broad, the space between them and the ribs small; the belly not sinking low in the middle, yet, in the whole, not forming the round and barrel-like carcass which some have described; the thigh tapering to the hock-joint; the bones larger in proportion to the size than in the breeds of the southern districts; the tail set on a level with the back; the legs short and straight; the whole carcass covered with a long thick coat of hair, and plenty of hair also, about the face and horns, and that hair not curly. They are hardy, easily fed; the proportion of their offal is not greater than in the most approved larger breeds; they lay their fat and flesh equally on the best parts, and when fat, the beef is fine in the grain, and so well mixed or marbled that it commands a superior price in every market. About 30,000 of these are annually sent from the Hebrides to the main land. (*On Cattle*, p. 67.)

In the Hebrides, the dairy is only attended to so far as to serve the family with milk, butter, and cheese. The milk of the Western Highland cow is small in quantity but excellent in quality; she does not yield, however, more than one third of that of the Ayrshire. The oxen of the Hebrides are never worked. (*Ibid.* p. 71.)

The Argyleshire breed are larger than those of the Hebrides, and are bred according to what the soil and the food will best
support. The Highlander, h
the gentleman whom I have
quoted so often,) " must be r
grazier alone; every attentio
his weight, in order to make h
agricultural labour, every eff
him for the dairy, will not o
hardiness of constitution and
fatten, but will fail in renderi
able for the purpose at whic
aims. The character of th
must still be, that he will pay
quantity of food than any oth
will fatten where any othe
scarcely live." (*Ibid.* p. 79.)

Of the North Highland cattl
Shetland Islands are the small
ill-shaped, and covered wit
sometimes are not more than
to the quarter. When they
the north of Scotland, they thr
on very poor food with great
when brought further to t
change is too great for them;
and sicken. The Shetland ca
vations from her birth; it is,
often as soon as it is born.
allowed to suck its mother,
is fed at first with milk, and af
bland, a wretched kind of butt
when it grows up it has noth
upon but moss, heath, and se
cows are housed at night, an
sence of straw, are littered w
the dust of peat. Their milk,
ceedingly rich, is very small i

In the northerly counties
there is nothing very peculiar
of their cattle. The introduc
and of better modes of cultiv
have gone far to diminish
poor, ill-fed, and worse man
herds of this once desolate
the island. These improvem
were long opposed by the hus
the tenders of cattle as bol
which were, at all events, t
Mobs, therefore, collected: th
driven away; fences destro
farmers intimidated: the la
ported these national impro
successful issue.

The county of Aberdeen
cattle than any other in S
stock has been estimated at
its annual sale of both fat a
is equal to more than 20,000
in character with the soil a
amongst the hills, they are
Highland breed; in the plain
scription has been produced
from these by bulls from F
horns of these, says Mr. Y

inely, nor stand so much upwards,
West Highlanders; and they are
r; the hair is shorter and thinner;
cannot be said to be flat, but the
leeper in proportion to the circum-
and the buttocks and thighs are
thinner. The colour is usually
ut sometimes brindled; they are
n carcass; they give a larger quan-
ilk, but they do not attain maturity
as the West Highlanders, nor is
h quite so beautifully marbled;
proper age, they fatten as readily
hers, not only on good pasture, but
which is somewhat inferior. They
y used for husbandry work, or, at
only one year. They are sent to
four years old for six months, after
ey will weigh from 5 to 6 cwt.
reed," adds Mr. Youatt, "has pro-
y improved, and this by judicious
from the native stock: it has in-
n size, and become nearly double
t, without losing its propensity to
d without growing above its keep."
also in this great agricultural
n excellent breed of poll cattle;
not so handsome, yet larger than
d cattle; the quality of their meat
d not to be so good. The calves
d in Aberdeenshire much in the
way. They are commonly fed with
m from the cow, and they are even
reared partly on oil cakes.
hire the breed of cattle are of a
iar description. "They are ge-
ays Dr. Thompson, "of a black
e horns small and white, gene-
y erect, or, at least, turned up at
and bending rather forward; the
in proportion to the carcass; the
but short, and the skin soft;
en the extreme points of the
; the ribs narrow and wide set,
reater curvature than in other
h gives the body a thick round
fatten quickly, and fill up well
hoice points; are hardy, fleet,
well; are docile, and excellent
Whatever may be the explan-
e fact, it is certain that, at the
, the Fifeshire breed of cattle is
er own. That they were cen-
improved by a cross with the
cattle of England, is pretty
t whether English cattle formed
lowry of Margaret, the daughter
II. of England, when she married
of Scotland, or whether English
sent as a present to Scotland by
England, is almost mere matter
e; but, be that as it may, "the
rmers," says Mr. Youatt, in his

valuable work on cattle, "are convinced that their cattle cannot be further improved *as a whole* by any foreign cross, and they confine themselves to a judicious selection from their own." The pure Durhams have been established in some parts of Fife, but not always without difficulty.

Ayrshire has a peculiarly fine breed of dairy cattle, which is thus described by Mr. Aiton, in his excellent treatise (p. 26.) on the dairy breed of cows:—"The most approved shapes in the dairy breed are, small head, rather long, and narrow at the muzzle; eye small, but smart and lively; the horns small, clear, crooked, and their roots at considerable distance from each other; neck long and slender, tapering towards the head, with no loose skin below; shoulders thin; fore-quarters light; hind-quarters large; back straight, broad behind; the joints rather loose and open; carcass deep, and pelvis capacious and wide over the hips, with round fleshy buttocks; tail long and small; legs small and short, with firm joints; udder capacious, broad, and square, stretching forward, and neither fleshy, low hung, nor loose; the milk veins are large and prominent; teats short, all pointing outwards, and at considerable distance from each other, skin thin and loose; hair soft and woolly; the head, bones, horns, and all parts of least value, small; and the general figure compact and well proportioned." (Youatt, *On Cattle*, p. 127.)

"The qualities of a cow," adds Mr. Aiton in another place, "are of great importance. Tameness and docility of temper greatly enhance the value of a milch cow. Some degree of hardiness, a sound constitution, health, and a moderate degree of spirits, are qualities to be wished for in a dairy-cow, and what those of Ayrshire generally possess. The most valuable qualities which a dairy cow can possess are that she yields much milk, and that of an oily, butyraceous and caseous nature; and that after she has yielded very large quantities of milk for several years, she shall be as valuable for beef as any other breed of cows known; her fat shall be much more mixed through the whole flesh, and she shall fatten faster than any other." And again, "the best Scotch dairy cows yield 1000 gallons of milk in one year; and in general, from 3¾ to 4 gallons of their milk will yield 1½ lbs. of butter, and about 27½ gallons will produce 1½ stone imperial of full milk cheese."

Lanarkshire is noted for its calves, whose veal is highly esteemed in the markets of Glasgow and Edinburgh. These, according to Mr. Aiton (*Survey of Ayrshire*, p. 441.), are fed on milk from a dish, not suckled. This is often given to them sparingly at first, to improve their appetite and relish for their food; but it is gradually increased till the calf has a full supply. Other farmers allow them as much as they please from the first. For the first week or two a calf consumes about half a good cow's milk; at a month old, the whole of a cow's milk; and at two months old, the greater part of that of two cows. Those which are reared for stock have commonly the first drawn milk; those which are fattening, the last drawn from two or three cows. When the calves are costive, they have a little bacon or mutton broth given them; if they purge, a little rennet in their milk cures the complaint. They are used to have, also, a lump of chalk in their cribs.

The Galloway polled cattle are a peculiarly fine and valuable breed. They are described by Mr. Youatt, on the authority of the author of the *Survey of Galloway*, as straight and broad in the back, and nearly level from the head to the tail—round in the ribs, and also between the shoulders and the ribs, and the ribs and the loins—broad in the loins without any large projecting hook-bones—long in the quarters and ribs, and deep in the chest, but not broad in the twist. There is much less space between the hook or hip-bones and the ribs than in most other breeds. They are short in the leg, and moderately fine in the shank-bone. The happy medium seems to be preserved in the leg, securing hardihood and a disposition to fatten. With the same cleanness and shortness of shank, there is no breed so large and muscular above the knee, while there is more room for the deep broad and capacious chest.—They are clean, not fine and slender, but well proportioned in the neck and chaps; a thin and delicate neck would not correspond with the broad shoulders, deep chest, and close compact form of the breed. The neck of the Galloway bull is thick even to a fault. The Galloway has a loose mellow skin of medium thickness, with long soft silky hair. The skin, which is thinner than the Leicester, is not so fine as the improved Durham; it handles soft and kindly. Their colour is commonly black, but there are several varieties; the dark coloured are preferred from their being considered to indicate hardness of constitution. 30,000 of these are estimated to be sent yearly out of Galloway to the south. (Youatt, *On Cattle*, p. 158.) The Galloway breeders prefer allowing the calves to suck the cow; they consider they thrive materially better than those fed from the pail, and that fewer die of stomach complaints. Another valuable breed of polled cows is bred in Angus, which much resemble in appearance those of Galloway; they are, however, rather larger and longer in the leg, flatter sided, and thinner shoulders.

In Norfolk and Suffolk a polled br
cows prevails, which are almost all desc
from the Galloway cattle, "whose g
form," says Mr. Youatt (p. 172.), "the
tain with some of, but not all, their
lences; they have been enlarged, but n
proved, by a better climate and soil. Th
commonly of a red or black colour,
peculiar golden circle around the eye.
are taller than the Galloways, but thin
the chine, flatter in the ribs, and longer
legs; rather better milkers; of greater
when fattened; though not fattening so
and the meat is not quite equal in q

The Suffolk dun cow, which is
Galloway descent, is celebrated as a
and, there is little doubt, is not inf
any other breed in the quantity
which she yields; this is from six
gallons per day. The butter produce
ever, is not in proportion to the mil
calculated that a Suffolk cow prod
nually about 1½ cwt. of butter.

Irish cattle.—Of the Irish catt
are two breeds, the middle and t
horns. The middle-horns are the
breed, and tenant the forests a
mountainous districts. "They a
Mr. Youatt, "small, light, active, a
the head commonly small; the hor
but fine, rather upright, and fr
after projecting forward, turning b
somewhat deficient in hind-quarter
boned, and wide over the hips,
bone not commonly heavy; the ha
and long, black or brindled, wi
faces. Some are finer in the bo
the neck, with a good eye and sharp
and great activity—are hardy, li
very scanty fare, and fatten with gr
pidity when removed to a better soil
are good milkers. The Kerry cows a
cellent in this respect. These last, how
are wild and remarkable leapers.
live, however, upon very little food, and
often been denominated the poor man's c

The other breed is of a larger size.
has much of the blood of the old Lanca
or Craven breed, or true long-horn.
horns first turn outwards, then curve,
turn inwards. Of each of these kind
immense number of both lean and fat
are annually exported to England: in
it amounted to 63,524.

The long-horns.—The long-hor
England came originally from Cra
Yorkshire, and derived their name
length of horn, which often extended
unbecoming degree. Bakewell, Culle
other great breeders improved upo
have long since destroyed, the chief

ld, long bodied, coarse, large boned
It is needless, therefore, to follow
ed through the various counties in
once predominated, for it has long
pidly disappearing, and has almost
ere given place to better kinds.

hort-horns. — Of this noble breed of
hich seems to be annually increas-
avour with the dairyman and the
we are mainly indebted to the de-
of the late Rev. Henry Berry.
and Yorkshire have for ages been
d for a breed of these possessing
inary value as milkers, "in which
says Mr. Youatt, "taken as a
ey have never been equalled. The
distinguished were always, as now,
ferent from the improved race.
ere generally of large size, thin
sleek haired, bad handlers, rather
in constitution, coarse in the offal,
ingly defective in the substance of
the fore-quarters. As milkers they
t excellent, but when put to fatten,
foregoing description will indicate,
nd slow feeders, producing an in-
uality of meat, not marbled or
to fat and lean; the latter some-
a very dark hue. Such, too, are the
ed short-horns of the present day."
the year 1750, in the valley of the
ommenced that spirit of improve-
the breeders of the old short-horns,
s ended in the improved modern
These efforts, began by Sir William
and carried on by Mr. Milbank of
ham, were nearly completed by
les Colling. The success of this
n was, from the first, considerable.
iced, by judicious selections and
the celebrated bull Hubback, from
descended the best short-horns of
Of this breed was the celebrated
ox, which was long shown in a
van at country fairs, and which,
ghtered in April 1807, at eleven
ge, weighed 187 stone; and the
de ox, probably the largest ever
In June, 1802, he measured —
shoulder, 6 feet 10 inches; girth
houlder, 10 feet 2 inches; breadth
hooks, 3 feet 1 inch; computed
stones of 14 lbs. (*Quart. Journ.*
vi. p. 271.)

Mr. Colling, his brother Mr.
ing, Mr. Charge, and Mr. Mason
y second to him in skill and
reeders of the short-horns.

e pure improved short-horns,
h a red polled Galloway cow,
ed a variety of this breed, which
amed "the alloy," but for which
llings's sale, October 11. 1810, some most extraordinary prices were obtained: thus a cow called

			Guineas.
Lady, 14 years old, sold for		-	206
Countess, her daughter,	9 years	-	400
Laura, ditto	4 years	-	210
Major, her son,	3 years	-	200
George, ditto, a calf	-	-	130

In short, at this sale, forty-eight lots produced 7115*l.* 17*s.*, Comet, a six year old bull, selling for 1000 guineas. (See COLLING, ROBERT AND CHARLES.)

The colours of the improved short-horns are red or white, or a mixture of both; "no *pure improved short-horns*," adds Mr. Youatt, "are found of any other colour but those above named." That the matured short-horns are an admirable grazier's breed of cattle is undoubted: they are not, however, to be disregarded as milkers; but they are inferior, from their fattening qualities, to many others as workers.

"In its *points*," says Mr. James Dickson (*Quart. Journ. of Agr.* vol. vi. p. 269.), for quantity and well laid on beef, the short-horn ox is quite full in every valuable part; such as along the back, including the fore-ribs, the surloin and rump, in the runners, flanks, buttocks, and twist, and in the neck and brisket as inferior parts. In regard to quality of beef, the fat bears a due and even preponderating proportion to the lean, the fibres of which are fine and well mixed, and even marbled with fat, and abundantly juicy. The fine, thin, clear bone of the legs and head, with the soft mellow touch of the skin, and the benign aspect of the eye, indicate in a remarkable degree the disposition to fatten; while the uniform colours of the skin, red or white, or both, commixed in various degrees, bare cream-coloured skin on the nose and around the eyes, and fine, tapering, white, or light coloured horns mark distinctly the purity of the blood; these points apply equally to the bull, the cow, and the heifer. The external appearance of the short-horn breed," adds Mr. Dickson, "is irresistibly attractive. The exquisitely symmetrical form of the body in every position, bedecked with a skin of the richest hues of red, and the richest white approaching to cream, or both colours, so arranged or commixed as to form a beautiful fleck or delicate roan, and possessed of the mellowest touch; supported on clean small limbs, showing, like those of the race-horse and the greyhound, the union of strength with fineness; and ornamented with a small, lengthy, tapering head, neatly set on a broad, firm, deep neck, and furnished with a small muzzle, wide nostrils, prominent 'mildly beaming' eyes, thin large biney ears set near the crown of the head and protected in front with semicircularly bent, white, or brownish coloured, short (hence the name), smooth pointed horns; all these parts combine to form a symmetrical harmony, which has never been surpassed in beauty and sweetness by any other species of the domesticated ox."

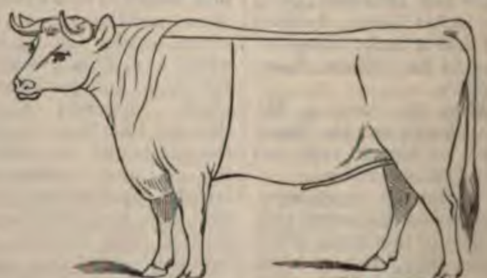
An excellent paper by Mr. Dickson on crossing the short-horns with other cattle, may be consulted with advantage by the breeder in the *Edin. Quart. Journ. of Agr.* vol. vii. p. 495., and on crossing in general, *Ibid.* p. 247.

The Yorkshire cow.—With Mr. Youatt's account of the Yorkshire cow (and this article is, in fact, hardly any thing else but an abridgment of his excellent work "On Cattle" in the *Library of Useful Knowledge*) we shall conclude. The Yorkshire cow is that generally found in the great dairies in the vicinity of London, and in these the character of the Holderness and the Durham unite. "A milch cow good for the pail as long as she is wanted, and then quickly got into marketable condition, should have a long and rather small head: a large-headed cow will seldom fatten or yield much milk. The eye should be bright, yet with a peculiar placidness and quietness of expression; the chaps thin, and the horns small. The neck may be thin towards the head; but it must soon begin to thicken, and especially when it approaches the shoulder. The dewlap should be small; the breast, if not so wide as in some that have an unusual disposition to fatten, yet should be very far from being narrow, and it should project before the legs; the chine to a certain degree fleshy, and even inclining to fulness; the girth behind the shoulder should be deeper than is usually found in the short-horn; the ribs should be spread out wide, so as to give as globular a form as possible to the carcass, and each should project farther than the preceding one, to the very loins. She should be well formed across the hips, and on the rump, and with greater length there than the milker generally possesses, or if a little too short not heavy. If she stands a little long on the legs, it must not be too long. The thighs somewhat thin, with a
tendency to crookedness or being
hammed behind; the tail thick at the
part, but tapering below; and she
have a mellow hide, and but little coar
Common consent has given to her larg
veins. A large milk vein certainly in
a strongly developed vascular syste
favourable to secretion generally,
that of the milk amongst the rest.
udder should rather incline to be la
proportion to the size of the animal, b
too large; its skin thin and free from
in every part of it; the teats of a mo
size. The quantity of milk given b
of these cows is very great; it is by no
uncommon for them in the beginning
summer to yield thirty quarts a day. Th
rare instances of the cow yielding thi
quarts; the average is about twenty-
twenty-four quarts. The milk, howe
not so rich in its produce of butter as
the long-horns, the Scotch, or the De
(For the Alderney cow, see ALDERN

Live and dead weight of cattle.—Sa
commonly calculate that the dead we
one half of what the animal weigh
alive; but the butcher knows that th
duce is greater: it often approaches to
fifths; and by an extensive stock baili
late Mr. Curwen, it was found that th
weight amounted to fifty-five per c
the live. But the amount differs str
as may be seen by the following sta
of Mr. Ferguson of Woodhill. (*Brit.*
vol. ii. p. 392.)

	Live Weight.		Dead Weight.	
	st.	lbs.	st.	lbs.
An Aberdeenshire ox	132	11	84	6
A short-horned ox -	132	0	90	1
A short-horned heifer -	120	4	77	9
A short-horned steer -	120	5	67	7

In ascertaining the weight by adme
ment, the girth is taken by passing
just behind the shoulder-blade and
the fore-legs: this gives the circumf
and the length is taken along the bac
the foremost corner of the blade bon



shoulder, in a straight line to the hindmost point of the rump. (See engraving, p. 308.)

Table for Admeasurement of Cattle.

Girth.		Length.		Weight.		Girth.		Length.		Weight.	
ft.	*in.*	*ft.*	*in.*	*st.*	*lbs.*	*ft.*	*in.*	*ft.*	*in.*	*st.*	*lbs.*
4	3	3	0	12	12	6	6	4	6	45	3
		3	3	13	13			4	9	47	10
		3	6	15	0			5	0	50	4
		3	9	16	1			5	3	52	11
		4	0	17	2			5	6	55	4
4	6	3	0	14	6			5	9	57	11
		3	3	15	9			6	0	60	4
		3	6	16	12			6	3	63	0
		3	9	18	1	6	9	4	6	48	11
		4	0	19	4			4	9	51	7
		4	3	20	6			5	0	54	3
4	9	3	3	17	6			5	3	56	13
		3	6	18	11			5	6	59	9
		3	9	20	2			5	9	62	6
		4	0	21	6			6	0	65	1
		4	3	22	11			6	3	67	11
		4	6	24	2	7	0	4	9	55	6
		4	9	25	7			5	0	58	4
5	0	3	3	19	5			5	3	61	3
		3	6	20	12			5	6	64	2
		3	9	22	7			5	9	67	1
		4	0	23	12			6	0	69	13
		4	3	25	5			6	3	72	12
		4	6	26	13			6	6	75	11
		4	9	28	6	7	3	4	9	59	6
		5	0	30	0			5	0	62	8
5	3	3	3	21	4			5	3	65	9
		3	6	22	13			5	6	68	11
		3	9	24	8			5	9	71	13
		4	0	26	3			6	0	75	1
		4	3	27	12			6	3	78	3
		4	6	29	7			6	6	81	4
		4	9	31	2	7	6	5	0	66	13
		5	0	32	11			5	3	70	4
5	6	3	6	25	2			5	6	73	9
		3	9	27	0			5	9	77	0
		4	0	28	11			6	0	80	5
		4	3	30	8			6	3	83	9
		4	6	32	5			6	6	87	0
		4	9	34	2			6	9	90	5
		5	0	36	0	7	9	5	0	71	7
		5	3	37	11			5	3	75	1
5	9	3	9	29	7			5	6	78	9
		4	0	31	6			5	9	82	3
		4	3	33	6			6	0	85	11
		4	6	35	5			6	3	89	5
		4	9	37	5			6	6	92	13
		5	0	39	5			6	9	96	7
		5	3	41	4			7	0	100	0
		5	6	43	4	8	0	5	3	80	0
6	0	4	3	36	6			5	6	83	11
		4	6	38	8			5	9	87	8
		4	9	40	10			6	0	91	6
		5	0	42	12			6	3	95	3
		5	3	45	0			6	6	99	0
		5	6	47	2			6	9	102	12
		5	9	49	4			7	0	106	9
		6	0	51	8	8	3	5	6	89	1
6	3	4	6	41	11			5	9	93	2
		4	9	44	2			6	0	97	3
		5	0	46	7			6	3	101	3
		5	3	48	11			6	6	105	4
		5	6	51	2			6	9	109	5
		5	9	53	6			7	0	113	6
		6	0	55	11			7	3	117	6
		6	3	58	2						

(*M'Derment's Farmer's Assistant.*)

The quantity of cattle annually sold in Smithfield is very great: it was (according to *M'Culloch's Dict. of Commerce*) in —

Year.		Cattle.	Sheep.
1732	-	76,210	514,700
1742	-	79,601	503,260
1752	-	73,708	642,100
1762	-	102,831	772,160
1772	-	89,503	609,540
1782	-	101,176	728,970
1792	-	107,348	760,859
1802	-	126,389	743,470
1812	-	133,854	953,630
1822	-	142,043	1,340,160
1832	-	166,224	1,364,160

Fatted calves: —

1822	-	24,255
1832	-	19,522

Cattle and beef imported from Ireland: —

Year.		Cattle.	Beef. Barrels.
1802	-	42,501	59,448
1812	-	79,122	114,504
1822	-	34,659	43,139
1825	-	63,519	63,557

The quantity of cattle in various European countries has been estimated to be as follows: —

		Cattle.
Great Britain	-	5,100,000
Russia	-	19,000,000
Netherlands	-	2,500,000
Denmark	-	1,607,000
Austria	-	9,912,500
France	-	6,681,900
Spain	-	2,500,000
Portugal	-	650,000
Italy	-	3,500,000

There are many able papers on subjects relating to cattle dispersed in the best agricultural periodicals, which the breeder may wish to refer to, such as "On Stall-feeding Cows in Summer," by Mr. Collett of Christiana in Norway (*Com. Board of Agr.* vol. vi. p. 60.); "On Soiling," by Mr. Curwen (*Ibid.* p. 49.); "On their Treatment in Winter" (*Quart. Journ. of Agr.* vol. ii. p. 228.); "On Fattening Cattle on different Kinds of Food," by Mr. Brodie (*Ibid.* vol. viii. p. 327.); "On Feeding Cattle on Sugar" by Mr. Ellis (*Com. Board of Agr.* vol. vii. p. 327.); and "On Potatoes," by Sir C. Burrell (*Ibid.* p. 323.); "On House and Yard-feeding Milch Cows for the Supply of Milk," by Mr. Harley (*Quart. Journ. Agr.* vol. i. p. 170.); see also "The Harleian Dairy System" by the same gentleman, and "On a celebrated Yard-fed Cow," the property of Mr. Cramp of Lewes (*Com. Board of Agr.* vol. vii. p. 53.). It will, perhaps, surprise an English farmer to learn to what coarse unnatural kind of food use will accustom animals. The cows of Shetland live upon the coarsest moss and sea-weed; those of still more northerly regions on even animal food. In Lapland and Iceland, according to Mr. De Broke, the cattle are uniformly fed on *fish*. "The English farmer's surprise," says Mr. Broke, "will not be lessened when he learns that the animals not only devour this kind of food with the greatest eagerness, but thrive and do well upon it; it seems that fish heads and bones are boiled together with some hay into a kind of soup, and poured into the mangers of the poor beasts." (*Quart. Journ. of Agr.* vol. x. p. 299.) There is a paper "On Live Stock and Crossing," by Mr. Ferguson (*Ibid.* vol. i. p. 33.); "On the Comparative Advantages of Feeding Stock with Mangel Wurzel, Turnips, and Potatoes," by Mr. Howden (*Trans. High. Soc.* vol. iii. p. 268.); and "On Raw and Prepared Food," by Messrs. Walker, Howden, Boswell, and Walker (*Ibid.* vol. iv. p. 253.); and again by Mr. Walker (*Ibid.* vol. v. p. 52.); and "On different Descriptions of Food," by Mr. Stephenson (*Ibid.* vol. vi. p. 61.) On the disease called the "Muir-ill," by Mr. M'Farlane (*Ibid.* vol. iv. p. 388.); on the disease called "The Tail-slip," by Mr. Dick (*Quarterly Journal of Agriculture*, vol. iii. p. 308.); "On Calculi" (*Ibid.* p. 642.); "On Diseases of the Udder" (*Ibid.* p. 871.); "On the Navel-ill," by Mr. Sitwell (*Com. Board of Agr.* vol. vi. p. 401.); "On Acclimating Cattle," by Dr. Smith of Kentucky (*Ibid.* vol. ii. p. 93.); "On determining the Weight of Cattle by Admeasurement (*Quart. Journ. of Agr.* vol. v. p. 612.); and Mr. Ferguson "On the Value of Live Stock with relation to the Weight of Offal (*Ibid.* vol. ii. p. 207.); "On their External Conformation," by Mr. Sparrow (*Veterinarian* for 1839; *Farmer's Mag.* vol. iii. p. 95. *n.* 5.); and if I omit to dwell at length upon the substance of these, it is owing only to the fact, that my limits forbid my doing more than referring the farmer to the source from whence I have, in other places, extracted the chief facts. (*Baron Malthus; M'Culloch's Dict. Com.; Youatt on Cattle; Quart. Journ. of Agr.; Farmer's Mag.; Trans. of Highland Soc.; Low's Illustrations of the Breeds of Domestic Animals.*)

CATTLE, REMEDIES FOR DISEASES OF.

Abortion. See ABORTION.

Blackwater is the concluding and commonly fatal stage of red water. See REDWATER.

Calving. See CALVING.

Cleansing drink.—1 oz. of bayberry powdered, 1 oz. of brimstone powdered, 1 oz. of cummin-seed powdered, 1 oz. of diapente. Boil these together for 10 minutes; give when cold in a little gruel.

Colic.—The best remedy is 1 pint of linseed oil mixed with ½ oz. of laudanum.

A cordial is easily made by 1 oz. of carraway seeds, 1 oz. of aniseeds, ¼ oz. of ginger powdered, 2 oz. of fenugreek seeds. Boil these in a pint and a half of beer for 10 minutes, and administer when cold.

Diarrhœa.—Give ½ oz. of powdered catechu, and 10 grs. of powdered opium, in a little gruel. See DIARRHŒA.

Dysentery.—The same as for diarrhœa.

Fever.—Bleed; and then give 1 oz. of powdered nitre and 2 oz. of powdered brimstone in a little gruel. If the bowels are constipated, give ½ lb. of Epsom salts in 3 pints of water daily, in need.

Hoose. See CALVES, DISEASES OF—only double the doses.

Hoove or *Hoven.*—Use the elastic tube; as a prevention, let them be well supplied with common salt, and restrained from rapid feeding when first feeding upon rank grass or clover. See HOOVE.

Mange.—½ lb. of black brimstone, ¼ pint of turpentine, 1 pint of train oil. Mix them together, and rub the mixture well in over the affected parts.

Milk fever, or Garget.—2 oz. of brimstone, 1 oz. of diapente, 1 oz. of cummin-seed powdered, 1 oz. of powdered nitre. Give this daily in a little gruel, and well rub the udder with a little goose-grease. See GARGET.

Murrain.—½ lb. of salts, 2 oz. of bruised coriander-seed, 1 oz. of gentian powder. Give these in a little water. See MURRAIN.

Poisons swallowed by oxen are commonly the yew, the water dropwort, and the common and the water hemlock. 1½ pint of linseed oil is the best remedy.

Purge, in poisoning—either 1 lb. of salts in a quart of water or gruel, or a pint to a pint and a half of linseed oil.

Redwater.—Bleed, says Youatt, first, and then give a dose of 1 lb. of Epsom salts, and ½ lb. doses repeated every 8 hours until the bowels are acted upon. In Hampshire they give 4 oz. bole armeniac and 2 oz. of spirits of turpentine in a pint of gruel.

Sprains.—Embrocation: 8 oz. of sweet oil, 4 oz. spirits of hartshorn, ½ oz. oil of thyme.

Sting of the adder, or slowworm.—Apply immediately to the part strong spirits of hartshorn; for sting of bees apply chalk or whitening mixed with vinegar. See BITES, and BEES.

Worms.—Bots: give ½ lb. of Epsom salts with 2 oz. of coriander-seed bruised in a quart of water. See BOTS.

Yellows.—2 oz. of diapente, 2 oz. of cummin-seed powdered, 2 oz. of fenugreek powdered. Boil these for 10 minutes in a quart of water, and give daily in a little gruel. See YELLOWS.

CATTLE SHEDS. The cow-house should be a capacious, well lighted, and well ventilated building, in which the cows or oxen can be kept dry, clean, and moderately warm; a temperature of about 60° is perhaps the best. It is a mistaken idea, that cattle suffer materially by *dry* cold. It is the wet and the damp walls, yard, and driving rains, and fogs of winter, that are so injurious to them. In this respect the

h farmers are very particular. They
their cows regularly groomed, and the
behind them sprinkled with sand. A
and *dry* bed, a portion of a trough to
them water, and another portion for
oil cake, or mangel, or turnips, and a
or their dry food, will all be necessary
rts. These, with regular feeding, a
of rock salt in the manger, and occa-
variations if possible in the food, are
hief points to be attended to in the
management of cattle. (*Brit. Husb.*
p. 202.; vol. ii. p. 399.; *Harleian Dairy*
s, p. 14.)

TTLE STEALING. See Horse
LING.

T-WHIN. A provincial term ap-
the burnet rose.

UDAL. (Lat. *cauda.*) Relating to
il of an animal.

UDEX. A term which signifies the
r trunk of a tree.

UF. A chest with holes in the top to
fish alive in the water.

UKER, or CALKERS. A term em-
d in farriery to signify bending or turn-
p of the heels of the shoes of horses,
tended to prevent the animal slipping.
method, though once general, is now
only limited to the outside heel of the
s of the hind feet.

AULIFEROUS. (From *caulis*, a stalk,
fero, to bear.) A term applied to
plants as are furnished with a stalk
h bear shoots, as the cauliflower, cab-
&c.

ULIFLOWER. (From Lat. *caulis*;
ica oleracea botrytis.) A species of bras-
of which there are two varieties; — the
which is smallest and most fit for
h under lights, for the winter-standing
and the large, for the open ground
ations. Cauliflower is propagated by
the first sowing to take place at the
of January or early in February, in a
hot-bed, or warm border, in either situ-
to have the protection of a frame. The
are fit to be pricked out in March in
r situations, and for final removal into
en ground during April and May; and
to be placed under hand-glasses for
immediately succeeding the winter-
ing crop. At the beginning of March
pril another sowing is to be performed
heltered border, the seedlings of which
be pricked out in May, and planted
y in June for production at the end
mmer. Again, another sowing may
one in the last week of May; for
ing out, in June; and for final
ing, the end of July; to produce
g October and November, and in
rable seasons until Christmas. The seed of these sowings must be inserted broadcast, and covered half an inch thick with fine mould. The seedlings are of sufficient size for pricking out when they have four or five leaves, about an inch in breadth; they must be set three or four inches apart each way. Water must be given moderately, both in the seed-bed and at the time of removal, if the weather is at all dry. When finally set out, they must be planted in rows two inches and a half apart each way. The mould must be frequently loosened by the hoe, and drawn up about their stems. In dry weather during summer, a cup-like hollow should be formed round each plant and filled twice a week with water; but as soon as the flower makes its appearance, it must be applied every other day. As the head appears exposed, it is advantageous to break some of the leaves, and turn them over it as a shelter from the sun: this preserves them from becoming of a yellow hue, as well as retards their advancing to seed.

Winter-standing crop. — The seed for this crop must be sown in the third week of August, in a warm border or an old hot-bed, with the protection of a frame or hand-glass. That the cauliflower, though the most tender of the brassica tribe, is not so impatient of cold as some gardeners are led to imagine, is demonstrated by the fact, that the imperfect covering of mats will almost always preserve the plants uninjured through the winter; and the practice of Mr. Bull, of Rossie Priory, North Britain, proves that it is scarcely more so than the broccoli. He sows in the last week of August, transplants in the middle or end of November, and often does not even afford the plants the protection of a south wall, and no description of covering. Plants thus raised are healthier, and produce finer heads than those which have additional shelter, though they are not so forward, neither are they subject to be *black-shanked.* (*Mem. Caled. Hort. Soc.* vol. iii. p. 192.)

The seed-bed, if not one that has grown cucumbers, &c. must be well manured with dung from a cucumber bed, or, as is sometimes recommended, a basis five or six inches thick of dung in a perfectly decayed state must be formed, firmly trodden down, and covered with a similar thickness of light rich mould: in this the seed is to be sown and buried a quarter of an inch deep, and, during the meridian of hot days, shaded with matting. Moderate waterings must be given, as may seem necessary. The plants appear in about a week, and the shading and watering must in like manner be afforded.

The plants are fit for pricking out at the close of September, when their leaves are rather more than an inch wide. They should be placed in a similar soil and situation to that from which they were removed. Towards the end of October, or first week in November, they must be removed, and planted in patches of from three to six together, these clusters being in rows three feet apart each way are to be sheltered with hand-glasses until the spring. At the end of February, if an open season, or not until March if otherwise, part of the plants may be removed from under the hand-glasses, two strong ones being left under each glass, and set out in the open ground; the soil and sheltered situation being as nearly similar to that from which they are taken as possible. Some, also, may be planted out from the frames; but from either situation these removals must be concluded by the middle of April. Care must be taken to remove the plants with as much earth as possible retained to their roots, and they are to be planted at a similar distance as was recommended for the other open-ground crops.

Those continued under the glasses must have air admitted as freely as possible, and other precautions adopted that were recommended during their winter growth. Earth should be drawn carefully about their stems, without any being allowed to fall into their hearts. When they fill the glasses, these last are easily raised by a circular mound, four or five inches high, thrown up round them. In mild weather, hot sunny days, and during genial showers, the glasses may be taken completely off, but replaced at night. The plants being thus hardened by degrees, and when all danger of frost is past, about the end of April or early in May, the glasses may be entirely removed. The leaves are to be broken down over the heads, as before directed. For the production of seed, some plants of the winter standing crop which have fine and firm heads must be selected, as these will produce the best seed, though not in such quantity as those of a looser texture. For the necessary treatment, see Broccoli. The seed ripens in September, and the branches should be gathered as soon as this occurs, and not allowed to remain until the whole is fit for collecting. The seed remains, if carefully preserved, in a good state for use until it is three or four years old. (*G. W. Johnson's Kitchen Gard.*)

CAUMERIL. A provincial term applied for the gambul used in killing sheep, hogs, &c. which has a crooked form.

CAUSTIC. In farriery, a substance which, by its powerful operation, destroys the texture of the part to which it is applied. Corrosive sublimate is the best caustic; but that requires skilful hands, for it is a dangerous remedy except in the hands of the veterinarian. Mix one drachm of powdered verdigris with one ounce of basilic ointment; apply this upon a piece of tow: or a drachm of blue stone (sulphate of copper), dissolved in one ounce of water may be used; or lunar caustic in a quill may be rubbed on to the diseased part.

CAUTERY, or CAUTING-IRON. (Old Fr. *cautere.*) In farriery, a name given to a searing iron, which is made *white hot*, and used to destroy fungous flesh, &c.

CAVE. A provincial word, signifying to rake off or from; as short straws and ears of grain from the corn in chaff on the barn-floor. *Cavings* are the rakings thus obtained; and *caving chaff*, the coarse chaffy materials collected.

CAVESSON, or CAVEZON. (Fr.) In horsemanship, a term applied to an apparatus resembling the musrol, which is used in the breaking of horses. From its formation, it binds and pinches the nose, and regulates the action of the animal to which it is applied.

CAVING RAKE. A sort of barn-floor rake, having a short head and long teeth.

CAZZONS. A provincial word used to signify the dried dung of cattle for fuel.

CEDAR OF LEBANON. (*Abies cedrus.*) The Latins called this tree *cedrus*, from the Greek κέδρος; the Arabians called it *serbin*; the Italians and Spaniards *cedro*; the French *cedre*; the Saxons ceder.

This sovereign of the forest appears to have been indigenous to Mount Lebanon; but at what period it was first introduced into England is not known. This noble tree is now so well naturalised in this country, that the seeds not only ripen, but propagate themselves without care or trouble. One of the cedars at Chiswick measures 13 feet 4 inches in circumference, and is 80 feet high; but the largest now remaining on Lebanon is 9 feet in diameter, or 27 in circumference. Cedar wood is reported to be very durable; the ancients believed it to be imperishable. But according to Mr. Drummond Hay's observations at Tangier, the indestructible cedar wood is the timber of the Sandarac tree (*Thuja articulata*). The timber of common cedar is far from being valuable. (*Phillips's Syl. Flor.* vol. i. p. 162.) See Fir.

CELANDINE, COMMON. (*Chelidonium majus.*) Celandine is a wild plant with large leaves and bright yellow flowers, growing in shady places, waste and untilled lands, and thickets, &c. especially on a chalky soil, and flowering from April through the summer. It grows two feet high, and the stalks are round and green. The leaves are large, long, and deeply divided at the edges, and of a yellowish green, standing ro at each joint. The flowers are small; veral together upon long foot-stalks. very part is brittle, and if you crush e stalk or leaves an orange-coloured rid juice is expressed, which is medicinal. ith this juice, as Dioscorides reports, allows were absurdly supposed to restore e sight of their young if blinded; whence e name, formed from the Greek appellation a swallow. This author favours another ore probable meaning, which is, that the ant appears and disappears with those rds. (*Smith's Eng. Flora*, vol. iii. p. 4.)

CELANDINE, LESSER. See Crow-ot Pilewort.

CELERIAC. (*Apium rapaceum.*) It propagated by seed, which may be sown March, April, and May, to afford suc-ssional plantations in June, July, and ugust. The seed must be sown broadcast, d kept regularly watered every evening dry weather, otherwise it will not ger-inate.

CELERY. (*Apium graveolens.* This the wild original of cultivated celery. he name probably proceeded from *apex*, tuft or crest, which its umbels form.) This class of plants flourish best in a moist oil, friable, and rather inclining to light-ess; it must be rich, and that rather from rior application than the immediate ad-lition of manure; celery and celeriac, owever, appear benefited even by its bundant application at the time of sowing nd planting. The parsleys, likewise, pre-r their soil to incline rather to dryness. or all it must be deep, and all equally re-se to thrive on a strong clayey soil. The tuation they thrive the most in, is one that s as open, and as free from the influence of rees as possible. The common parsley is he one that bears best a confined or shady mpartment.

There are six varieties of celery in gene-al cultivation:—The gigantic, the dwarf-urled, the common upright, red-stalked pright, giant hollow upright, and the lid-stalked (red and white). The red is eared chiefly for soups, the white being uch more delicate in flavour. It is pro-pated by seed. The first sowing should be erformed either in a hotbed or on a warm, ight border, towards the end of February; ome gardeners even insert it as early as he middle of January. The border is by any gardeners considered the best situ-tion, in as much as the plants are more ardy, and with proper care come forward ith scarcely any difference as to time. This to be repeated in March; but the prin-pal sowings must take place in April and ay; and the last one in June. As the pro-ce of the early sowings will not continue long in a state fit for use, from their leaf-stalks becoming piped or hollow, they must be proportionably small; they must all be inserted broadcast, and the seed scattered thinly. The seed-beds of the early sowings should be light and dry, with the full enjoyment of the sun throughout the day, but for the three last, in a moist situation; and it is advantageous for them to have a free exposure to the morning sun only, yet free from the drip of trees; so advantageous is it to have the plants of these sowings as luxuriant as possible in their first stage of growth, that to afford them as regular and unstinted a supply of nourishment as possible, the mould of the seed bed is often formed artificially. Mr. Walker, gardener to J. Walker, Esq. of Longford, North Britain, recommends it to be formed of black loamy soil and old hotbed dung in equal parts. (*Mem. Caled. Hort. Soc.* vol. ii. p. 295.) The plants from these several sowings will in general be ready for pricking out in four or six weeks from the time of insertion, and for final planting, after a further continued growth of two months. A more determinate datum for judging the appropriate time for performing these operations is the size of the plants, they being fit for the first removal when three or four inches in height, and for the second when seven or eight. From the above enumerated sowings, monthly plantings may be successionally made from the commencement of June until September closes; but for the supply of a family, a sowing at the close of February for production during the same year, and another about the middle of May, to yield a produce in the winter and the following spring, will in general be amply sufficient.

They are usually planted out finally in trenches, from twelve to eighteen inches wide, and at least four feet apart. To cut the trench straight, and with firm sides, the spade should be thrust down all along the line which marks the boundary on each side, previous to digging out the earth: the top spit of mould throughout the length must be turned alternately on either side, for this is required in the after cultivation for earthing up the plants. Some well putrefied dung, two or three inches thick, must be then spread along the bottom and dug in, care being taken that its surface is not more than four inches below the regular surface of the soil. Mr. Walker here recommends the same unsparing application of manure; he forms the soil in his trenches of three parts dung, and one part fresh strong soil. (*Mem. Caled. Hort. Soc.* vol. ii. p. 296.) By this abundant application of manure, his celery undoubtedly obtains a fine growth, being often 4½ feet long, and averaging 6 lbs.

weight; but at the same time it is to be remarked, that many soils will grow it equally fine, without such immoderate application.

Celery, as before mentioned, delights in a soil abounding in fertilising matter; the mode adopted to effect this, as practised by Mr. Judd, gardener to C. Campbell Esq. of Edmonton, is one which, with equal advantage, may be adopted for any crop requiring a very rich soil; he prepares his ground in the winter preceding the time of planting, or as long before as convenient, by manuring and trenching it two spades deep; performing this last operation twice, that the dung may be better incorporated with the soil, and then leaves it as rough as possible, until the time arrives for forming the trenches, at the bottom of which he also turns in some manure. (*Trans. Hort. Soc. Lond.* vol. iii. p. 46.) As celery is very apt to decay in winter on account of excessive moisture, it would undoubtedly be a good practice, after preparing the ground as just detailed, to plant in rows five or six feet apart on the surface, taking the mould required for earthing them up from this allotted space.

Before planting, the long straggling leaves are to be cut away, and any side offsets removed; but if the plants are older or larger in growth than before mentioned, the tops of the leaves may be generally removed, which serves to check their running to seed, which they are otherwise apt to do. After this preparation they may be planted, a single row in each trench, about eight inches apart. Mr Judd says, that he finds the plants are much injured in their future growth, if, during any of their removals, their roots become at all dry; therefore, when taking them either from the seed bed, or for final planting, he lays them, as he draws them from the ground, in a garden pan containing a little water. (*Ibid.* p. 45.) Planting is best performed in the evening, and water should be given plenteously at the time, as well as every other day subsequently until they are well established. Earthing them up must commence when they are about a foot high, and may be continued until the plants are fit for use, or are one foot and a half high and upwards. In performing it one person must hold the bases of the plants together, whilst a second regularly follows, and throws in the soil, otherwise the mould separating the leaves breaks them and induces decay, and ofttimes destroys them by injuring the heart. (*Ibid.* p. 47.)

The earthing is best performed gradually, a few inches being added once a week, and a dry day always selected to perform it in. In very severe weather the winter standing
crops should be covered with straw o
litter, care being taken always to ren
in mild days. On the arrival of f
quantity may be taken up, and bur
sand under shelter. As celery w
continue in perfection except in
more than three or four weeks after b
ing, it is advisable for family use o
make small plantations of the early
at a time. To raise seed some plant
be left where grown; or in Febru
March, some may be carefully take
and after the outside leaves are cut o
all laterals removed, planted in a moi
a foot apart. Those which are most
and of a middling size are to be sele
When they branch for seed they mu
each attached to a stake, to preserve
from being broken by the violence of
The flower appears in June, and whe
seed is swelling in July, if dry weathe
curs, they should be watered every
night. In August the seed will be ripe
when perfectly dry may be rubbed out
stored. (*G. W. Johnson's Kitch. G*
Brit. Husb. vol. ii. p. 575.; *Willich's*
Encyc.)

CELERY, WILD, or SMALL
PARSLEY. (*Apium graveolens.*)
is a biennial, found in ditches and m
ground, especially towards the sea; root
shaped, herb smooth and shining. Fl
numerous, small, greenish white. The
and whole plant in its native ditches are
and dangerous, with a peculiar strong
and smell, but by culture it become
mild and grateful garden celery, for
and its name we are indebted to the Ita
and which has now supplanted our
Alexanders (*Smyrnium olusatrum*). (S
Eng. Flora, vol. ii. p. 75.)

CELL. (Lat. *cella.*) In botany, the h
part of a capsule in which the seed
lodged; and, also, the part of the an
which contains the pollen.

CELLS. The small divisions in h
combs, which have been observed to
ways regular hexagons. They also d
the hollow places between the partitio
the pods, husks, and other seed-vess
plants.

CENTAURY. One of the names
corn Blue-bottle (*C. cyanus*), which s

CENTAURY, COMMON. (*Ery*
centaurium.) From *erythros* red, alludi
the pink colour of the flowers. The spec
this genus are pretty, but not easy of
vation, the herbaceous species requi
open loamy soil, and may be increas
divisions. The annuals and biennials re
sowing in the open border in autum
they will not come up. (*Paxton's*
Dict.) There are three native spec

y, viz. the broad leaved tufted (*E.*
), the dwarf tufted (*E. littoralis*),
common centaury, to the last of
e following observations more es-
apply. The two first-named varieties
d mostly in sandy ground near the
s. (*Smith's Eng. Flora*, vol. i. p. 320.)
ty wild plant (*E. centaurium*) grows
dry places, and in gravelly pas-
s roots are to be taken up in autumn,
of flower. It is about eight or ten
gh. The leaves are radicle, or grow
ter from the root, and are about an
; the stalks divide towards the top
ral branches, and the flowers, which
ght pink, are long and slender, and
cluster. The leaves growing upon
are oblong, broad, and acute at the
ommon centaury has all the medi-
perties which distinguish the family
tianaceæ), to which it belongs. Its
greeable: and it might be advan-
used as a stomachic, instead of
root. The dose of the plant in
from a scruple to a drachm.

AURY, or SWEET SULTAN.
ea *moschata*.) A hardy odoriferous
native of the Levant. It blows a
ower in July and August, and grows
high. There are several varieties,
ian, golden, wing leaved, &c.

TIPEDE. (Lat. *centum*, a hundred,
foot.) The name of the myria-
insects belonging to the genus
dra of Linnæus. They are wingless;
largest species possess, when full
ore than fifty, and less than two
pairs of feet; they are sometimes
called *forty-legs*. (*Brande's Dict.*
.)

S. The Roman Pagan goddess of
harvests; the Isis of the Egyptians.
vals to her honour were denomi-
Rome, the Cerealia or Cerealion,
term Cerealian grasses; and Sicily,
brated for its corn, was supposed
favourite retreat.

IS. The ancient name for the

MONEY. A fine paid yearly by
nts of several manors to the lords
nd sometimes to the hundred, for
a keeping of the *leet*.

ONIAN PLANT, or EARWORT.
ylvestris.) Names applied in some
the horsemint, an aromatic and
rb, which is said to be useful in
afness. See Horsemint.

. A term used in horsemanship
rse *beats upon the hand*, and does
is head steady, but tosses up his
hakes it all of a sudden, to avoid
tion of the bridle. In order to fix and secure his head, it is only necessary to put under his nose-band a small flat ligature of iron, bent archwise, which serves as a martingale.

CHAFF. (Sax. ceaf; Dutch, *kaf*.) The husks of corn which are separated by thrashing and winnowing. It likewise implies hay, straw, &c. cut small, for the purpose of being given to horses and other cattle.

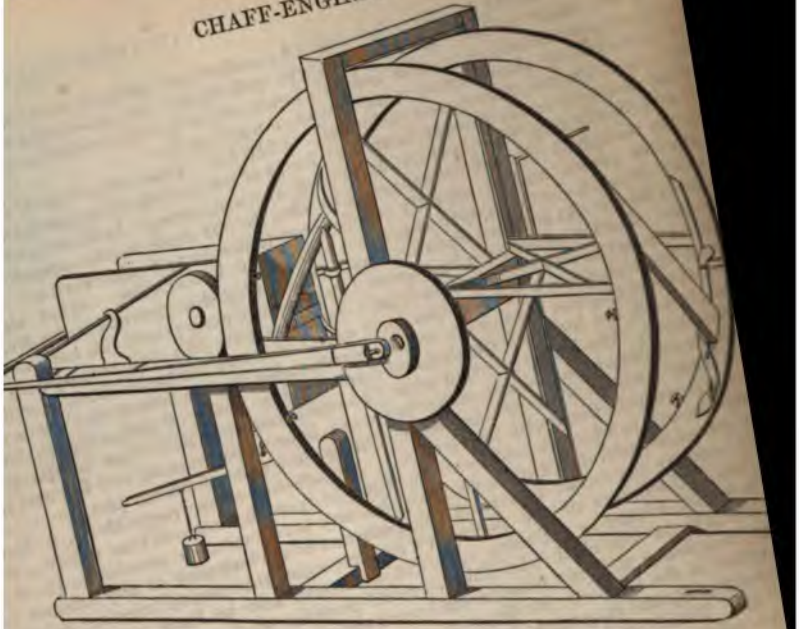
CHAFF-ENGINES. That chaff has been employed as provender for live stock from a very early period, we have abundant evidence. Cato (lib. 54.) recommends it for oxen; and two centuries since, Hartlib recommended its use, mixed with *cut oats and peas*. The mode of preparing the chaff, however, from hay and straw by the knife, was a later improvement, and the first machines were rude and incomplete.

We are not aware (says Mr. J. A. Ransome of Ipswich, to whom I am indebted for this and other valuable articles on the implements of agriculture) of any attempt to improve upon the plan of pressing the hay in a trough, and by hand bringing it by small portions to the front edge, where it was severed by a long knife attached to the end of a lever, till in 1794-5 the Rev. J. Cooke of Holborn, London, and W. Naylor of Langstock, respectively obtained patents for machines for expediting the process.

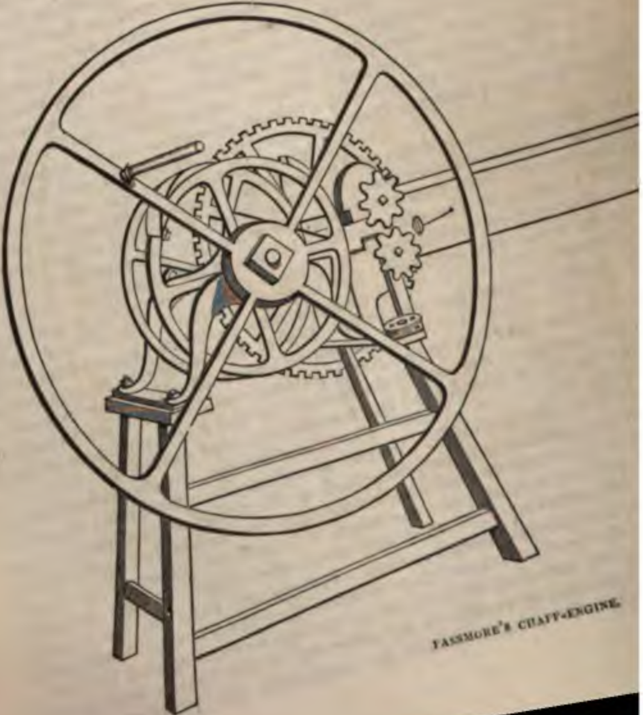
In the year 1797 we find Robert Salmon, of Woburn, whose inventive talent and practical experience added many and various original ideas and improvements to the then limited knowledge of agricultural mechanics, constructed a chaff-engine, which, although cumbrous in its appearance, was effective in its operation, and furnished the original idea, which was subsequently improved upon; first, by Rowntree, and afterwards by Thos. Passmore of Doncaster; the latter of whom, in 1804, patented the machine known as the Doncaster engine, upon the plan of which, for many years, most of the engines in the midland and eastern counties were made; and even at the present time, few of the machines in general use are found more effective. A reward of thirty guineas was conferred on Salmon by the Society for the Encouragement of Arts, &c. for this improved machine.

The plan of Salmon's machine as exhibited in the accompanying illustration may be described as the fellies of two wheels connected together, and knives fixed upon them, the edges of which are placed at an angle of 45° from the plane of the wheel's motion. Springs are fixed on the wheels thus connected, by means of which the knives are pressed forward against the box: on the other side of the knives, wedges are fixed to counteract the pressure of the

CHAFF-ENGINES.



SALMON'S STRAW-CUTTER.



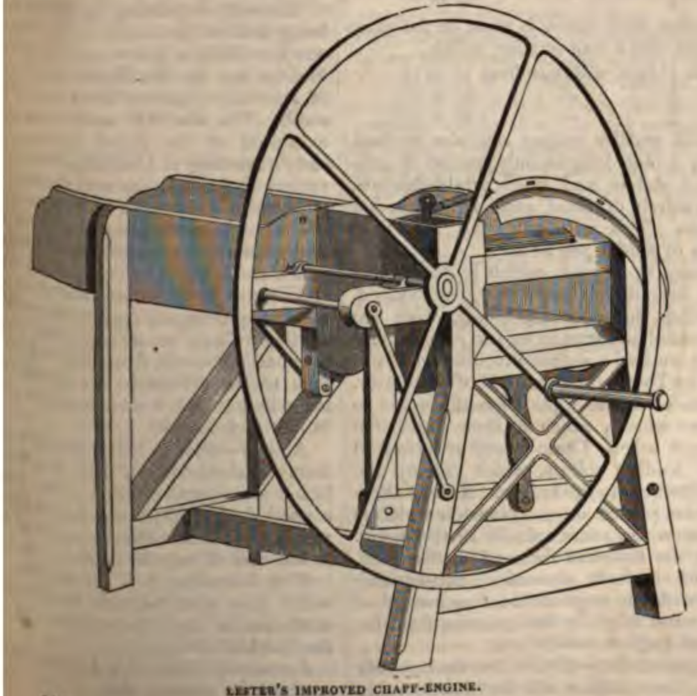
PASSMORE'S CHAFF-ENGINE.

should it be too great. To a cir-
ck of wood, having four holes and
the wheel, one end of the feeding
ewed, and is fixed to the cross bar by
veable at pleasure to five different
which arrangement twenty different
f length of chaff may be obtained.
ed rollers in the box are turned
outside by ratchet wheels, so that
is at rest during the time the knife
upon it. A weight is suspended
r under the box, which will assist
the straw forward, and counter-
the ratchet wheel of the upper
Equal pressure is given to the straw
n passing from near the fulcrum of
to a roller with two small bars of
ich are attached also to the pro-
xle of the upper feeding roller.

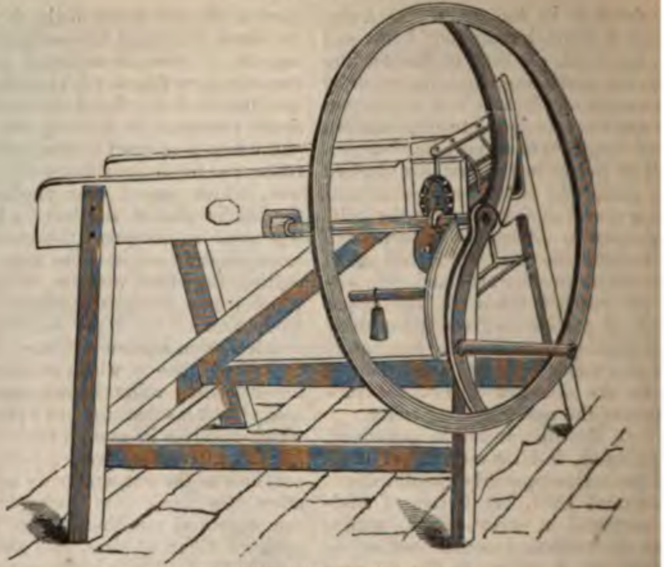
ore's machine, it will be perceived,
similar, but its mechanical com-
are advantageously simplified.

00 and 1801, W. Lester of Pad-
patented a straw-cutter, which,
ne alterations, is much used at the
day, and is known as the "Lester
It is a very simple machine, having
e knife, placed on a fly-wheel; the
ed turns on a cranked spindle, which
unicates motion to a ratchet wheel fixed at the end of one of the feeding rollers by means of a small hook or catch, which is capable of being so adjusted as to lift one two, three, or four teeth at each revolution, and by this is regulated the length of the straw projected in front of the face plate, and which is severed by the knife. On the roller was fixed a revolving cloth or endless web, which passed over another roller at the hinder end of the box; a heavy block was used to compress the straw. In the more modern engines the rolling cloth is entirely dispensed with, as the purpose for which it was intended is effected by the introduction of an upper feeding roller, to which motion is communicated by a pair of cog-wheels, one of which is attached to the lower feeding roller before described; the heavy block is substituted by a pressing piece, which receives its motion from the cranked spindle, alternately presses down the straw previous to the cut, and rises afterwards to allow the straw free passage. A cut of the improved machine is here given; it is made of different sizes, and the larger are frequently used with horse-power.

This is the best modern chaff-engine; it will adjust and vary the work to the following lengths of cut:—¼ inch, ½ inch, and ¾ inch.



LESTER'S IMPROVED CHAFF-ENGINE.



HEPPENSTALL'S COMMON CHAFF-ENGINE.

	Bushels of fodder per hour.
At ¼ inch it will cut from	18 to 20
½ —	40 to 50
¾ —	50 to 60

Another chaff-cutter is made on the same principal, but a size smaller, which

at ¼ inch will cut from	10 to 12
½ —	30 to 40
¾ —	40 to 50

A still smaller engine can also be had, cutting ½ inch lengths only, suited to gentlemen's stables and small establishments, made entirely of metal, and adapted for hot climates. This will cut from 15 to 20 bushels of fodder per hour.

Passing by several, which in the course of the next fifteen years were introduced, but which, however ingenious, were too complicated and cumbrous for general use, in 1818 we find a simple invention was patented by Thomas Heppenstall, of Doncaster. It consisted in the application of a worm to turn two wheels, which in their revolution meet each other. These wheels are attached to two feeding rollers, which convey the straw forwards to the knives. Two of these knives are placed on a fly-wheel, which is fixed upon the same spindle as the worm. This is the simplest form of chaff-engine, and with a slight alteration, substituting wheels with the cogs on the face instead of on the outer edge, is the common form for the small engines now in use.

Two patents have also, within the last year or two, been taken out for considerable improvements on this machine, Lord Ducie in connection with Clyburn and Budding, two engin siding at Uley.

The only remaining machine we bring before the notice of our re one for which a patent was obtain months ago by Mr. Charles May, of Ipswich, a partner in the house some. We saw this among the exhibited at the Royal Agricult ciety's meeting at Cambridge, wher peared to perform its work admira is intended to be used by horse-po is so contrived that cog-wheels of diameters, may be placed on the which motion is first communicate working in different moveable whe another spindle, will regulate the spe feeding rollers, so as to vary the the chaff to be cut, from three-eigh inch to three inches. Its capabil estimated to cut 8 cwt. of straw in half inch lengths.

A chaff-cutter is indispensable o farm establishment. This implen has been shown, is either construc a good deal of expensive machiner very simple mechanism; it may be at the cost of only 1*l.* or 1*l.* 5*s.*

The following is a list of the which have been taken out for chaf machines, or improvements thereo the last half century:—

January 8. 1794. Rev. J. Cooke, machine for cutting chaff.

2. 1795. William Naylor of Langs-
nachine for cutting chaff.
ıary 4. 1800. William Lester, Cot-
Northamptonshire, machine for
hay into chaff.
ıary 17. 1801. William Lester, im-
nts on former patent, &c.
ıary 7. 1804. Thomas Passmore,
er, machine for chopping straw.
ıary 4. 1808. W. F. Snowden, Ox-
eet, engine for cutting chaff.
29. 1815. James Gardner, Banbury,
d hay-cutter.
h 7. 1818. Thomas Heppenstall,
er, improved chaff-cutting engine.
nber 1. 1819. S. Shorthouse, Dud-
hine for cutting straw.
6. 1840. Charles May, Ipswich,
g vegetable substances for food for

24. 1840. J. S. Worth, Manchester,
for cutting vegetable substances as
cattle.
nett of Turnlea, machine for cutting
e substances as food for cattle.
5. 1840. Lord Ducie, Woodchester,
ments in machinery for cutting chaff.

FFINCH. (*Fringilla cœlebs.*) A
lively English bird. In France,
e songster is a favourite cage bird. In
they are gregarious in hedge-rows
n-fields. In winter they haunt the
the shrubbery, and the farm yard.
tch in May; their food, insects, grain,
ds. Colour, head and neck, bluish
ack, chestnut; wings almost black;
six inches. (*Yarrell's Brit. Birds*,
. 462.)

FF-FLOWER. (*Alternanthera.*)
ne refers to the stamens being alter-
fertile and barren. The biennial
of this interesting genus (none of
re indigenous) should be sown on a
eating hotbed, in peaty soil. The
d greenhouse plants succeed well in
t rich soil, and propagate freely by
. (*Paxton's Bot. Dict.*)

FF-WEED (*Centunculus mini-*
BASTARD PIMPERNEL. An
very diminutive weed growing on
watery heaths, flowering in July.
Eng. Flor. vol. i. p. 216.)

IN PLOUGH. A plough with a
for the purpose of giving security
eam of the swing plough). (*Trans.*
oc. vol. v. p. 392.)

LK. (Sax. cealc; Welch, *calch;*
al or *kal.*) The carbonate of lime,
united with carbonic acid. (See
Carbonate of lime exists abun-
n various parts of the earth's sur-
the state of chalk, limestone, and
and in smaller masses, as the arragonite, &c.; of which, between one and two hundred varieties (all carbonate of lime), are known to mineralogists: for the purposes of agriculture, they may be all classed under one head. Common chalk has a dull white colour, is soft, adhesive when applied to the tongue, stains the fingers, and thence is in common use for marking. In agriculture chalk is perhaps the most extensively employed of the limestone species; it varies slightly in composition, containing usually some silica (flint), alumina (clay), and some red oxide of iron, and the remainder carbonate of lime, 100 parts of which contain: —

	Parts.
Carbonic acid - - -	45
Lime - - - -	55

100 parts of common limestone are composed, according to MM. Thenard and Biot, of —

	Parts.
Carbonate of lime - -	95·05
Water - - -	1·63
Silica - - -	1·12
Alumina - - -	1·
Oxide of iron - -	·75
	100

These carbonates, when burnt, form lime, for the heat drives off the carbonic acid. By exposure to the air the lime absorbs carbonic acid gas, and again becomes converted into carbonate of lime. A knowledge of these facts is of considerable value to the farmer even on the score of carriage, independent of the greater value of lime as a manure; for, in some cases, the object of the needless weight of water and carbonic acid in chalk is very material, as will be readily seen by the following analysis of the chalk of Kent, which is the variety largely employed in the county of Essex, although it has to be brought by sea nearly seventy miles, and then often carted several miles. I found by careful experiment, 100 parts of chalk, from Kent, in the state in which it was carted on the land in December, contained, besides some oxide of iron and silica, —

	Parts.
Water - - -	24·
Carbonic acid - -	34·2
Lime - - -	41·8
	100

So that, when the farmer carts 41 tons of fresh lime, he conveys as much real manure to his soil as if he carried 100 tons of chalk. This must be assuredly a question of the highest importance to those farmers who have to carry the earth a considerable distance, especially if they can procure lime at a reasonable rate; which, in the large quantities required for agricultural purposes, must in most situations be the case.

Carbonate of lime is found in almost all vegetables; it is an essential food of plants. The cultivator will see, by the results of the experiments which I shall give under the head LIME, that the quantity of carbonate of lime contained in the cultivated grasses is very considerable, and still more so in trees; and that, as might be expected, the proportion increases with the quantity of this substance found in the soil. To the planter, this fact offers an unanswerable reason in favour of the addition of chalk, marl, or limestone, to all poor soils intended for plantations, in the manner long successfully practised on the black heathy sands of Norfolk by Mr. Withers of Holt, and which he has shown to be equally advantageous to trees, whether planted for ornamental or profitable purposes.

There is no fact more necessary to be understood by the agriculturist, than that no land can be productive which does not contain a fair proportion of carbonate of lime. It is, perhaps, even in excess much less prejudicial to any cultivated soil, than either silica or alumina. But, on the other hand, no soil can be productive if it contains more than nineteen parts in twenty of chalk. The earth of the fine sandy hop gardens near Tonbridge in Kent contain about five per cent. of chalk. The good turnip soils near Holkham in Norfolk are seven eighths sand, and the remaining eighth is composed of

	Parts.
Carbonate of lime or chalk	63
Silica (flint)	15
Alumina (clay)	11
Oxide of iron	3
Vegetable and saline matter	5
Water	3
	100

The soil at Sheffield Place in Sussex, which is so admirably adapted for the growth of the oak, contains three per cent. of chalk. The fine wheat soils of West Drayton in Middlesex contain more than ten per cent. That of Bagshot Heath contains less than one per cent. The richest soils on the banks of the Parret in Somersetshire contain more than seventy per cent. Those of the valley of Evesham, about six per cent. A specimen of a good soil from Tiviotdale, examined by Davy, was composed of five sixths sand, and the remainder of the following substances (*Lectures*, 202.):—

	Parts.
Clay	41
Silica (flint)	42
Chalk	4
Oxide of iron	5
Vegetable, animal, and saline matter	8

A soil yielding excellent pasture, from the banks of the Wiltshire Av Salisbury, yielded the same che eleventh of its weight of siliceo The remainder was composed of

Chalk
Silica (flint)
Vegetable, animal, and saline matt
Alumina (clay)
Oxide of iron

Many soils also contain a small tion of carbonate of magnesia; bu rarely amounts to a sufficient qu be worth estimating in the mode of I shall presently give.

It is difficult to say in what form bonate of lime enters the system o as it is an insoluble compound: u can suppose that it attracts an exce bonic acid from the air, becoming bonate, in which state it is soluble But whatever may be the cause of taken up by plants, its influence o undoubted.

The mode of applying chalk as a In the county of Essex, where ch practised to a very large extent, t is brought in sailing barges fr Kentish shore of the Thames, at pense of about two shillings per afterwards carted for some miles country. It is applied in quantiti vary from ten to thirty tons per cording to the description of the poor light soils requiring a larger of chalk than the richer lands. It i applied without any preparation; t lumps of chalk are not even brok the chalk being once ploughed in, th of the frost, the plough, and the ha time sufficiently pulverises it. It mixed in smaller proportions with farm-yard manure, ditch scraping mud, &c. and suffered to remain so before it is carried into the fiel equally excellent plan is followed of the best Essex farmers, who quantities of chalk over head land &c. which require lowering, and the these portions of land, ploughin often, and letting the chalked earth as long as possible incorporating they carry and spread the mixed c earth on to the field; by this m effects of a few loads of chalk are over a field. It is a plan admirably for those situations where chalk is pensive.

The good effects of chalk are m manent than immediate; for, alt good dressing with chalk will remai soil for from ten to twenty years, some soils, *one* or even *two* years w efore the farmer perceives a decided im- rovement. There is hardly any manure at answers better for grass than chalk, pecially on light sandy soils. If, however, e soil already contains an abundance of alk, its addition to that land cannot con- itute a manure. The cultivator can easily rm a rough estimate of the quantity of alk in a soil, by taking a quantity of it om three inches beneath the surface, well ying it in an oven, and adding to, say 0 grains, 800 grains of muriatic acid; the ixture, which weighs 1200 grains, will, if contain chalk, effervesce; and the car- nic acid of the chalk being expelled, will, course, lessen the weight of the mixture. hen the effervescence has entirely ceased, igh the mass; every 4½ grains deficient e experimenter may consider to indicate e presence of 10 grains of chalk in the l. The agriculturist will then be able to dge, by comparing the quantity of chalk isting in the examined soils with that other lands, the analyses of which I have ven, whether his land requires the ad- tion of chalk. (My work *On Fertilizers*, 256.; *Brit. Farm. Mag.* vol. iii. p. 129.)

CHAMBERS, SIR WILLIAM, of ottish parentage, was born in Sweden in 726, died in 1796. The following are his ublished works:—

1. Designs for Chinese Buildings. London. 1757. rge Folio. 2. A Treatise on Civil Architecture. ndon. Folio. 3. Plans of the Gardens at Kew. ndon. 1763 and 1765. Folio. 4. Dissertations on iental Gardening. London. 1744. 4to. (*G. W. John- , Hist. Eng. Gardening.*)

CHAMOMILE. See Camomile.

CHANGE OF CROPS. See Rotation.

CHANGE OF SEED. See Seed.

CHAR. A species of lake trout found Windermere; in length never exceeding teen or sixteen inches, spotted like a trout, th very few bones. (*Walton*, p. 173.) It also found in Loch Tay, in Scotland.

CHARBON. The little black spot or rk remaining after the large spot in the ity of the corner tooth of a horse is gone.

CHARCOAL. (From *chark*, to burn, d formerly written *charke coal.*) The maining portion of wood after it has been ated to redness for some time, which sipates all the hydrogen and oxygen of hich, with carbon, it is composed. (See arbon.) Charcoal burning is a regular de, followed in some of the woody dis- ricts by persons who do hardly any thing e.

Charcoal is prepared in two different ways. one, billets of wood are formed into a ap, which is covered with turf, and a few all openings only left for the admission the air requisite to maintain it in a state low combustion after it is lighted. When the whole heap is on fire, the holes are stopped; and, after the mass has cooled, the residue is charcoal. In the other mode the wood is distilled in iron cylinders, in which case the products are pyroligneous acid, and empyreumatic oil; and what remains in the retort is charcoal. The quantity of the distilled products, as well as of the charcoal, depends on the kind of wood employed. 100 parts of dried oak yields, of,

	Parts.
Pyroligneous acid - -	43·
Carbonate of potassa - -	4·5
Empyreumatic oil - -	9·06
Charcoal - - -	26·2

The charcoal thus procured is lighter than common charcoal. Charcoal should be black sonorous, brittle, and retain the texture of the wood. It has a powerful attraction for water, gases, and odorous and colouring principles. It is a powerful antiseptic, and well adapted for preserving animal substances from putrefaction. In fine powder it is the best of all tooth powders.

Ivory, or bone black, is animal charcoal, prepared in the same manner as the second kind of vegetable charcoal. It has a remarkable property of abstracting colour from many vegetable solutions, on which account it is much used by sugar refiners.

CHARLOCK. (Sax. cerlice.) A troublesome weed, which abounds in most arable soils, and is very difficult to expel. It is frequently called *chadlock*, *catlock*, *corlock*, *corn-kale*, and *white-rape*. There are four different species of plants, says Sinclair, confounded under the name of charlock, viz. *Sinapis arvensis*, or common wild mustard; yellow blossom, in May; annual. *S. nigra*, black or Durham mustard; blossom, pale yellow, in June; annual. *Raphanus raphanistrum*, wild radish; straw-yellow blossom, in June and July; annual. *Brassica napus*, wild navew (this last is the least common); yellow blossom, in May; biennial. (*Weeds of Agriculture*, p. 45.; *Smith's Flora*, vol. iii. p. 321–6.)

CHARRING OF POSTS. The reducing that part of the surface of posts which is to be put into the ground to the state of charcoal. This method is highly useful where the parts are to be placed in wet situations, or to stand between wet and dry. This was a practice common to the ancients.

CHASE. (Fr. *chasser*.) An extent of forest-ground, used as a range or station for different sorts of wild beasts; but which differs from a forest, as capable of being in possession of a subject, which the latter cannot; in not being so extensive, or endowed with so many liberties, as courts of *attachment*, *swainmote*, *justice-seat of eyre*, &c.

A chase differs from a park, in that it is not inclosed; and also, that a man may have a chase in another man's ground as well as in his own. (2 *Blackstone's Comment.* p. 38.)

CHASE. The hunting of game has probably continued from the earliest periods. In England that of the fox, the hare, the deer, and the otter only remains.

CHATS. A term employed in some districts to signify the *keys* of the ash, sycamore, and very small refuse potatoes, &c.

CHAVLE. A provincial word, used to signify chewing imperfectly.

CHEDDER-CHEESE. A kind of cheese, so named from its being made at Chedder, a village near the Mendip-hills in Somersetshire, famous for its pastures.

CHEESE. (Lat. *caseus;* Sax. ceꞅe.) A well-known kind of food, prepared from milk by coagulation, and separated from the serum, or whey, by means of pressure, after which it is dried for use. See Butter. Cheese has been made from a very ancient period; it is mentioned by Job, and also by Homer. According to Strabo, our British ancestors did not understand how to make cheese,—a deficiency with which their descendants cannot now well be charged.

Good cheese, says Dr. Thomson, melts at a moderate heat; but bad cheese, when heated, dries, curls, and exhibits all the phenomena of burning horn. From this it is evident that good cheese contains a quantity of the peculiar oil of cream; hence its flavour and smell. Proust found in cheese a peculiar acid, which he called the caseic. (*System of Chem.* vol. iv. p. 499.)

The best season for making cheese is during those months when the cows can be fed on the pastures; that is, from the beginning of May till towards the end of September, or, in favourable seasons, the middle of October. On many of the larger dairy-farms, in several districts, cheese is frequently made throughout the year; but that made during the winter months is considerably inferior in quality, and much longer in becoming fit for sale, or for use, than that which is made within the periods which have been just mentioned. In Gloucestershire, the season of making thin cheese is from April to November; but the principal one for making thick is during the months of May, June, and the beginning of July. If made late in the summer, the cheese does not acquire a sufficient degree of firmness to be marketable in the ensuing spring.

The *milking* in Cheshire, during the summer season, is at six o'clock, both morning and evening; and, in winter, at daylight in the morning, and immediately before dark in the evening. But in other districts, as Wilts, Suffolk, &c. the people are frequently employed in milking by four o'clock in the morning in summer; and the business in a dairy of forty or fifty cows is nearly completed before the usual period at which it commences in Cheshire.

The *colouring* of cheese has been so long common in the cheese districts, that it is probable that cheese of the best quality would be in a great measure unsaleable if it did not possess the requisite colour. The degree of colour is regulated chiefly by the name under which it is intended the cheese should be sold, as Gloucester, Cheshire, &c. The object of the introduction of this practice was no doubt to convey an idea of richness which the cheese did not really possess. This is the more evident, as it is universally allowed that the poorest cheese always requires the greatest quantity of dye to bring it to the proper degree of colour. The material which is employed for this purpose is Spanish annotta. (See Annotta.) The weight of a guinea and a half of it is considered in Cheshire sufficient for a cheese of 60 lbs.; and in Gloucestershire an ounce is the common allowance to 1 cwt.

In regard to the *rennet*, it may be observed, that milk may be coagulated, or curdled, by the application of any sort of acid; but the substance which is most commonly used is the maws or stomachs of young calves, prepared for the purpose. These are most generally denominated *rennets*; but they are also often provincially called *vells*, and in Scotland *yearnings*. See Rennet.

In Cheshire, after the rennet is added to the milk, and as soon as the curd is firm enough to discharge its whey, the dairy-woman plunges her hands to the bottom of the vessel, and, with a wooden dish, stirs the curd and whey; then lets go the dish, and by her hands agitates the whole, carefully breaking every part of the curd; and, at intervals, stirring it hard to the bottom with the dish, so that no curd remains unbroken larger than a hazel-nut. This is done to prevent what is called slip-curd, or lumps of curd, which, by retaining the whey, do not press uniformly with the other curd, but in a few days, if it happens to be situated towards the rind of the cheese, turns livid and jelly-like, and soon becomes faulty and rotten. In a few minutes the curd subsides. The dairy-woman then takes her dish, and lades off the whey into a milk-lead to stand for cream, to be churned for whey-butter. This is a practice peculiar to the cheese counties. In Norfolk the whey, even from new milk, passes from the ch vessels immediately to the hog-tub. Ha laded off all the whey she can, she sp a straining cloth, and strains the wh

h it, returning the curd retained in
th into the cheese-tub. When she
all the whey she can by pressing
d with her hand and the lading-dish,
es a knife and cuts it into square
f about two or three inches. This
more of the whey, and makes the
re handy to be taken up in order to
en into the vats.

g made choice of a vat or vats pro-
d to the quantity of curd, so that
se when fully pressed shall exactly
vat, she spreads a cheese-cloth
ver the mouth of the vat, into which
breaks the curd, carefully squeezing
art of it in her hands; and having
he vat heaped up, and rounded
s top, she folds over it the cloth and
t in the press, on the construction
er of which much depends.

the vat is properly placed in the
e ordinary degree of pressure is ap-
hich is more or less, according to the
the cheeses usually made. At all large
there are two or three presses, all va-
respect to weight or pressure. There
ious kinds of cheese-presses; one
tirely of iron by the Shotts Foundry
y is described in the *Trans. High.*
l. iv. p. 52. As soon as the vat is
in the press, and the weight applied,
are thrust in through the holes
side of the vat; this is done re-
y during the first day when the vat is
ress. From the time the vat is first
n the press till it is again taken out
t, in ordinary cases, exceed two or
ours. When taken out, the cheese
nto a vessel with hot whey, with a
hardening its coat or skin, where it
for an hour or two; it is then re-
wiped dry, and after having remained
ne to cool, is covered with a clean
nd the vat being wiped dry, and the
replaced, it is again put into the
In the evening, supposing the cheese
been made in the morning, which is
al time, it is again taken out of the
d another dry cloth being applied, it
d and replaced; what was formerly
er becoming now the under side.
manner it is taken out, wrapped in
loths, and turned in the vat twice
for two days, when it is finally re-

alting is the next operation. The
on being for the last time taken out
vat, is carried to the salting-house,
ced in the vat in a tub filled to a
rable depth with brine, in which it
for several days, being regularly
once at least every day. The vat is
moved from the brine-tub; and the cheese being taken out, is placed on the salting-bench, where it stands for eight or ten days, salt being carefully rubbed over the whole every day during that period. When the cheese is of a large size, it is commonly surrounded with a wooden hoop or fillet of cloth to prevent renting. After it is supposed to be sufficiently salted, it is washed in warm water or whey, and when well dried with a cloth, is placed on what is called the drying-bench, where it remains a like period before it is removed to the keeping-house or cheese-chamber.

The last part of the business is the management in the cheese-room. In Gloucestershire the young cheeses are turned every day, or every two or three days, according to the state of the weather, or the fancy or judgment of the dairy-woman. If the air be cold and dry, the windows and door are kept shut as much as may be; if close and moist, as much fresh air as possible is admitted. Having remained about ten days in the dairy (more or less, according to the space of time between the washings), the cheeses are cleaned; that is, washed and scraped.

The produce of a dairy of cows, where the milk is converted into cheese, is very variously stated by different writers. In some districts 2½ cwts. from each cow, whether a good or a bad milker, if at all in milk, is considered a good return. In others, the average runs as high as 3 cwt.; and in the county of Wilts in particular, from 3½ to 4 cwts. is the usual quantity. From accurate calculations made by Mr. Marshall, and these several times repeated, he found that in Gloucestershire about 15 gallons of milk were requisite for making little more than 11 lbs. of two-meal cheese, and that one gallon of new milk produced a pound of curd. It is the general opinion of dairy farmers that the produce from two and a half to three and a half acres is necessary to maintain a cow all the year round. Taking, therefore, the medium of the three averages of cheese above mentioned (amounting to 355 lbs. from each cow), the quantity of cheese by the acre is 118 lbs. Every calculation of this kind must, however, be extremely vague and uncertain.

In the making of *Parmesan* cheese, we are informed by Mr. Price, in the *Papers of the Bath and W. of Engl. Society* (vol. vii.), that the method is "to put, at ten o'clock in the morning, five brents and a half of milk, each brent about forty-eight quarts, into a large copper, which turns on a crane over a slow wood fire, made about two feet below the surface of the ground; the milk is stirred from time to time, and about eleven o'clock, when just lukewarm, or considerably under a blood-heat, a ball of rennet, as big as a large walnut, is squeezed through a cloth into the milk, which is kept stirred. By the help of the crane the copper is turned from over the fire, and left till a few minutes past twelve; at which time the rennet has sufficiently operated. It is now stirred up, and left for a short time. Part of the whey is then taken out, and the copper again turned over a fire sufficiently brisk to give a strongish heat, but below that of boiling. A quarter of an ounce of saffron is now put into the milk to give it a little colour; and it is well stirred from time to time. The dairyman frequently feels the curd. When the small, and, as it were, granulated parts, feel rather firm, which is in about an hour and a half, the copper is taken from the fire, and the curd left to fall to the bottom. Part of the whey is taken out, and the curd brought up in a coarse cloth, hanging together in a tough state. It is then put into a hoop, and about a half hundred weight laid upon it for about an hour; after which the cloth is taken off, and the cheese placed on a shelf in the same hoop. At the end of two, or from that to three days, it is sprinkled all over with salt; the same is repeated every second day for about forty or forty-five days, after which no further attention is required. While salting, they generally place two cheeses one upon another; in which state they are said to take the salt better than singly. The country between Cremona and Lodi, says Mr. Evans, comprises the richest part of the Milanese. The irrigation, too, is brought to the highest degree of perfection; the grass is cut four times a year as fodder for the cows, from whose milk is made the well-known Parmesan cheese. The cows, which are kept in the stall nearly all the year round, are fed during summer on two of these crops of grass or clover, which are cut green; and in the winter on the other two, which are hayed. The milk of at least fifty cows is required for the manufacture of one Parmesan cheese. Hence, as one farm rarely affords pasture for such a number, it is usual for the farmers or metayers of a district to club together. (*Quart. Journ. of Agr.* vol. v. p. 622.)

Cream cheese is made in various places; but that which is generally known by the name of Stilton is made in Leicestershire, in the following manner, according to the *Agricultural Report* of that county:—The night's cream is put into the morning's new milk with the rennet; but when the curd is come it is not broken, as is done with other cheeses, but is taken out with a soil-dish altogether, and placed in a si drain gradually; and, as it drains, pressed, till it becomes firm and being then placed in a wooden hoo afterwards kept dry on boards, it is frequently, with cloth binders rou which are tightened as occasion re Cream cheese of good quality is li made, in some districts, by adding the of one meal's milk to the milk w immediately taken from the cow. after being made and pressed gently three times, and carefully turned fo or two, is fit for use.

There are papers, by Mr. P. Mille making Cheese resembling that of Glo and Wiltshire" (*Trans. High. Soc.* p. 228.); and "In Imitation of Gloucester," by Mr. Bell (*Ibid.* p. 155.); and "On communicating th vour of old to new Cheese by Inocul by Mr. Robinson (*Ibid.* p. 232.) (The knife is merely employed to transfer of the ripe cheese to that whose ripe intended to be hastened.) "On Cheese from Potatoes in Thuringia." *Mag.* vol. viii. p. 142.)

CHEESE CLOTHS are large to put inside the chessel or vat, while the is staining. They are of home manuf and should be of strong and open te every time they are used for this p they should be wrung out of boiling and dried in the sun, or before the f

CHEESE COLOURING. See A

CHEESE-FLY and MAGGOT. *phila casei.*) The small white larva in old and putrescent cheese, pro small two-winged fly, about two li length, which has a greenish-black, and shining body. It is fully descri the *Quart. Journ. of Agr.* vol. xii. p.

CHEESE-KNIFE. A large knife, or spatula, made use of in dai the purpose of cutting or breaking the curd whilst in the cheese-tub.

CHEESE-LEP. The bag in dairy-women keep the rennet for cheese.

CHEESE-MITES. This is the *siro*, an almost microscopic apterous furnished with eight legs, on the four which, between two claws, is a vesic a long neck, to which the insect c every kind of inflexion. "When it foot down, it enlarges and inflates; an it lifts it up, it contracts it, so th vesicle almost entirely disappears." *Geer*, quoted by Kirby, vol. xxxiv. It is not possible to say how this ins into cheeses. The brown powder, so by epicures, in which the mites live, excrement.

CHEESE-PRESS. A press employed in cheese dairies, to force the whey from the curd when in the cheese vat.

Cheese presses are of different forms. The most simple and primitive press is merely a long beam, one end of which is placed in a hole of the wall, and frequently it is fixed to a bolt, or in the trunk of a tree. The sinker forms the fulcrum, a weight consisting of two or three undressed stones being placed on the other end of the lever. A second kind is formed by a large square stone, suspended by a screw between the side posts of a timber frame. The chessel is placed underneath it, and the stone is lowered upon the sinker by turning the screw to the left hand. The cheese vat is removed at pleasure by turning the screw to the right hand, which elevates the stone. To preserve the screw, a small block of timber is placed underneath the stone during the period that cheese-making is suspended.

Another kind of press consists of a timber frame formed of two perpendicular side posts and a cross top with a parallel beam, which is suspended from the top by two screws. The cheese vat is placed upon the beam, which is lifted up when the screws are turned to the right hand; and the sinker of the chessel or vat being pressed against the cross top, squeezes or *stanes* the cheese. When the chessel requires to be removed, the screws are turned to the left hand.

But more complicated presses, and therefore in many instances more convenient, can be adopted. The most complete, effective, and approved press consists of a frame of cast iron with a perpendicular piston, flat below to cover the sinker of the chessel. The piston is raised or depressed by a small pinion attached to a ratchet wheel and malleable iron lever, three feet in length. The lever is grooved in several places on the upper side to hold the ring of the weight for increasing or diminishing the power, in proportion to its distance from the ratchet wheel. The weight of this press is about two stone, cost 1*l.* 4*s.*, pressure 20 tons. (*Martin Doyle's Pract. Husb.; Prof. Low's Elem. of Agr.*)

CHEESE RENNET, or YELLOW BED-STRAW (*Galium verum*), is a perennial plant, common in waste places and the borders of fields, flowering in July and August. The stem, which is woody and much branched, rises eighteen inches, and sends off, in the same plane, narrow, deep green, deflexed leaves, rough with minute points, each tipped with a hair. The flowers are golden yellow, in dense tufted panicles, and smell strongly of honey in the evening and before rain. The flowers of this weed were formerly used in Cheshire for curdling milk. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. i. p. 208.)

CHELIDONIUM. From *cheledon*, a swallow; it being said to flower at the arrival and wither at the departure of the swallows. See Celandine.

CHELONE. (*Chelone barbata.* From *chelone*, a tortoise; to the back of which the helmet of the flowers is fancifully compared.) This plant is a native of North America, and a hardy perennial; blowing beautiful red flowers in July and August. It loves shade and moisture, and grows three feet high. The white chelone is hardy, and likes any soil. The downy chelone blows a flower which is yellow inside, and light purple outside. It is propagated by seed, and by separating the roots in autumn. It belongs to a hardy herbaceous genus, that ought to have a place in every collection: the species succeed well in a mixture of peat and loam. (*Paxton's Bot. Dict.*)

CHEMISTRY. The importance of this science to the agriculturist no intelligent modern farmer will doubt. Its triumphs in the cause of the cultivator have been far too many for him to hesitate in acknowledging the obligation. I have, in this work, under the heads Earths, Analysis of Soils, Gases, Water, Salts, Organic Chemistry, &c. endeavoured, to the best of my power, to illustrate some of the many chemical facts on which the successful practice of agriculture depends; and to these I must refer the farmer. Most of the substances belonging to our globe, says Davy (*Chem. Philosophy*, p. 1.), are constantly undergoing alterations in sensible qualities, and one variety of matter becomes, as it were, transmuted into another. Such changes, whether natural or artificial, whether slowly or rapidly performed, are called chemical; thus, the gradual and almost imperceptible decay of the leaves and branches of a fallen tree exposed to the atmosphere, and the rapid combustion of wood in our fires, are both chemical operations. The object of chemical philosophy is to ascertain the causes of all phenomena of this kind, and to discover the laws by which they are governed. The ends of this branch of knowledge are the applications of natural substances to new uses, for increasing the comforts and enjoyments of man; and the demonstration of the order, harmony, and intelligent design of the system of the earth. The foundations of chemical philosophy are observation, experiment, and analogy. By observation, facts are distinctly and minutely impressed on the mind. By analogy, similar facts are collected. By experiment, new facts are discovered; and, in the progression of knowledge, observation, guided by analogy, leads to experiment; and analogy, confirmed by experiment, becomes scientific truth. To give an instance,—whoever will consider with attention the slender green vegetable filaments (*Conferva rivularis*) which in the summer exist in almost all streams, lakes, or pools, under the different circumstances of shade and sunshine, will discover globules of air upon the filaments exposed under water to the sun, but no air on the filaments that are shaded. He will find that the effect is owing to the presence of light. This is an *observation;* but it gives no information respecting the nature of the air. Let a wine-glass filled with water be inverted over the conferva thus acted upon by the light. The air-bubbles, as they rise, will collect in the upper part of the glass; and, when the glass is filled with air, it may be closed with the hand, placed in its usual position, and an inflamed taper introduced into it: the taper will burn with more brilliancy than in the atmosphere. This is an *experiment.* If the phenomena are reasoned upon, and the question is put, whether all vegetables of this kind, in fresh or in salt water, do not produce such air under like circumstances, the inquirer is guided by *analogy;* and, when this is determined to be the case by new trials, a general scientific truth is established,—that all confervæ in the sunshine produce a species of air (oxygen gas) which supports flame in a superior degree: a fact which has been shown to be the case by various minute investigations.

By such researches the chemist ascertains the composition and uses of the various other gases, and also of the earths, metals, and salts, of which the materials of the earth we inhabit are composed; delightful inquiries, which will well repay the cultivator in more ways than one for the labour he may bestow upon them. They will speedily teach him that nothing in this world of ours is ever lost or *destroyed;* that the decaying materials of his most noisome manures speedily again make their appearance in new forms, and in salubrious and fragrant plants; that the expired breath of himself and his live stock is the inhaled food of all vegetation; and that vegetables purify the very air which animals have vitiated. And again, the correct *rotation* of crops, the use of permanent or *earthy* additions to the soil (which see), the fattening of live stock, the origin of diseases, are a few only of the facts connected with the cultivation of the soil which the chemist's operations illustrate. "The nature of soils" (as it is remarked by Mr. G. W. Johnson), "of manures, of the food and functions of plants, would all be unknown but from the analyses which chemists have made." We know that every plant has a particular temperature in which it thrives best, a particular modification of food, a particular degree of moisture, a particular intensity of light; and those particularities vary at different periods of their growth. It is certain that plants are subject, like all other organised bodies, to various influences. Acids are injurious to some, alkalies to others; the excess of some of their constituents, and the deficiency of others, insure disease to the plants to which such irregularities occur. Disease is accompanied by decay more or less extensive and rapid; and if these cannot be checked by salutary applications and treatment, death ultimately ensues. Now, if it was possible for any science or sciences to teach the cultivator of plants how to provide for them all the favourable contingencies, all the appropriate necessaries above alluded to, and to protect them from all those which are noxious to them, the art of cultivation would be far advanced to perfection. Such sciences are botany and chemistry. It is not asserted that they can, at present, do all that is desired of them,—all of which they are capable; but they can do much. As evidence of what can be effected by a combination of chemical and practical knowledge in the cultivation of the soil, we may quote the example of Lavoisier. He cultivated 240 acres in La Vendée, actuated by the beneficent desire of demonstrating to his countrymen the importance of sustaining the art of cultivation on scientific principles. In nine years his produce was doubled, and his crops afforded one third more than those of ordinary cultivators. It is unnecessary to dwell upon the importance of such improvements. Science can never supersede the use of the dunghill, the plough, the spade, and the hoe; but it can be one of their best guides,—it can be a pilot even to the most experienced. (*Baxter's Lib. of Ag.; Gard. Mag.* vols. iii. and iv.; *Davy's Chem. Phil.; Leibig's Organic Chemistry.*)

CHERRY, THE BIRD. (*Prunus padus.*) See Bird Cherry.

CHERRY TREE. (*Prunus Cerasus.*) It derives its name from Cerasus, a city of Pontus, whence the tree was brought by Lucullus, about half a century before the Christian era. It soon after spread into most parts of Europe, and is supposed to have been carried to Britain about a century after it came to Rome. The cherry is pretty generally cultivated throughout the kingdom, as an agreeable summer fruit. The varieties are very numerous. The Horticultural Society's Catalogue embraces 246; but the following list is recommended by

Mawe, as containing the best varieties for general cultivation, the whole being arranged in the order in which they ripen: — *June:* Early May, May Duke, Knight's Early Black, and Late Duke. *July:* Archduke, Black Tartarian, White Tartarian, Black Eagle, Kentish, Bigarreau, Holman's Duke, Elton, Herefordshire Heart, Bleeding Heart, Carnation, and Waterloo. *August:* Harrison's Heart, Black Heart, Waterloo, Couronne, Lukeward, Black Geen, Small Black, Small Red Wild, White Swiss, Lundie Geen, Transparent Geen, Cluster, Yellow Spanish. *September:* Florence, Amber Heart, Flemish Heart, Red Heart, White Heart. *October:* Morello or Milan. For small gardens, either as wall trees, espaliers, or standards, the following varieties are recommended: — The May Duke, Morello, Archduke, Black Heart, White Heart, Bigarreau, Harrison's Heart, and Kentish Cherries. Miller considers the common Red or Kentish, the Duke, and the Lukeward as the best trees for an orchard; they are plentiful bearers. This tree prefers a light dry sandy loam, with a free exposure. The wood of the cherry tree is close, takes a fine polish, and is not liable to split. It is used in the manufacture of chairs, musical instruments, &c. and stained to imitate mahogany. The principal supplies of cherries for the London market are brought from the cherry orchards in Kent and Herts. The wild cherry tree is found frequently in our woods and hedges, and has round branches with a polished ash-coloured bark. The leaves, in all the varieties are simply folded flat while young, by which cherries differ from the Bullace tribe. (*Phil. Hist. Fruits*, p. 76.; *Willich's Domestic Encyclopædia; M'Culloch's Commercial Dictionary; Baxter's Library of Agriculture; Smith's Eng. Flora*, vol. ii. p. 354.)

CHERRY-LAUREL. (*Cerasus laurocerasus.*) This shrub is an exotic, although it is now naturalised to this climate, and was brought to Europe from Trebisonde in 1576. It is an evergreen, with smooth bark, and short-stalked, oblong, lanceolate, remotely serrated, coriaceous, shining leaves, with two or four glands at their base. The flower is white, with round spreading petals, and the fruit a small, black drupe or cherry. The leaves of the cherry laurel have long been employed both in medicine and in confectionery, on account of the agreeable odour and flavour of the bitter almond which they possess. They lose their odour after they are dried, but retain their flavour. The odour depends on the elements of a volatile oil, which is developed by the addition of water, and, thence, readily obtained by distillation. It contains Prussic acid in considerable quantity. In consequence of these components, the leaves of the cherry-laurel, when chewed, or employed too freely in flavouring dishes, are poisonous; and the distilled water, *laurel water*, is as poisonous as Prussic acid. It causes an uneasy sensation at the stomach, insensibility, and death in a few minutes. Notwithstanding these deleterious properties, the distilled water of the cherry-laurel is a valuable sedative medicine; but it should not be entrusted to the hands of the ignorant. When it has proved hurtful in puddings, or any form of cookery, its effects should be combated by cordials, and sal-volatile, and dashing cold water on the face and the chest.

CHERRY, WINTER. (*Physalis Alkekengi.*) This is a pretty shrub; sometimes cultivated. It grows two feet high; its stalk is thick and strong, with large sharp-pointed leaves. The flowers are white, with yellow anthers. The fruit is a red berry, contained in a round green husk, about the size of a large cherry. The berry is sometimes medicinally used: it is slightly diuretic. See ALKEKENGI.

CHERVIL, GARDEN. (*Chærophyllum sativum.*) This herb grows in gardens, and sometimes wild in waste ground; perhaps the outcast of gardens. The flowers are white, and bitter-tasted; the seeds are smooth, furrowed, and large; altogether the plant resembles parsley, only the leaves are paler and more divided. The roots are given in decoction. Chervil is slightly diuretic: the cutters of simples distil a water from its leaves, which they consider excellent in colics. Dioscorides says it is healing to the lungs, and softens phthisicky coughs. He speaks of it also as forcing in its effects, and recommends it in salads, or boiled in broths and potages, to which it is better adapted than to medicine. It is much used in France for salads; and is mentioned as a potherb by Gerarde. The parsley-leaved chervil (*Scandix cerifolium*) and fern-leaved chervil (*S. odorata*), are still cultivated by the Dutch for soups, salads, &c.; but in this country they are not often found in the kitchen garden. The soil for these plants must be mouldy, and containing a portion of calcareous matter: it need not be very poor, yet far from rich. The situation cannot be too open, but a shelter from the meridian sun is of great importance. Seed may be said to be the only means of propagation, and the only sowing of this that can be depended upon must be performed in early autumn, immediately after it is ripe; for if kept until the following spring, it will seldom germinate; or if this first grade of vegetation takes place, the seedlings are generally weak, and die away during the hot weather.

The seed may be sown in drills eight inches apart, or broadcast; in either mode being only just covered. The plants are to be thinned to eight inches asunder, and to remain where they are raised. The only after-cultivation required by them is the keeping them clear of weeds. For the production of seed, some of the autumn-raised plants of the annual species must be left ungathered. They flower in April, and ripen their seed about June. Of the perennial species, some must in a like manner be left untouched: they will flower about June, and ripen their seed in July or August. (*G. W. Johnson's Kitchen Garden.*)

The wild chervil, or smooth cow parsley (*Ch. sylvestre*), is the only indigenous species, besides *Ch. sativum.* It is a perennial, flowering in April and May, and thriving in hedges, orchards, and pastures. The root is spindle-shaped, a little milky; it has a striated stem, downy in the lower part. The snow-white flowers, some of the earliest of their tribe, plentifully adorn the hedges and margins of fields in spring and announce the approach of summer. The whole herb having the flavour of carrots, is eaten by domestic cattle, particularly asses, cows, and rabbits. Its presence indicates a fertile soil, but it ought to be eradicated from all pastures early in the spring. The umbels of this plant afford an indifferent yellow dye, the leaves and stems a beautiful green. (*Smith's Eng. Flor.* vol. ii. p. 48.; *Willich's Dom. Ency.; Sinclair's Weeds.*)

CHERVIL, THE NEEDLE. See SHEPHERD'S NEEDLE.

CHESSEL. The mould or vat in which the cheese is formed. It is made of thick staves, generally of white or American oak, bound with two strong iron hoops to withstand the necessary pressure. The chessel is perforated with many small holes in the bottom and sides to let the whey drain out of the curd.

CHEST. The breast; or that part of an animal's body which contains the heart and the lungs.

CHEST-FOUNDER. In farriery, a disease incident to horses, which proceeds from inflammation about the chest and ribs.

CHESTNUT, or CHESNUT. (*Fagus-castanea.*) The species cultivated in England are the common or sweet chestnut, of which there are two kinds, the Spanish (*Cas. vesca*) and the American (*Cas. Americana*); — and the horse chestnut, which belongs to a distinct genus. The true chestnut tree flourishes on poor gravelly or sandy soils, and will thrive in any but moist or marshy situations. It has been much questioned wheth
is indigenous or exotic.
time very common in
great many chestnuts h
within the last thirty y
lived, grows to an imm
very ornamental. The w
compact: when young,
flexible; but when old it i
shaky. When divested
this timber will stand in s
to wet and dry longer than
posts it ranks in durabili
acacia, the yew, and proba
than the larch. The nut
for our dessert. In some
nent they are frequently u
for bread, and form a la
the food of the inhabita
three years ending with 1
foreign chestnuts for ho
averaged 20,948 bushels
pay a duty of 2*s*. per bus
Princip. of Carpentry;
Dict.; Willich's Dom. Enc
of Fruits, p. 84.)

CHESTNUT, HORSE
castanum.) This ornamen
common throughout Eur
Asia. The first plant is
brought into Europe by t
tanist Clusius in a portma
well known to require
wood is soft and of little
contains much nutritive
combined with a nauseous
which renders it unfit for
but horses, kine, goats, an
of it. The bark of the
astringent, bitter principl
as a tonic. It has cured
authors affirm that it mig
for the Peruvian bark; b
perience have not justifi
Given in a decoction, mad
of the bark to a pint of
advantageously taken, to
habit weakened by previo

CHETWERT. A me
Russia, equal to $5\frac{19}{26}$ Wi
so that 100 chetwerts =
quarters.

CHEVIOT SHEEP.

CHEWING-BALL.
name of a medicine in
adapted to restore lost ap

CHEWING THE CUD
of leisurely re-chewing o
food in ruminating anim
sheep, &c.: by this means
effectually broken down,
the saliva. If a ruminant
chew the cud, immediate i

ed, as the digestive organs cannot act
out this natural process. See an excel-
article "On Rumination, or Chewing the
" in the *Quart. Journ. of Agr.* p. 344.
HICCORY, or SUCCORY. (*Cichorium*
us.) An English perennial weed, the
endive, common on the borders of corn-
and poor gravelly soils; extensively
vated in Belgium, Holland, and Ger-
y. The cultivated variety was much
ght into notice by the late Arthur
ng, as a forage plant. He brought the
from France in 1788, and grew it ex-
ively on his own farm; and reports (*An-
of Agr.* xxxix.), "The quantity of seed
ired to sow one acre is 13 lbs. The root
deep into the ground, and is white,
y, and yields a milky juice. On the
inent, the dried root is roasted and
instead of coffee, and it is now allowed
he excise to be mixed with coffee.
root contains a strong bitter, which
be extracted by infusion; it is also
in the brewing of beer to save hops."
Gorrie (*Quart. Journ. of Agr.* N. S.
v. p. 206.) says, "No plant cultivated
s country will bring the cow-feeder
an equal return with the chiccory."
uld be added, however, that the
give a bad taste to the milk of the
hich eat them. (*Brit. Husb.* vol. iii. art.
Husb." p. 42.) And Von Thäer, in
nciples of Agriculture* (2d ed. vol. iv.
), asserts that it is extremely difficult
icate from the land, and has been
materially impoverish the soil.
esh root of chiccory, when sliced
sed, yields a juice which is slightly
nd has been used in chronic affec-
the stomach, connected with tor-
(*Sinclair's Hort. Gram. Wob.
M'Culloch's Com. Dict.; Willich's
cyc.; Brit. Husb.* vol. ii. p. 303.)
, or CHICKEN. See Poultry.
PEA. (*Cicer arietinum.*) A
delicate for field culture in Eng-
t in the south of France it is
the same purpose as vetches in
It is the *gram* of India. (*Pax-
Dict.; Low's Agr.* p. 286.)
WEED. A low, creeping weed,
there are several varieties. The
hickweed, or stitch-wort (*Stellaria*
s an annual, small, tapering root;
from March to December. Small
poultry eat the seeds, and whole
ence its name. Swine are ex-
nd of it; and it is eaten by cows
s; but is not relished by sheep,
used by goats. The herb may be
the table like spinach: it is re-
be nutritive. The field chick-
erastium arvense) is a perennial, from four inches to a foot in length, found in fields and on banks and hillocks, on a gravelly or chalky soil. In this order there are seven other species of mouse-ear chickweed, viz. two kinds of broad-leaved (*C. vulgatum* and *C. latifolium*); the narrow-leaved (*C. viscosum*); the little mouse-ear (*C. semi-decandum*); the four-cleft (*C. tetrandum*); the alpine (*C. alpinum*); and the water (*C. aquaticum*). These call for no observation. The berry-bearing sort, which grows with smooth erect stalks, and the stamens longer than the petals, is the wild lychnis, or white behen, and is a very rambling weed, natural to most parts of England, frequently called spattling-poppy. Its roots are perennial, and strike so deep into the earth that they are not easily destroyed by the plough; for which reason, bunches of this plant are too common among corn, in land which has not been perfectly well tilled. Summer-fallowing, and carefully harrowing out the roots, which should then be burnt, is the best and most effectual remedy.

The common chickweed grows in almost every situation, in damp or even boggy woods, and on the driest gravel walks in gardens. In its wild state, this plant frequently exceeds half a yard in height; and varies so much from the garden chickweed, that if a person were acquainted only with the latter, he would with difficulty recognise it in the woods. Its small white flowers, and pale green leaves spreading in all directions, sufficiently point it out to our notice. It may be considered as a natural barometer; for if the flowers are closed, it is a certain sign of rain, while, during dry weather, they are regularly open from nine o'clock in the morning till noon. The plant boiled in vinegar and salt is said to cleanse breakings-out or eruptions of the hands and legs. (*Smith's Eng. Flor.* vol. ii. p. 301.; *Sinclair's Weeds,* p. 52.; *Willich's Dom. Encyc.*)

CHICKWEED, EUROPEAN WINTER-GREEN. (*Trientalis Europæa.*) A species of chickweed growing on turfy heaths and woody declivities, in mountainous countries. Found in several parts of the north of England, but most plentiful in Scotland. Perennial; root slightly tuberous; herbage smooth; stem solitary, erect, roundish, three or four inches high, almost naked, except at the top, where it is covered with a tuft of leaves, and very elegant white flowers; seeds dotted, black, with snow-white reticulated tunics, like fine lace. (*Smith's Eng. Flor.* vol. ii. p. 208.)

CHICKWEED, GERMANDER. See Speedwell.

CHICKWEED, PLANTAIN-LEAVED. See Sandwort.

CHICKWEED, SEA. See Sandwort.

CHICKWEED, SPEEDWELL. See Wall Speedwell.

CHICKWEED, UMBELLIFEROUS JAGGED. (*Holosteum umbellatum.*) Found on old roofs and walls; rare. Root annual; small fibrous stems, weak and partly decumbent, branched from the bottom only, four or five inches high, round, leafy. Leaves hardly an inch long, spreading, single-ribbed, glaucous, and rather succulent, entire and even at the edges. Flower stalks about five, terminal, umbellate. Petals white with a tinge of red, various and unequally jagged at each side. Seed reddish. (*Smith's Eng. Flor.* vol. i. p. 188.)

CHICKWEED, UPRIGHT. See Speedwell, Blunt-fingered.

CHICKWEED, WATER. See Blinks, Water.

CHICLING-VETCH, or EVERLASTING PEA. See Vetch.

CHIFF CHAFF. (*Sylvia hippolais.*) A hardy small bird, which takes its name from its oft-repeated double note, resembling the two syllables "chiff, chaff." Frequents shady woods, hedgerows, and bushes. Food insects; nest oval or rounded, with a hole in the side, by which the bird enters; outside formed of dry grass, dead leaves, and moss; lined with a profusion of feathers; it is generally placed on or near the ground in a hedge-bank; eggs usually six, white with a few specks of dark purplish red; beak shorter and narrower at base than the willow warbler; legs very dark brown; and the plumage partakes more of brown and less of green than that bird. (*Yarrell's Brit. Birds*, p. 307.)

CHINA-ASTER. See Aster.

CHINE. In horsemanship, the backbone, or ridge of the back. In pork, that part of the back which contains the backbone.

CHINESE DUCK. See Poultry.

CHISLEY LAND. Soil between sandy and clayey, containing a large admixture of small pebbles or gravel.

CHISSUM. A term used provincially for to put forth roots, or to vegetate.

CHIT. A word used in the same sense for to bud, or sprout out.

CHIVES, or CIVES. (*Allium schœnoprasum.*) This plant is a perennial, flowering in May and June. It is easily propagated by offsets of the roots. The time for making plantations is January or February: however, March is the month to be preferred to either; but if previously neglected, it may be performed as late as June. It is also planted in the autumn. They are to be inserted by the dibble, eight or ten inches apart, and *eight or ten* offsets in each hole. The only cultivation required is to keep the
from weeds. By autumn they multi
large-sized bunches; and if require
be taken up as soon as the leaves dec
be stored, after the necessary preca
as a substitute for the onion: the
which are fit for use as long as they
green, must, when required, be cut
close to the ground, when they will
be succeeded by others. (*G. W. Jo
Kitch. Garden.*)

CHIZZLE. Provincially, the br
husky parts of ground wheat.

CHLORIDE OF LIME. This
stance is a compound of lime in its sl
state, or as a *hydrate* and chlorine.
combination is loose, and the chlori
exposed to the air, affording the colo
that gas. It dissolves only partiall
water; and the solution, when expo
the air, evolves chlorine, whilst the
lime attracts carbonic acid, and form
insoluble carbonate of lime, which co
in the bottom of the vessel. The
the chloride of lime, or bleaching po
has been recently proposed again as
nure; and I am much inclined to believ
on hot sandy soils, if used in prope
portions, it would be productive of
good results; for it not only, when a
with the seed, stimulates its germin
but also by gradually giving out a p
of its chlorine, and being converted
carbonate of lime, it produces much
It is only in this way that chloride o
can be useful to vegetation, unless,
experiment of Mr. Fincham's sugges
odour may be found to keep off the a
of the fly; for chloride of lime is cer
not a food, nor constituent part of veget

It is important not to confound ch
of lime with chloride of *calcium*, wh
a compound of chlorine and the m
basis of lime. The latter salt is a p
chemical compound; but the former
imperfect combination of chlorine and
and, as the lime has a greater affinit
carbonic acid than for chlorine, it a
the former and evolves the latter when
exposed to the air.

Davy investigated the fertilising, or
stimulating properties of chlorine,
made no experiment on its comp
what he did he did well; yet in this
he stopped short at the very threshold
investigation. But he shall tell his
story:—"There are several chemical
strua," says this great chemist, "which
der the process of germination more
when the seeds have been steeped in
As in these cases the seed leaves are q
produced, and more speedily perform
functions, I proposed it as a subject

periment, to examine whether such menstrua might not be useful in raising the turnip more speedily to that state in which it would be secure from the fly; but the result proved that the practice was inadmissible; for seeds so treated, though they germinated much quicker, did not produce healthy plants, and often died soon after sprouting. I steeped radish seeds, in September, 1807, for twelve hours in a solution of chlorine, and similar seeds in very diluted nitric acid, and in very diluted sulphuric acid (oil of vitriol), in weak solution of ox-sulphate of iron (green vitriol), and some in common water. The seeds in solutions of chlorine and ox-sulphate of iron threw out the germ in two days, those in nitric acid in three days, in sulphuric acid in five, and those in water in five. But in every case of premature germination, though the plume was very vigorous for a short time, yet it became at the end of a fortnight weak and sickly, and at that period less vigorous in its growth than the sprouts which had been naturally developed, so that there can be scarcely any useful application of these experiments. Too rapid growth and premature decay seem invariably connected in organised structures, and it is only by following the slow operations of natural causes that we are capable of making improvements. (*Agric. Chem.* p. 217.)

Chloride of lime is prepared in large quantities for the service of the bleachers in most of the manufacturing districts. It is composed, according to the analysis of Dr. Marcet, of

			Parts.
Chlorine	-	-	63·23
Lime	-	-	36·77
			100

Dr. Ingenhousz, in a paper published by the Board of Agriculture in 1816, remarks, in alluding to some experiments he had tried at Hertford in company with the Baron Dimsdale with various salts, — "Be it sufficient to say here, that of all the neutral salts we tried, the glauber salt did seem to be one of the best in promoting vegetation; and the steeping the seeds in water, impregnated with oxygenated marine salt (which is now employed in bleaching linen in an expeditious way), had a particularly beneficial effect in producing vigorous and healthy plants. We were somewhat astonished at those seeds, viz. of wheat, rye, barley, and oats, which had been steeped in the above mentioned oxygenated muriatic liquid, and during forty-eight hours, did thrive admirably well; whereas, the same seeds steeped during so long a time, in some of the other medicated liquids, were much [illegible], or had lost their vegetative power. The same oxygenated liquid poured upon the ground had also a beneficial effect." These experiments of Ingenhouz were made, it appears, in 1795. See SALTS, their uses to vegetation. (*Brit. Farm. Mag.* vol. ii. p. 258.; "On Fertilisers," p. 366.)

CHOCCY. A vulgar term used provincially to signify chalky, or resembling chalk.

CHOLIC, or COLIC. See HORSES, CATTLE, SHEEP, DISEASES OF.

CHOPPER, HAY. See CHAFF-ENGINES. A new and very efficient straw-cutter under the title of the "Canadian Straw and Haychopper," is figured and described in the *Trans. High. Soc.* vol. vi. p. 336. One person driving the machine can, it is said, cut with ease 5 cwt. of hay or straw in an hour.

CHOUGH, or RED LEGGED CROW. (*Fregilus graculus.*) The plumage of this British bird is uniformly black, glossed with blue; beak, legs, and toes, vermilion red; claws, black. In the family of the crows the males are larger than the females; in this species the male measures almost seventeen inches in length, female about fourteen inches. Food, insects and berries, occasionally grain. Nest of sticks, lined with wool and hair, in the cavities of high cliffs, old castles, or church towers, near the sea. Eggs, four or five, yellowish white, spotted with ash-grey and light brown; one inch eight lines by one inch one line in breadth. (*Yarrell's Brit. Birds*, vol. ii. p. 56.)

CHRISTOPHER, HERB-. See BANEBERRIES.

CHRONIC COUGH. In horses, this is a frequent consequence of chest diseases. In a few instances this seems to be connected with worms; and if the coat is unthrifty, the flanks tucked up, and there is mucus around the anus, it will be proper to put the connexion between the worms and the cough to the test; otherwise a sedative medicine may suffice to allay the irritation. (*Clater's Far.* p. 123.)

CHRYSANTHEMUM, INDIAN. (*Chrysanthemum indicum.*) A native of China and India and a perennial, growing three feet high, blowing its purple, yellow, and white flowers in November and December. It loves a rich soil, and must be removed every two years. Propagate by dividing the roots, and by cuttings. The garden *Chrysanthemum coronarium* is an annual, blowing yellow or white flowers in July, August, and September. Sow the seed where it is to grow.

CHUB, or CHEVEN. (*Leuciscus cephalus.*) A powerful fish belonging to the *Cyprinidæ*, common in our English rivers, and which takes its name from the size of its head. The scales are large; the colour of the upper parts dusky green; of the sides and belly silvery white. In summer, chub will rise to almost any kind of fly and beetle; in autumn, it will take gentles and paste; in winter, bullock's brains, pith, greaves, &c. Fly-fishing for chub may be pursued from May till August; the humble bee, palmer, black caterpillar-fly, and large blow-fly are good killing baits in the summer months. Chub sometimes reach to the size of 8 or 9 lbs. weight on the Continent; but with us 3 lbs. is considered a fine fish. Spawns in April. (*Blaine's Ency. of Rur. Sports*, p. 1054.)

CHURCHWARDENS. (From Sax. ƿeaꞃdian.) These, says the learned Dean Prideaux, are officers of the parish in ecclesiastical affairs, as the constables are in civil; and the main branches of their duty are to present what is presentable by the ecclesiastical laws of this realm, and repair the church. About the year 700, the Saxons, in large districts, founded churches for themselves and their tenants; and those were the original of parish churches. (*Seld. de Dec.* 259. c. 9. s. 4.) Within these districts other churches were afterwards erected, which in process of time obtained tithes, burials, and baptism, and thereby became parish churches. (*Ibid.* 262. c. 9. s. 4.) And, therefore, every church having burial, baptism, and tithes, is now esteemed a parish church. (*Ibid.* 265. c. 9. s. 4.) A church built within the precinct of a parish church, to which burial and sacraments belong, is a chapel of ease. (2 *Rol.* 340.) Churchwardens are lay persons, though ecclesiastical officers. (*Hardr.* 379.; 2 *Rol.* 71.; 1 *Salk.* 166.; 5 *Mod.* 326.; 1 *Lord Raym.* 138.) Their duties were originally confined to the care of the ecclesiastical property of the church. (1 *Haggard*, 173. *per* Lord Stowell.)

They are obliged twice every year, *i. e.* at the visitations of the bishop, archdeacon, or other ordinary, to make their presentments of all things that are amiss in their parishes; and may, if they think fit, do it oftener. And they are bound not only to observe who are absent from the church, but also to see that all do in time of divine service behave themselves orderly, soberly, and reverently (*Can.* 18. 111.); that none make any noise in the church to disturb the duty which is performing (*Ibid.*), or sit there with their hats on, or in any other indecent or irreverent manner. (1 *Eliz.* c. 2. s. 14.; *Can.* 18.)

The churchwardens are to take care that no stranger be admitted to preach in their church, of whom they are not well satisfied that he is in orders, and licensed to preach by the bishop of the diocese. (*Can.* 28.) And if any such disorder should be there committed against their will, or if the church be not in all other respects re
according to the good rule and
Church of England, such irreg
are to present; so that, when
ister offends in any of them, h
censures of the church, be
amended, or else, if incorrigibl
and another put in his place.
122. &c.)

The churchwardens were
sole overseers of the poor,
wholly on them, under the di
minister, to take care of all su
want in their parish, and pro
relief. But when the poor law
Eliz.) the overseers, which ar
appointed, have virtually su
church-wardens in this.
church-wardens are still by
law overseers of the poor in e

As to the repairs of the churc
yard, although they both are o
of the minister, whether he be r
(11 *H.* 4. c. 12.; 21 *H.* 7. c. 21.
Hobart, 69.), yet since the pari
the use of the body of the c
divine service, and of the ch
the burial of their dead, they
repair both. (*Can.* 85.; 2
653.) But the repair of the
lies upon the parson, whether
impropriator, or instituted re
489.; 2 *Rol. Rep.* p. 211.; *Deg*
Except in the city of Londo
immemorial custom, the parish
the chancel as well as the body o
which custom is also in the cit
and most other cities and la
England. The churchwarden
fore bound, in behalf of the p
care that the body of the ch
churchyard, the gates, stiles,
leading into the churchyard
ways leading to it be kept in
and repair.

As the soil and feed of the
the minister's, so also are the
therein; but he is not to cut
unless for the necessary repair
cel, or else that he shall thin
them to the parishioners for
the body of the church; but w
used to be topped, the toppi
the minister. (*Edw.* 1. stat. x

The churchwardens are to be
year in vestry, public notice
church doors being previously
ing to the 1 Vict. c. 45., alter
c. 69. s. 1. (unless where there
morial custom for another d
the time appointed, the mini
rishioners being met together,
wardens shall be chosen by the

it if they cannot agree, the canon
t the minister shall name one,
rishioners the other. (*Can.* 89.
where there hath been an imme-
m for the parishioners to choose
churchwardens, there the cus-
ke place of the canon, and they
ue to choose both still. (2 *Cro.*
551, 552.; *Noy.* 31. 139.; 2 *Rol.*
, p. i. c. 12.; *Gibs. Codex*, 242.)
or vicar, who has a right to
fix time and place for taking
or their adjournment, cannot
vestry, but the majority of the
may. (*Fort.* 168.; *Str.* 1045.;
ary, Lambeth, L.J. 1840.) Of
ht the parishioners shall choose
parson the other. (*Str.* 1246.;
2.) A curate stands in the place
n. (*Str.* 1246.; 2 *Vent.* 41.)
rsons are excused from bearing
a churchwarden, as all peers
; all clergymen in holy orders;
nt men, and all in the king's
dinary; all lawyers, attorneys,
Chancery, King's Bench, Com-
and Exchequer (2 *Rol. Abr.*
icians and chirurgeons in the
don and suburbs (by the stats.
, 32 H. 8. c. 40.); apothecaries
, 1 Ann. c. 11., 10 Ann. c. 14.);
s and teachers of dissenting con-
(1 W. & M. c. 18.); freemen of
ion of surgeons in London (18
; Roman Catholic ministers (31
8.); serjeants, corporals, drum-
militia, and private men (26 G. 3.
0.); all these persons being ex-
the office of churchwarden, are
osen unless they consent. Cer-
s, as *aliens, denizens, naturalised*
sons convicted of *felony, fraud,*
papists, and *Jews*, are absolutely
Excepting these, all are eligible,
erve the said office when legally
ut he must be an inhabitant of
for no out-setter, who occupieth
parish but dwells not or inhabits
pable of being chosen church-

ext visitation, after the choice
ardens by the bishop or other
he new churchwardens must
, according to the 5 & 6 W. 4.
make a declaration that he will
d diligently fulfil the duties of
And as the churchwarden has
the church and its repairs, so he
payment for the same; and he
nber that there is a doubt if he
a rate for expenses already in-
for necessary repairs and within

According to the ecclesiastical law, the laying of the church-rate ought to be according to the lands and the stock which the parishioners have within the parish; so say John of Athon and Lindwood, the best of our English canonists. But this is not to be understood, as if any one were to be layed for both land and stock. They who make the rate may lay him according to either of the two, and even for the best of them, but not for both. But the general usage now is, to make a rate according to the value of the lands. However, this rate is only a personal, not a real charge; for it is not laid upon the lands, but only upon the persons in respect of the lands which they occupy within the parish; and for this reason, the farmer or occupier, not the landlord, is to pay the same (5 *Co.* p. 67.). A mandamus will not lie to compel the churchwardens to make a rate (*Rex* v. *Wilson*, 5 D. & R. 602.), because it is a subject of ecclesiastical jurisdiction (*Rex* v. *Thetford*, 5 T.R. 364.). But if the churchwardens, for necessary repairs, summon the parishioners to make a rate, and they having refused or neglected to meet, or having met refuse to grant a rate, then there is little doubt (though the last question is now, 1841, in dispute) that the churchwardens may make and enforce the payment of a rate by their own authority. (*Gaudern* v. *Selby; Veley* v. *Burder; Johnson's Report of the Braintree Church-rate case.*)

Churchwardens have the care of all the seats in the church, and likewise to repair them, and see that good order be preserved in them, and no disturbance or contention be made therein, but that every man regularly take that seat and that place in it which he hath a right to whether it be by prescription, or that he hath been placed there by the order of the bishop or by themselves.

A right to a pew in a church can only exist by faculty or by prescription. (*Morgan* v. *Curtis*, 3 M. & R. 389.) A pew in the body of the church may be prescribed for as appurtenant to a house out of the parish (*Lousely* v. *Hayward*, 1 Y. & J. 583.); but a non-parishioner, whether extra-parochial, or residing in another parish, can have no right to a pew in the body of a parish church, except by prescription. (*Byerley* v. *Windus*, 7 D. & R. 564.) As to all other seats in the body of the church, which are repaired at the charges of the parish, they are in the disposal of the churchwardens, with the advice of the minister, but still in subordination to the bishop who hath the primary right of disposing and ordering of this matter in every church of his diocese. But although the freehold of the church and churchyard be in the minister, yet as he can hinder no parishioner from having a place in the body of the church for the hearing of divine service, so neither can he hinder any such from having a place in the churchyard for the burial of his dead. For as the one is a common hearing-place for the living, so the other is a common burying-place for the dead. But as to the burials in the church, no one can be buried there without the leave of him that hath the freehold, that is, not in the body of the church without the leave of the minister, whether vicar or instituted rector, and not in the chancel without the leave of the parson, whether appropriator, impropriator, or instituted rector. At the Easter visitation, the churchwardens must take care to make their presentments before the new churchwardens are sworn. (*Can.* 118.) And on their being discharged, they should within a month after, make their account; in order whereto they must give notice in writing, affixed to the church door the Sunday before, for a parish-meeting; at which meeting the churchwardens having produed the rates which they have made, must give an account how they have expended the sums levied by them. (*Prideaux's Office of Churchwardens; Degge's Parson's Councillor; Watson's Complete Incumbent.*)

CHURN. (Sax. cernan; Goth. *herna*; Dutch, *hernen*. Our old authors wrote it *cherne*, and *kern* is yet a local word, and generally used north of the Tweed.) A vessel in which cream is coagulated by long and violent agitation. There are many different kinds of churns, but those most generally used are the upright or Dutch plunge churn and the barrel-churn. In large dairies, churns are frequently turned by means of a horse: this is particularly the case in Flanders, where churns are used which will make forty or fifty pounds of butter at a time. In the large dairies of Cheshire they are now often driven by small high pressure steam-engines. On such farms as have thrashing-mills, churns might be very conveniently attached to and wrought by them. An improved butter-churn by Mr. C. Harley of Fenchurch-street, and another by Mr. W. Bowler, to which the Society for the Improvement of the Arts, &c. awarded a prize of thirty guineas, are described in *Willich's Domestic Encyc.* The following patents for improvements on churns have been taken out: — Aug. 8. 1777, J. Rastuck, a barrel-churn. July 28. 1792, — March, horizontal churn. Nov. 10. 1796, W. Kaley, a butter-churn. May 9. 1807, James Watts, Ormskirk, a butter-churn.

CIBOULE, or WELSH ONION. See ONION.

CICADA. See GRASSHOPPER.

CICHES. (*Cicer.*) This is a sm
plant, sown for its fruit, which is
pea-kind. The flowers and leaves r
the pea, but the leaves and stalks a
The pods are downy, short, and th
containing above one or two seeds e

CICELY, SWEET. (Lat. *Myrrh*
rata; from *myron*, perfume; or myr
of plant.) A perennial, found in m
pastures, flowering in May. Formerl
was used in a variety of ways, but it
appeared from our tables a long tim
Any common soil suits it, and it is
increased by seeds, or dividing at th
(*Paxton's Bot. Dict.*) The young
have the flavour of anise, and are
fully stomachic. Smith enumerate
other species of these perennial herbs,
are noted for their aromatic, pung
sweet flavour. (*English Flora*,
p. 50.)

CIDER, or CYDER. (Fr. *cidre*
zider; Ital. *cidro*; Russ. *sidor*; Span.
A sharp and vinous beverage made
menting the juice of apples. It is a
pleasant, and wholesome liquor dur
heat of summer, if it has been p
without foreign ingredients and p
fermented. Cider was formerly su
heavy duties; but the latest impos
of 10*s*. per barrel was repealed in
Somerset, Hereford, and Devonshire
principal cider counties of England.
good quality is also made in Ireland
counties of Waterford and Cork. Th
will find very explicit instructions
manufacture of cider in the *Penny*
vol. vii. p. 161.; in the *Lib. of Useful*
Brit. Husb. vol. ii. p. 364.; *Low's*
Agr. p. 379.; Crocker, *On the Art of*
and managing Cyder; in the *Quart. J*
Agr. vol. viii. p. 332., by Mr. Tower
in *Baxter's Agr. Lib.* p. 125.; by
Crosse, Esq. of Somerset. My sp
only allow me to give the following
tions for making it by a Devonshire

Gather the fruit when ripe; let it
in a heap until the apples begin to ge
then grind them in a mill (similar t
mill); take the pulp and put it into
press, like a cheese-press, only on
larger scale; place a layer of reed
bottom of the vat, and a layer
alternately, until the vat is full. Th
square, and the ends of the reed
allowed to turn over every layer of
as to keep it from being pressed ou
sides: the layers of pulp must be
six inches thick. When you have
making your cheese, press it as hard
can, and let it remain three or four
then cut down the corners of it,

a on the top, with reed, as before; then it again, and allow it to remain for her three or four hours. Repeat this ess as long as necessary, or until the e is quite dry. It takes seven bags of s for one hogshead of cider, and the vat t to be large enough to make from three ur hogsheads at a time. The best sort of to make mild cider is the hard bitter- t. Any sort of sour apple will do to the harsh cider. The liquor must trained through a fine sieve into a large l, and allowed to ferment for three or days, taking off the scum as it rises; rack it, and put it into casks stopped quite close. Before the cider is put the cask, a match made of new linen ttached to a wire is lighted and put in- cask, and the bung is put in to keep ire from falling into it. After a few es the match is removed, and the cider d into the cask, while yet full of the e.

person would require three or four experience before he would be quali- o superintend the making of sweet or cider. Much depends on the year, or on the ripening of the apples; it d be the *second*, not the *first falling*; the "green bitter-sweet" and the ket apple" are the best for making it. pounding, isinglass and brimstone are to sweeten and fine it, and many other ients. (*A. M. K.*)

e sweet *cider*, above described, is dis- from the other two kinds of cider (the and mild). Cider, according to Brande, ins about 9·87 parts per cent. of alcohol. a wholesome beverage for those who much bodily exercise. (*Willich's Dom. c.; M'Culloch's Com. Dict.*)

NERARIA. See Fleawort.

NQUE-FOIL, COMMON CREEP- , or FIVE FINGERED GRASS. *ntilla reptans.*) This creeping plant mon about way-sides and in meadows pastures. It is a perennial, flowering in . Its stalks are round, smooth, and lying upon the ground, and taking at the joints. The leaves stand five in her on each foot-stalk, long and narrow rm, and indented at the edges. The ers are large, of a bright yellow colour, ding upon long foot-stalks. The root is and large, covered with a brown rind. th (*Eng. Flora*, vol. ii. p. 423.) describes and ten other species of cinque-foil, all nging to the same genus. The root is medicinal part, and once was an officinal t; but is now discarded: dig it up in il, take off the outer bark or rind, and it. The powdered bark *of the root is* ringent.

CINQUE-FOIL, PURPLE MARSH. (*Comarium palustre.*) A perennial, found in spongy muddy bogs and ditches. Root, creeping extensively, with many long fibres. Stems, round, reddish, a foot or more in height. Flowers, several, without scent, but handsome, an inch broad, all over of a dark purplish blood colour, as well as the fruit. They appear in June. (*Smith's Eng. Flora*, vol. ii. p. 433.)

CIRL BUNTING. (*Emberiza cirlus.*) In habit resembles the yellow bunting; builds in furze or some low bush; nest, of dry stalks with a little moss, and lined with long hair and fibrous roots. Eggs, four or five, dull white, tinged with blue, streaked and speckled with dark liver-brown; length, ten lines by eight lines in breadth. Food, insects and berries. Whole length, six inches and a half. General colour of plumage, rich chestnut-brown, shaded with black. (*Yarrell's Brit. Birds*, vol. i. p. 448.)

CISTERN. (Lat. *cisterna*, from Greek, *κίστη*.) A reservoir of, or receptacle for, water for public or domestic use; when made of brick or stone, it is commonly called a tank.

CISTUS. A beautiful genus of plants, varying in height from one to four feet. They are considered hardy, but there are some of them that require protection in winter, either in a green-house or a cold frame, although most of the species will pass the winter in the open air if the weather be not severe; it is the best plan to keep some of all the sorts in pots, that they may be more easily protected from severe weather, in spring they may be turned out in the borders, where they will flower freely. They do well in common soil, and are increased by layers or ripened cuttings, placed under a glass; or by seeds. (*Paxton's Bot. Dict.*) Smith describes seven species of native cistus. (*Eng. Flora*, vol. iii. p. 22.) The rock-rose (*Cistus laurifolia*) grows six feet high, a native of Spain; blows a large white flower in June and July. The gum cistus (*Cistus ladaniferus*) blows beautiful white flowers with violet spots in the centre, in June and July; loves a sheltered situation and good soil; propagated by cuttings, and by seed sown in pots.

CITRIC ACIDS. See Acids, vegetable.

CLARY, or SAGE (*Salvia*). Smith (*Eng. Flora*, vol. i. p. 34.) describes two kinds, the meadow clary (*S. pratensis*), and wild English clary (*S. verbenaca*). The first is very uncommon, but sometimes met with in dry meadows and about hedges; grows three feet high, erect; not very aromatic; leaves, dark green; flowers, large and handsome, of a fine purplish blue. The second species is more common on gravelly or chalky soils, a foot or eighteen inches high;

leaves, greyish green; flowers, small, violet-blue. Seeds black, smooth; blows from June to October. This plant is of great virtue, and is kept in gardens on account of its excellent flavour as a wine. The whole herb is medicinal, and is equally good, freshly gathered or dried. It is cordial and astringent in its quality.

CLASPERS. The threads or tendrils of creeping plants.

CLAYING OF LAND. See MIXTURE OF SOILS.

CLAY-KILN. A stove for burning clay. There are two modes commonly employed, one by kilns partly constructed of masonry, and the other of sods; in both of which the earth is piled upon them, instead of being placed under cover, as in a lime-kiln in Suffolk, where it is called *clod-burning*. (*Brit. Husb.* vol. i. p. 369. 375.) See ASHES.

CLEANING. A term applied to the secundines of the cow, ewe, &c.

CLEARING. A term applied, in thrashing corn, to a heap large enough to be winnowed. *Clearing of land* is the means of removing such obstacles and impediments as prevent or retard its cultivation.

CLEAS. A provincial word, applied to the claws of cattle, sheep, &c.

CLEAVERS, or GOOSE-GRASS. See HARIFF.

CLEDGY. A term applied to such sorts of land as are stiff, stubborn, hard, and tenacious, or mixed with clay.

CLEFTS. In farriery, a disease in the heels of horses. (See CRACKS IN HEELS.)

CLEMATIS, VIRGIN'S BOWER. (*Clematis viticella.*) A hardy climber, suited to trellis-work, and propagated by layers. It blows a bluish purple flower in July and August. Multiply by parting its roots, and from seed. It flourishes in any soil.

Clematis vitalba. Common Traveller's Joy: is an indigenous shrub, found in hedges, chiefly on calcareous soils. It is a climber, using the footstalks of the leaves as supports. The leaves consist of five leaflets, stalked and heart-shaped; the flowers are white, and have the odour of the almond or peach blossom.

CLETCH. The country name for a young brood of chickens, &c.

CLEVELAND BAYS. See CART HORSES.

CLEVVY. A provincial word applied to the draft-iron of a plough.

CLICKING. An unpleasant noise known also by the term "overreach," which arises from the toe of the hind-foot of a horse knocking against the shoe of the fore-foot. If the animal is young, the action of the horse may be materially improved; otherwise, nothing can be done.

CLIDERS. A weed. See HARIF

CLIMATURE. A word sometim
ployed in much the same way as c
It is a term made use of by some a
tural writers.

CLIP. A provincial word used
nify shearing sheep. It also mea
produce of wool. See SHEEP-SHEAR

CLOCKS. A country term appl
beetles of all sorts.

CLOCK-SEAVES. A provincial
for the black-headed bog rush.

CLOD-CRUSHER. See ROLLER.

CLODDY. A provincial word ap
to cattle, when thick, short, or full of

CLOG. A provincial term, some
applied to a log of wood.

CLOG SHOES. The country nam
wooden shoes.

CLOSE TEAP. A name some
provincially given to a ram or male s
which has both the testicles within
barrel.

CLOTBUR. See COMMON BURDO

CLOTE. A provincial name fo
weed colt's-foot.

CLOTHIER'S TEASEL. See TE

CLOTHING. In horsemanship,
practice of covering the animals with c
with the view of keeping them healthy
giving a fine coat.

CLOTTED or CLOUTED CRE
See BUTTER.

CLOUDBERRY (*Rubus chamæm*
The mountain bramble, found on turf
pine bogs; stem, without prickles,
flowered. It flowers in June.
large, tawny, agreeably acid, and muc
nous, with the flavour of tamarinds.
BRAMBLE. (*Smith's Eng. Flora*, vol.
412.)

CLOUGH. A valley between two
hills. It also sometimes signifies a cl

CLOUT. An iron plate put on the
tree of a cart or other carriage.

CLOVER. One of the most va
species of the artificial grasses, of
there are several varieties, all too well
to need a particular description. 1.
clover, white trefoil, or Dutch
(*Trifolium repens*), growing on alm
soils and situations. 2. Perennial red
(*T. pratense perenne*); is found wil
Wainfleet, and in other rich natural E
pastures. 3. Marl clover, cow gras
medium); when in flower it yielded S
per acre, from a rich black loam, 20,41
of nutritive matter, 717 lbs. 4. Long
clover (*T. macrohizum*); a rich
loam yielded of this grass when flo
74,868 lbs.; of nutritive matter, 2,924
Crimson clover (*T. incarnatum*). 6.
tian clover (*T. alexandrinum*); see

. of *Agr.* vol. ii. p. 729. These
es contain the phosphate and sulphate
ne; hence peat, wood ashes, and gyp-
(see these heads), are found to be
ent dressings for this crop, and have
any cases succeeded in renovating
-sick lands. (*Sinclair's Hort. Gram.*;
erly *Journal of Agriculture*, vol. xi.
. "On turning the second Crop of
t;" *Com. to Board of Agriculture*,
. p. 197.; *Davy*.)

UB GRASS. (*Corynephorus.*) An
resting species of grass, requiring
o be sown in common soil. The last
lation of the jointed beard is club-
d, whence its name.

UB MOSS. (*Lycopodium*, from λύκος
, and ποῦς a foot, because of the resem-
of the roots.) This moss grows abun-
on mountainous heaths or stony moors;
of the species, which are numerous
to a foot high, in watery, heathy,
ainous situations. The seeds are often
inflammable, like powdered sulphur.
ardy species of club moss require to
tivated in peat soil, in a moist situ-
some of them succeed in pots of water.
are readily increased by suckers.
k's *Eng. Flora*, vol. iv. p. 330.;
s's *Bot. Dict.* p. 193.)

UB RUSH. See Scirpus.

UMP. (Ger. *klump.*) A number of
or trees growing together.

UNG. (Sax. clunᵹu.) A provincial
signifying closed up or stopped. Ash
er is sometimes so much clung, that it
t be split into hoops.

USTER. (Sax. cluſteꞃ; Dutch,
r.) A bunch, or a number of things of
me kind growing or joined together.
clusters is provincially used to imply
bunches or clumps in turnip-crops,
In Botany, a cluster is termed *ra-*

USTER-GRAPE. The small black
rrant grape. See Vine.

USTER-SOWING. That method of
g grain, in which a number of corns
laced together.

LYDESDALE HORSES. See Horses.

LYSTER. See Glyster.

OAGULATION. (Lat. *coagulatio.*) A
signifying that chemical change which
s place when a fluid, or some part of it,
ndered more or less solid.

OAGULUM. A term applied to the
led concretion formed by the mixture
wo liquors. It sometimes also means
t.

OB. A kind of wicker basket, made
to be carried on the arm. Hence a
cob, or seed-lip, is a basket for sowing
Cob was formerly the name for a spider, hence we have cobweb. Cob is also applied provincially to a round sort of stone, to a mud wall, and sometimes to a particular kind of horse.

COBBLE. A provincial term for a round sort of stone found in the fields. It also signifies a small kind of fishing-boat.

COBBLE-TREES. A sort of double swingle-trees, whippins, or splinter-bars.

COBEA, CLIMBING. (*Cobæa scandens.*) A shrub from Mexico, about as hardy as the passion flower, blowing large handsome flowers of a pale yellow, which afterwards become purple or violet-coloured in August and September. A great climber, running forty yards in length. Protect it from frost, but it is easily renewed by cuttings and by seed every year. It loves good garden soil.

COB-LOAF. A crusty uneven loaf.

COBS. A provincial term for sea-gulls.

COCCIFEROUS PLANTS. (From κοκκὸς, and *fero* to bear.) Such plants or trees as afford nutrition to, and a habitation for, the insect called a coccus.

COCK. (Sax. coec; Fr. *coq.*) The male of the hen kind, or of many sorts of birds. Cock is also sometimes applied to a particular kind of draft-iron for a plough.

COCKCHAFER. (*Melolontha vulgaris.*) One of the common names for a species of tree beetle, whose food consists almost entirely of leaves. They come rather late in the vernal season, about May 20., but occasionally appear at uncertain intervals in amazing swarms. White says, they abound only once in three years. They are also known by the provincial names of May-bug, dor, and dummador. Cockchafers are sometimes used as baits in angling. The larva or grub of the common cockchafer is one of the great ravagers of our meadows and grass lands. It remains in the grub state for four years. "It undermines," says Kirby, "the richest meadows, and so loosens the turf, that it will roll up as if cut with a turfing spade. These grubs did so much injury seventy years ago to a poor farmer near Norwich, that the court of that city, out of compassion, allowed him 25*l*., and the man and his servant gathered eighty bushels of the beetles. The damage done by them in 1785 was so great in France, that the government offered a reward for the best mode of eradicating them." The rooks are great friends to the farmer in distroying this grub, to procure which they follow the plough. (*Kirby and Spence's Introd. to Entomology*, vol. i. p. 180.)

COCKEY. A provincial word applied to the grate over a sewer.

COCK-FIGHTING. A very old and

barbarous common pastime and amusement, which is happily growing into disuse in civilised England, and becoming superseded by more manly and noble sports.

COCKLE, CORN, or CORN CAMPION. (Sax. coccel; Lat. *Agrostemma githago.*) A well known troublesome annual weed, of rather an ornamental appearance, growing in our corn-fields in summer, bearing purplish red flowers. It stands two feet and a half high, the stalk firm, hairy, slender, and round, with one large flower upon each top. The leaves stand two at a joint, long, narrow, and of a bright green colour. The flowers stand in a cup composed of linear hairy sepals, which are longer than the corolla. The seeds, which are numerous, are black and rough, and nearly as big as small wheat kernels; they are filled with white flour, and very heavy. The miller's objection to these seeds is, that their black husks break so fine as to pass the boulters, and render the flour specky; also because the seed is bulky, and if there be much in the sample, it detracts considerably from the produce in flour. Being easily distinguished, this weed should be eradicated from the field by the hand before flowering. (*Smith's Eng. Flora*, vol. ii. p. 325.; *Sinclair's Weeds*, p. 9.; *Elements of Agriculture*, 441.; *Willich's Dom. Encyc.*)

COCKLETS. A term sometimes applied to small heaps of hay, &c.

COCKEREL. The name in some places for a young cock.

COCK'S-FOOT GRASS (*Dactylis glomerata.*) A species of grass, which, from the experiments of Sinclair, appears to become by cultivation superior to rye grass and some others as a pasture grass, if kept closely cropped by cattle or the scythe; and also when made into hay. Oxen, horses, and sheep eat it readily. It flowers from June till August, and perfects its seed in July. The produce of herbage per acre, at the time of flowering, is 27,905 lbs., which affords of hay 11,859 lbs., and the proportion of nutritive matter is 1089 lbs. The produce is something less when the seed is ripe, and it loses about one half its weight in drying. (*Sinclair's Hort. Gram.* p. 136.; *Smith's Eng. Flora*, vol. i. p. 134.)

COCK'S-HEAD. See SAINTFOIN.

COCK-SPUR. A common name for the Virginian hawthorn; a species of medlar. See HAWTHORN.

COCOON. The fibrous web round a chrysalis.

COD. A term used sometimes for pod.

CODLIN. A well known kind of baking apple. See MALUS.

CODLINGS AND CRE
the local names of the great
herb. (*Epilobium hirsutum.*)
HERB.

COFFIN-BONE. In farr
which lies encircled within a
in a coffin.

COLCHICUM. (*Colchic*
Common meadow saffron. A
up a reddish purple flower
in September and October:
four inches high: found in m
dows, but not common. It
gated from offsets in July.
the plant contains an alka
named *Colchicia*, which is
purgative as well as narcotic.
matter is extracted by wi
wine, and vinegar. A tinctu
or of the seeds of colchicu
of twenty to thirty drops
has been found very useful
rheumatism. It has been
taken without medical advi
mischief has resulted. In an
chicum is a virulent poison.
Flora, vol. ii. p. 202.)

COLD. (Sax. colꝺ; Dan
CATARRH, and DISEASES OF C
&c.

COLDER. A term used
signify fodder from thrashe
STOVER.

COLE, or COLESEED.
Welsh, *cawl;* Lat. *Brassica na*
of the cabbage genus, much cu
east of England; it is sown f
of July to the end of Aug
autumn sheep-feed, or for
very rich in oil) for the follo
The ashes of the burnt straw
excellent dressing for clover.
vol. ii. p. 312.)

COLE TIT. (*Parus at*
woods, plantations, and shrub
larly those containing the v
birch, or oak. Food, small ins
of evergreens. Nest, built
wool lined with hair, in the
or a tree, occasionally on the
six or eight; white, spotted
seven lines in length by fi
in breadth; whole length
inches and a quarter. Gen
plumage, black tinged with
breast, dull white. (*Yarrell*
vol. i. p. 337.)

COLEWORT. See CABB

COLIN, THE VIRGIN
virginiana.) This bird has be
into this country from the
and is a species of partridge.
borders of woods, among bru

k grassy plains. Food, grain, seed, and berries. Eggs, numerous, as twelve; white; one inch two lines lf in length by one inch in breadth larger end, thence tapering to a olour, mottled, reddish and greyish breast and belly, buffy white, with se bars of black; legs and claws, brown; whole length of bird rather an nine inches. (*Yarrell's Brit.* ol. ii. p. 348.)

LAR. (Span. *collar;* Lat. *collare.*) t of the harness of a horse or other hat goes round his neck and rests houlders. For horses they are nade of canvas, &c. stuffed with , or straw, and covered with

EY, or COLLY. A kind of dog ized by the Scottish drovers. See EPHERD'S.

EY SHEEP. A name for sheep e black faces and legs. The wool sheep is generally very harsh, airs mixed with it.

ING, ROBERT and CHARLES. ebrated farmers of the county of who, by their skill, enterprise, lic spirit, not only secured for es the plaudits of after generations rs, but did honour to their country improvement which they effected rham breed of short-horns, perhaps celebrated of all our modern breeds It is not in my power to give any ith regard to their private history; lic efforts is all in which my readers nterested. The following account of their stock, and the enormous which it produced, will afford a er view of their success as breeders eulogium of mine.

Colling, of Ketton, near Darling- a very ample fortune. The prices d for his stock could hardly indeed l to have produced such a result: s sale of improved short-horns, 810, the following were some of obtained: —

	Age.		Guineas.
	11	-	- 83
	5	-	- 170
ss	9	-	- 400
	5	-	- 200
	14	-	- 206
	3	-	- 410

	6	-	- 1000
	9	-	- 200
ch	2	-	- 365
	1	-	- 110
	1	-	- 105

Bull calves under one year old.			Guineas.
Young Favourite	-	-	140
Geerse	-	-	130
Sir Dimple	-	-	90
Cecil	-	-	170

Heifers.	Age.		
Phœbe	3	-	105
Young Duchess	2	-	183
Young Countess	2	-	206
Lucy	2	-	132
Charlotte	1	-	132

Heifer calves under one year old.			Guineas.
Lucilla	-	-	106
Calista	-	-	50
White Rose	-	-	75

Altogether it appears that —

		£	s.
17 cows sold for	-	2802	9
11 bulls	-	2361	9
7 bull calves	-	687	15
7 heifers	-	942	18
5 heifer calves	-	321	6
47 lots	-	7115	17

Robert Colling's stock was sold at Barmpton, near Darlington, September 29. 1818, when it produced for —

		Guineas.
34 cows	-	4141
17 heifers	-	1287
6 bulls	-	1343
4 bull calves	-	713
61 head of cattle	-	7484

	Guineas.
One 2 year old cow sold for	331
One 4 — —	300
One 5 — —	370
One 1 — bull calf	270
One 4 — bull —	621

(*Youatt on Cattle*, p. 231—233.)

Charles Colling, after his retirement from business, resided at Croft, in the North Riding of Yorkshire, where he died January 16. 1836, aged 85. Robert Colling died in his 70th year, at Barmpton, near Darlington, March 7. 1820.

COLLINSIA BICOLOR. Two-coloured Collinsia. A new and handsome annual, which blooms in May and June, if sown in the autumn; and in August and September, if sown in May.

COLT. (Sax. colt.) A term applied to young horses. See HORSES.

COLT-EVIL. In farriery, a distemper to which young horses are subject, consisting of a swelling in the sheath.

COLTS-FOOT, COMMON. (*Tussilago farfara.*) This is a herb of peculiar growth, found very common on a chalky or marly soil, in moist situations. It is mostly found in fields that are over-cropped or exhausted, and often severely exercises the patience of the farmer. It may be eradicated by ploughing up the soil, carrying the plant away when rooted out, and laying the fields down to grass. The flowers rise in spring on stalks six or eight inches high, round, large, and yellow, like the dandelion; their stalks being thick, fleshy, scaly, and red coloured. Each stalk supports one flower. When the flowers have decayed, then the leaves appear on erect furrowed footstalks, broad and cordate, lobed and toothed, resembling the form of a horse's foot, whence the name. They are green above, and white and downy underneath. The leaves are used medicinally, and they dry well. A decoction of the leaves and roots, or a syrup of the juice, is useful in coughs, whence the generic name. The ancients inhaled the smoke for the relief of coughs.

COLTS-FOOT, THE GARDEN. (*Cacalia suaveolens.*) This is a hardy perennial, bearing white flowers in August. It prefers a strong soil and open situation. Propagate by parting the roots. It is a native of North America. There are five sorts of hardy Cacalia.

COLUMBINE. (*Aquilegia vulgaris.*) A perennial growing two or three feet high, blowing a blue, red, or variegated flower in June and July. It is found wild in meadows, pastures, and thickets. It is the double varieties which find a place in our gardens. (*Smith's Eng. Flora*, vol. iii. p. 32.) Give it shade and a stiff soil. Propagate by separating the roots in autumn. The seeds are contained in a hairy capsule.

COMFREY, COMMON. (*Symphytum officinale.*) This wild plant grows by the sides of ditches and in moist places to a height of three feet. The leaves are a deep green colour, pointed, long, and rough to the touch. The stalk is green, thick, and upright, and winged at the bases of the leaves. The flowers are sometimes white, and often reddish, in colour. The root is thick, black externally, and white within. It is full of a slimy juice when crushed or broken. The root is the part used medicinally. It contains much mucilage, and may be used as a demulcent, but it is of little value. For those who think otherwise, conserve of comfrey is the best way of preserving it through the year. The tuberous-rooted comfrey (*S. tuberosum*) is a herb of much humbler stature than the last-named root; knobbed and branched; externally whitish; flowers fewer, drooping, yellowish-white, tinged with green. (*Smith's Eng. Flora*, vol. i. p. 263.) The prickly comfrey (*S. asperrimum*) is a hardy perennial of gigantic growth, introduc
Caucasus as an ornamental plant, i
by Messrs. Loddiges, of Hackney
Curtis's Bot. Mag. No. 929.) The a
of the agriculturist has recently b
rected to the cultivation of comfrey
food for cattle, by Mr. Grant, of Le
who speaks highly of its merits. (
Agr. Lib.)

COMINS. A provincial word sig
commonage.

COMMON, or RIGHT OF CO
says Blackstone (vol. ii. p. 32.), is
which a man hath in the land of an
to feed his beasts, to catch fish, to d
to cut wood; and hence common is
of four sorts: 1. Common of past
the right of feeding beasts; 2. C
of fishery; 3. Common of turbary
digging turf; 4. Common of estovers
of cutting wood. The right of con
generally one that rests almost entire
the custom.

COMPOSITION FOR TREE
CANKER.

COMPOST. (Fr.; Lat. *comp*
That sort of manure which is formed
union or mixture of one or more d
ingredients with dung, or other
matter. An excellent essay, by Mr.
Dixon, on making compost heaps from
and other substances, written on t
dence of many years' experience, was
ed a premium of 10*l.* in July 1839,
Royal Agr. Soc. of England, and is pu
in their *Quart. Journ.* vol. i. p. 135. S
FARM-YARD MANURE.

CONDITION. (Fr. and Lat.) In
manship, a term supposed to imply a
being in a state of strength and po
much above the purpose he is desti
that he displays it in his figure and a
ance: this, according to Taplin, s
"fine in coat, firm in flesh, high in
and fresh upon his legs."

CONIFEROUS PLANTS AND T
Such plants and trees as bear cones;
fir, pine, cedar, &c.

CONSERVATORY. (Lat.) A
structure in which exotic trees and
are grown in a bed or floor of soil.
distinguished from an orangery by its
a glazed roof, while that of the la
opaque, and from a green house
plants being set in the fine soil
of in pots placed on shelves. The
conservatory in the world at the
time (close of 1841), is that erec
Chatsworth, in Derbyshire, for pal
other tropical plants, which covers ab
acre of ground, and is sixty feet
(*Brande's Dict. of Science and Art.*)

CONSTABLE. This is a Saxon

om *conig*, king, and *staple*, or the
d of the king. According to Coke,
were created by the 13 Ed. 1. st. 2.
eing created by act of parliament,
no more authority than what they
n some act of parliament (4 *Inst.*
former days, both high and petty
were appointed by the sheriff in
and were sworn there, as well as
t leet. By the common right a
s to be chosen by the jury in the
he is present and refuses to be
steward may fine him; if he is
may be sworn before a justice of
and if he refuses to be so sworn
ust present him at the next court,
e shall be fined. (1 *Salkeld*, 175.)
2 W. 4. c. 41. two or more jus-
information on oath that dis-
exist or are apprehended, may
sufficient number of special con-
The office of constable may be
by deputy (*Rex* v. *Clarke*,
9.), and it can only be imposed
son actually resident within the
v. *Adlard*, 7 D. & R. 340.), and
foreigner, even if he is natural-
v. *Ferdinand*, 5 Burroughs, 2787.).
son chosen finds a deputy, who
sworn in absconds, the principal
eless discharged. (*Underhill* v.
spinasse, 56.)

nd Duty. A constable, if an affray
is presence, may take the parties
ly, and keep them either until the
e is over, or he may take them
efore a magistrate (*Churchill* v.
2 Selw. N. P. 911.); but he has
to take a person into custody for
ssault, unless committed in his
or to prevent a breach of the
upy v. *Henley*, 2 Espinasse, 540.),
ase, if a by-stander interrupt him,
ified in taking such person into
Levy v. *Edwards*, 1 C. & P. 40.)
move a person from church who
ng the congregation. (*Williams* v.
4 D. & R. 217.) He cannot exe-
rant out of his particular district.
v. *Kemp*, 1 H. Black. 15.) If a
owever, be directed to him merely
me, he can then execute it any
hin the jurisdiction of the magis-
if it be directed to him by his
fice, he can only execute it in the
of which he is constable. (*Rex* v.
& R. 444.) Neither can he execute
to search for property hid by a
(*Sly* v. *Stevenson*, 2 C. & P. 464.)
n who is erroneously charged with
quietly with a constable when
still an assault. (*Pocock* v. *Moore*,
21.) A constable is in duty bound to present a highway within his district for want of repair. (*Rex* v. *Taunton*, 3 M. & S. 465.)

By the 24 G. 2. c. 44. s. 6. no action shall be brought against any constable, or against any person assisting him, under or by warrant from a magistrate, until after a demand shall be previously made of a sight and perusal of such warrant, and neglected for the space of six days after such demand. And then, if after the sight of such warrant the complainant proceeds without including the magistrate as a defendant, then "the jury shall give their verdict for the defendant, notwithstanding any defect of jurisdiction in such justice."

CONSTIPATION. See DISEASES OF CATTLE, SHEEP, &c.

CONSUMPTION. See SHEEP, DISEASES OF.

CONTRACTION OF THE HOOF. In farriery, is a distorted state of the horny substance of the hoof in cattle, producing all the mischiefs of unnatural and irregular pressure on the soft parts contained in it, and consequently a degree of lameness which can only be cured by removing the cause. Contraction of the hoof rarely happens, however, except to those animals whose hoofs, for the convenience of labour, are shod.

CONVERSION OF LAND. Every one who intends to lay down land to a permanent state of meadow or pasture, should make himself well acquainted with the best natural grasses, and the peculiar soils to which they are indigenous, as well as with the state of the land in regard to shelter, drought, or humidity, as affecting their growth and durability; and having become master of these particulars, he should then select the seeds accordingly, either by purchase from some seedsman whose character may be presumed to guard the buyer from fraud, or from his own growth. The *Quart. Journ. of Agr.* N. S. Nos. 18. and 19., and the *Trans. of High. Soc.* vol. ii. p. 198., and above all Sinclair's *Hort. Gram. Wob.*, may be consulted with advantage for the result of experiments on different soils with various combinations of grasses. (*Brit. Husb.* vol. i. p. 503. et seq.)

CONVOLVULUS MAJOR (*Ipomœa purpurea*), is a beautiful creeper, climbing eight or nine feet high, and blowing from July to September. Its purple and white flowers are very handsome, opening only in the shade during hot weather. Excellent for alcoves. The scarlet convolvulus is tender, and requires care. Raise it in pots. See BIND-WEED.

CONVOLVULUS MINOR. (*Convolvulus tricolor.*) A trailing annual, native of

Sicily, which blows its shaded blue and white flowers in June, July, and August. It loves a fresh and rather moist soil. Sow the seed in light earth.

COOMB, or COMB. (Fr. *comble*; Lat. *cumulus*, a heap.) A measure of corn usually consisting of four Winchester bushels; but in some of the fen districts it consists of four bushels, each containing eight gallons and a quart.

COOP, or COUP. (Icel. *kuppa*; Dut. *kuype*.) A provincial name for a tumbrel or cart, enclosed with boards to carry dung, sand, grains, &c. It is also a pen or enclosure where lambs, &c. are shut up to be fed or fattened; and a kind of cage in which poultry are enclosed for the same purpose.

COPPICE, or COPSE. (Supposed from the Fr. *couper*; or Nor. *copper*, to cut off.) Low woods cut at stated times for poles, fuel, &c. A place overrun with brushwood. Its wood is called coppice-wood.

COPPY. A provincial word used for coppice. Hence, to coppy, signifies to cut for underwood.

COPYHOLDS, originated in days of feudalism, by grants from the lords of manors, and others, to their vassals or tenants, at first to hold at will, and afterwards by succession. Copyhold property must be situate within the manor, and have been immemorially demised by copy of court roll. (*Stalman*, 3.) By the 2 W. 4. c. 45. s. 19. copyholders holding above the annual value of 10*l.* vote for counties. By the 3 & 4 W. 4. c. 104. and 1 & 2 Vict. c. 110. copyholds are made assets for payment of debts, whether special or on simple contract. Copyholds are: 1. Of ancient demesne. 2. Customary freeholds. 3. Of inheritance. 4. For life or lives. By the 4 & 5 W. & M. c. 24. copyholders of 10*l.* per annum were first admitted to serve on juries in the king's courts. Although copyhold tenure, says Mr. Casswall (to whose excellent work on Copyholds I am indebted for this article), cannot be created at the present day, the lord of the manor may, by custom, be warranted in granting out parcels of the waste to hold by copy of court roll. With regard to the agricultural condition of the manor, adds Mr. Casswall, if by lack of draining, &c. the land is not so productive as it ought to be, the steward should, in assessing his fine, act as if such improvements had been already made, as there is no reason why a lord should be damnified by his tenant's negligence. A copyholder *for life* cannot claim custom to fell timber, but a copyholder of inheritance can; windfalls belong to the lord. The steward must license, and the bailiff mark, before the tenant cuts timber.
Heriots vary the custom. The co
of the manor must reside on it. A
an offence in the court leet is impo
the steward; an amercement is a puni
imposed by the jurors for offences
court, but within the manor. Eve
may have a court baron, but not
leet. Fines are divided into fines
and fines arbitrary. By the 4 &
c. 35. entitled an act for the commuta
certain manorial rights in respect o
of copyhold and customary tenure, &
and tenants are empowered to co
rents, fines, and heriots, and to enfr
and render copyhold land freehold.
wall on Copyholds, 3d edit.)

CORAL-ROOT, SPURLESS. (
lorrhiza innata.) An herb found in
umbrageous woods in Scotland, bu
Root perennial, fleshy, of numerous br
spreading about two inches, pale brow
yellowish. When beginning to dry, it
the sweet and powerful scent of
which is not entirely lost after it ha
kept for twenty years. Leaves none;
solitary, a span high; cluster of from
ten drooping, pale yellowish flowers. (
Eng. Flora, vol. iv. p. 49.)

CORALWORT, or LEADW
(*Dentaria bulbifera*.) This perennia
grows in our gardens when planted;
loves moist umbrageous places in it
state. The root is whitish, toothe
branched, resembling coral. It grow
feet high; the stalk is tender, leaf
weak; the leaves are a bright green
and have in their axilla, dark purple
bulbs by which the plant is propa
The flowers, which are large and
some, but inodorous, stand in thic
long clusters on the top of the stalk
purple or red colour; seldom fertile.
dried root is the part used, and its
is hotter than even the pellitory of
A piece of the dried root held
mouth fills it instantly with water,
cure for toothach, which has obtained
in many places the name of *tooth*
(*Smith's Eng. Flora*, vol. iii. p. 186.)

CORDGRASS. (*Spartina stricta.*
spartine, a rope made of broom.) A
of perennial maritime grasses fou
muddy salt marshes on the sea co
which this is the only native variety.
are very easy of culture, and increa
divisions and seeds. Roots, creeping
strong fibres; whole plant, hard, toug
rigid; stems, ten to twenty inches hi
veral together; leaves, numerous, stria
a dull green colour, and smooth.
Flora, vol. i. p. 135.; *Paxton's Bot.*

Spartina juncea.—According to t
periments of Sinclair, this grass is ve

roduction of foliage, and inferior in
e qualities to most other kinds of
It, however, yields well as a single
produce from a rich silicious sandy
e time of flowering, being 33,350 lbs.,
forded of nutritive matter 1433 lbs.
een tried for the purpose of forming
; and Sinclair tells us, the results
ourable, inasmuch as the clear fibre
al in strength and softness to that
but it was deficient in length. The
antage that appears would result
is plant affording flax is, that it
e produced on a soil unfit for the
of flax or the production of corn.
s the second week in August, and
is ripe by the middle of September.
ram. Wob. p. 373.)

IAL BALL. See Ball.

IAL DRINK, for a horse or a
z. of carraway seeds, bruised; ½ oz.
eds, bruised; ½ oz. of coriander
uised; 2 drachms of ginger, pow-
oil these for 10 minutes in 1½ pint
give it milk-warm.

-WOOD. Small pieces of wood
up for fuel. It also signifies top-
ots, &c. cut and set up in cords; so
ated from its being formerly mea-
th a cord. A statute cord of wood
e eight feet long, four feet high,
feet broad.

OPSIS, EAR-LEAVED. (*Core-
riculata.*) A hardy perennial, a
f N. America. It grows three or
high, and its yellow flowers bloom
st. The *Coreopsis delphinifolia* is
tive of N. America, growing about
inches high, with yellow flowers.
from July to October. Divide the
d plant it in open situations.

ANDER. (*Coriandrum sativum.*
ρις, a bug; the fresh leaves, when
emitting an odour very similar to that
ermin.) Coriander thrives best in a
ly rich but sandy loam: excessive
is equally inimical to it as the
a regular supply. It must have an
d rather sheltered situation. It is
ed by seed, which, if it is required
ust be sown during February, in a
order or moderate hotbed, in either
with the protection of a frame.
y be repeated at the close of March.
ds small crops may be succession-
rted every month in an open bed or
until September, in which month,
ber, if required for winter's supply,
ps must be sown under a frame, as
ary. The summer sowings should
e of small extent, as the plants at
on are very apt to run.

owings are generally performed in drills eight inches apart, and half an inch deep; the plants to remain where sown. The only cultivation required is to thin them to four inches' distance, and to have them kept clear of weeds throughout their growth. For the production of seed, some plants of the early spring sowings must be left ungathered from at about eight inches apart each way; they will perfect their seed in early autumn, being in flower during June. (*G. W. Johnson's Kitchen Garden.*)

CORIARIA, MYRTLE LEAVED SUMACH. (*Coriaria myrtifolia.*) A hardy shrub, native of the south of Europe, blowing its whitish flowers in April. Propagated by suckers and by seed. It loves a moderately good soil.

CORN BINDWEED. See Bindweed.

CORN CALE. A provincial name for charlock.

CORN-CROWFOOT. (*Ranunculus arvensis.*) A weed very common among corn. Root fibrous. It has an upright stalk; the leaves are of a pale shining green, and cut into long, narrow, acute segments. The lemon-coloured flowers are much smaller and paler than those of the crowfoot which is found in pasture-grounds, and the seed-vessels are very remarkable, being covered all over with prickles. It is very acrid and dangerous to cattle, though they are said to eat it greedily. M. Brugnon, who has given a particular account of its qualities, relates, that three ounces of the juice killed a dog in four minutes. (*Smith's Eng. Flor.* vol. iii. p. 53.) See Crowfoot.

CORN-CUTTING MACHINES. Machines for cutting corn by horse power, of which none have hitherto been produced whose merits have insured their adoption by the farmer. I am indebted to the Messrs. Ransome, of Ipswich, for the following list of patents which have been taken out for improvements in machines for cutting standing corn, &c.

May 4. 1795. W. Naylor, machine for cutting wheat.

July 4. 1799. Joseph Boyce, Marylebone, machine for cutting wheat.

May 20. 1800. Robert Mears, Frome, Somerset, machine for cutting standing corn.

June 15. and August 23. 1805. T. J. Plucknett, Deptford, machines for mowing.

November 13. 1811. D. Cumming, Whitefield, machine for reaping corn.

September 21. 1814. James Dobbs, Birmingham, machine for cutting and gathering grain.

November 2. 1840. J. Duncan, Westminster, machinery for cutting and reaping growing plants.

CORNELIAN CHERRY. (*Cornus mascula.*) A species of dog-wood, which is so slow in growth that it requires fifteen years to attain ten feet in height. The wood is very hard, and, in the south of France, is used for props in the vineyards, and hoops for casks. The flowers appear before the leaves, sometimes as early as February. They grow on umbels, of from fifteen to thirty flowers, small and yellow. The fruit is a drupe that ripens in August: it is about the size and form of a small olive, and hangs transparent, like so many cornelian drops, from the branches. Dr. James says the fruit is cooling and astringent, strengthening to the stomach, and good in fevers, especially if attended with a diarrhœa. The bark is tonic, and may be used to invigorate the habit weakened by disease. (*Phillips's Syl. Flor.* vol. i. p. 185.)

CORNEL TREE. See DOGWOOD.

CORNET. In farriery, a name sometimes given to the instrument used in venesection, called a fleam.

CORN FLAG. (*Gladiolus communis.*) A perennial growing two feet high, which blows a purplish flower in July. It is a native of France, and likes a warm situation and light rich soil. Cover the root in winter. Propagate by offsets.

CORN FLOWER. See BLUEBOTTLE.

CORN GOOSE. A name for the moss rush (*Juncus squarrosus*). See RUSH.

CORN LAWS. The regulation of the supply, and consequently, the value of corn, has been an object of legislation from a very remote period; a public interference varying, however, in degree, from that of protective taxation, to that which was intended to be prohibitory. Of the first kind are the modern English corn laws; of the last are the present local-regulations of Paris, by which bread is sold always at the same price, both in bountiful seasons or in those of scarcity. It would occupy too much space to follow these, generally necessary, interferences with the sale of corn, which have occurred from the days of the Athenians (who depended upon Thrace for their daily bread), or from the popular broils about bread, which were long a source of disorder to Rome, even in its splendour. In England, there are traces of a corn law nearly six centuries since. By the statute *Judicium Pillorie*, 51 Hen. 3. (1266), it is directed that the municipal authorities of certain towns should enquire of the price of corn. By the 34 Ed. 3. c. 20. (1360), the exportation of corn was prohibited; but, in 1436, by the 15 H. 6. c. 2., it was allowed. In 1436, however, by the 3 Ed. 4. c. 2., the necessity (which was declared in the preamble) arose of preventing "the labourers and occupiers of land from being grievously endamaged by bringing corn out of other lands when
growing of this realm is at a lo
then declares that wheat shal
ported, unless wheat be sold at
import for 6*s*. 8*d*. per quarter.
the 25 H. 8. c. 2., it was enac
exportation of corn should ce
price be regulated by the l
council, the preamble of the b
sibly remarking, that "dear
good and cheap and plenty of,
necessary for man's sustenanc
riseth, and chanceth of so man
occasions, that it is very hard
to put any certain prices to any
In 1534 (1 P. & M. c. 5.), cor
allowed to be exported when
wheat did not exceed 6*s*. 8*d*.
This standard was increased t
5 Eliz. c. 5. (1562); and, in 1
c. 13.), the exportation was di
regulated from average prices
of the council.

This average price was, in
35 Eliz. c. 7., raised to 20*s*. p
customs duty on export of 2*s*
posed. This average was rai
(1 Jac. c. 25.) to 26*s*. 8*d*.; a
(21 Jac. c. 28.), to 32*s*. In 1
c. 4.), a scale of export duties
of 5*s*. 6*d*. under 44*s*.; 6*s*. 8*d*.
44*s*. When under 40*s*. it might
free. These standard prices w
by the 15 C. 2. c. 7. in 1663 to
(1 W. & M. c. 12.), a bounty w
the export of corn 5*s*.; viz. on
at or under 48*s*. This was
various subsequent acts until
the bounty upon the export
ceased, as will be seen from t
table:—

Sums paid in Bounty upon the
of Corn from Great Britain,

Year.	£	Year.	£
1697 ..	14,712	1724 ..	77,935
1698 ..	11,653	1725 ..	107,524
1699 ..	408	1726 ..	83,308
1700 ..	—	1727 ..	48,756
1701 ..	—	1728 ..	28,296
1702 ..	42,624	1729 ..	18,945
1703 ..	61,232	1730 ..	40,590
1704 ..	44,403	1731 ..	58,492
1705 ..	48,104	1732 ..	60,760
1706 ..	74,277	1733 ..	114,654
1707 ..	38,997	1734 ..	171,000
1708 ..	37,652	1735 ..	100,038
1709 ..	94,120	1736 ..	50,862
1710 ..	16,293	1737 ..	102,511
1711 ..	44,468	1738 ..	177,737
1712 ..	65,872	1739 ..	145,702
1713 ..	84,803	1740 ..	39,366
1714 ..	77,157	1741 ..	18,580
1715 ..	60,669	1742 ..	90,640
1716 ..	56,027	1743 ..	131,459
1717 ..	48,272	1744 ..	116,896
1718 ..	60,495	1745 ..	131,879
1719 ..	83,398	1746 ..	104,362
1720 ..	68,032	1747 ..	127,011
1721 ..	64,375	1748 ..	189,501
1722 ..	91,304	1749 ..	222,184
1723 ..	86,558	1750 ..	262,583

Year.	£	Year.	£	Year.	£	Year.	£	Year.	£
1785 ..	47,546	1792 ..	76,802	1799 ..	4,632	1801, 1802	—	1804 ..	15,372
1786 ..	55,998	1793 ..	7,415	1800 ..	372	1803 ..	767	1807 ..	78
1787 ..	50,916	1794 ..	5,796					1808 to 1814 when they ceased	Nil.
1788 ..	45,537	1795 ..	24						
1789 ..	82,253	1796 ..	50						
1790 ..	13,434	1797 ..	62						
1791 ..	7,656	1798 ..	495						

(*Thornton on the Corn Laws*, p. 42.)

nt of the imports and exports of all descriptions of corn, from 1697 to

	Imports.	Exports.	Excess of Imports.	Excess of Exports.
	qrs.	qrs.	qrs.	qrs.
4 both inclusive, 68 years -	1,723,818	34,926,825	—	33,203,007
3 — 9 — -	3,151,020	1,468,092	1,682,928	—
1 — 18 — -	11,945,822	5,419,625	6,526,197	—
4 — 13 — -	18,577,612	1,832,515	16,745,097	—
4 — 10 — free interchange with Ireland	7,697,863	1,430,938	6,266,925	—

(*Abstract of Parl. Paper, No.* 100. *Sess.* 1826.)

cts (many of them temporary) sed; as, in 1668 (11 & 12 W. 3. (11 W. 3. c. 1.), 1700 (11 & 12 , 1707 (5 Anne, c. 29.), 1709 .), 1741 (14 G. 2. c. 3.), 1757 .), 1758, 1759, 1765 (5 G. 3. –1774 (13 G. 3. c. 43.). By en wheat sold at 48*s.* per qr., be imported on payment of a ; 1780, 1783, 1787 (27 G. 3. this act the import duty on under 48*s.*, was to be 24*s.* 3*d.* (31 G. 3. c. 30.). By this act, e was adopted, by which, when ove 54*s.*, it was to pay an im- 6*d.* This was increased to 6 (37 G. 3. c. 15.); to 6*s.* 6*d.* . 3. c. 110.); to 6*s.* 8*d.* in 1803 8—70.); and 7*s.* 6*d.* in 1804 .). Other acts also passed to corn trade in 1795 (35 G. 3. 36 G. 3. c. 21.). By this act, . per qr.) were first allowed ortation of foreign corn, which ed for about fourteen years. is a table of the amounts paid the importation of corn into in this period:—

	£		£
1800 ..	44,836	1804 ..	4,791
1801 ..	1,420,355	1805 ..	21,799
1802 ..	715,323	1807 ..	129
1803 ..	43,977	1810 ..	138

e other corn acts in 1797–98 01–2–4–6–14 (54 G. 3. c. 26. ed), 1815–17–21–22–24–25–26 ; imperial measure act), 1827, c. 60.), 1842 (5 Vict. c. 14.). isting (1842) corn law act, by spectors are appointed in 287 nsmit returns to the Board of compute the average weekly description of grain, and the erage price for the previous nd transmit a certified copy to the collectors of customs at the different out-ports. The aggregate average regulates the duty on importation according to the following scale:—

If imported from any Foreign Country.

Wheat. — Whenever the average price of wheat, made up and published in the manner required by law, shall be for every quarter

	£	s.	d.
Under 51*s.*, the duty shall be for every quarter	1	0	0
51*s.* and under 52*s.* - - - -	0	19	0
52*s.* .. 55*s.* - - - -	0	18	0
55*s.* .. 56*s.* - - - -	0	17	0
56*s.* .. 57*s.* - - - -	0	16	0
57*s.* .. 58*s.* - - - -	0	15	0
58*s.* .. 59*s.* - - - -	0	14	0
59*s.* .. 60*s.* - - - -	0	13	0
60*s.* .. 61*s.* - - - -	0	12	0
61*s.* .. 62*s.* - - - -	0	11	0
62*s.* .. 63*s.* - - - -	0	10	0
63*s.* .. 64*s.* - - - -	0	9	0
64*s.* .. 65*s.* - - - -	0	8	0
65*s.* .. 66*s.* - - - -	0	7	0
66*s.* .. 69*s.* - - - -	0	6	0
69*s.* .. 70*s.* - - - -	0	5	0
70*s.* .. 71*s.* - - - -	0	4	0
71*s.* .. 72*s.* - - - -	0	3	0
72*s.* .. 73*s.* - - - -	0	2	0
73*s.* and upwards - - - -	0	1	0

Barley. — Whenever the average price of barley, made up and published in the manner required by law, shall be for every quarter

	£	s.	d.
Under 26*s.*, the duty shall be for every quarter	0	11	0
26*s.* and under 27*s.* - - - -	0	10	0
27*s.* . 30*s.* - - - -	0	9	0
30*s.* .. 31*s.* - - - -	0	8	0
31*s.* .. 32*s.* - - - -	0	7	0
32*s.* .. 33*s.* - - - -	0	6	0
33*s.* .. 34*s.* - - - -	0	5	0
34*s.* .. 35*s.* - - - -	0	4	0
35*s.* .. 36*s.* - - - -	0	3	0
36*s.* .. 37*s.* - - - -	0	2	0
37*s.* and upwards - - - -	0	1	0

Oats.—Whenever the average price of oats, made up and published in the manner required by law, shall be for every quarter

	£	s.	d.
Under 19*s.*, the duty shall be for every quarter	0	8	0
19*s.* and under 20*s.* - - - -	0	7	0
20*s.* .. 23*s.* - - - -	0	6	0
23*s.* .. 24*s.* - - - -	0	5	0
24*s.* .. 25*s.* - - - -	0	4	0
25*s.* .. 26*s.* - - - -	0	3	0
26*s.* .. 27*s.* - - - -	0	2	0
27*s.* and upwards - - - -	0	1	0

Rye, Peas, and Beans. — Whenever the average price of rye, or of peas, or of beans, made up and published in the manner required by law, shall be for every quarter

	£	s.	d.
Under 30*s*., the duty shall be for every quarter	0	11	6
30*s*. and under 33*s*. - - - -	0	10	6
33*s*. .. 34*s*. - - - -	0	9	6
34*s*. .. 35*s*. - - - -	0	8	6
35*s*. .. 36*s*. - - - -	0	7	6
36*s*. .. 37*s*. - - - -	0	6	6
37*s*. .. 38*s*. - - - -	0	5	6
38*s*. .. 39*s*. - - - -	0	4	6
39*s*. .. 40*s*. - - - -	0	3	6
40*s*. .. 41*s*. - - -	0	2	6
41*s*. .. 42*s*. - - - -	0	1	6
42*s*. and upwards - - - -	0	1	0

Wheat Meal and Flour.— For every barrel, being 196 lb., a duty equal in amount to the duty payable on 38½ gallons of wheat.

Oatmeal. — For every quantity of 181½ lb., a duty equal in amount to the duty payable on a quarter of oats.

Maize or Indian Corn, Buckwheat, Bear or Bigg. — For every quarter, a duty equal in amount to the duty payable on a quarter of barley.

See Wheat.

An Account showing the total Quantities of Wheat and Wheat Flour imported from Foreign Countries and from British Colonies.

	Quantities entered for Home Consumption in the United Kingdom from the passing of the Act 9 Geo. 4. c. 60. (15th July, 1828), to the 5th January, 1841.	
Foreign.	Wheat.	Wheat Flour.
When the Rate of Duty on Wheat was— L. s. d.	qrs.	cwts.
0 1 0 per quarter -	3,907,981	1,276,731
0 2 8 — -	2,788,277	835,406
0 6 8 — -	1,994,102	518,897
0 10 8 — -	783,280	238,592
0 13 8 — -	548,348	466,432
0 16 8 — -	298,677	213,707
0 18 8 — -	76,200	44,788
1 0 8 — -	377,667	96,538
1 1 8 — -	107,005	5,861
1 2 8 — -	13,664	5,940
1 3 8 — -	138,775	56,530
1 4 8 — -	37,329	2,070
1 5 8 — -	27,153	1,555
1 6 8 — -	4,724	654
1 7 8 — -	1,882	690
1 8 8 — -	134,275	1,377
1 9 8 — -	61,649	101
1 10 8 — -	13,955	756
1 11 8 — -	1,496	87
1 12 8 — -	432	63
1 13 8 — -	908	511
1 14 8 — -	385	164
1 15 8 — -	154	24
1 16 8 — -	326	42
1 17 8 — -	314	24
1 18 8 — -	154	72
1 19 8 — -	151	51
2 0 8 — -	3	—
2 2 8 — -	7	3
2 3 8 — -	4	7
2 4 8 — -	16	13
2 5 8 — -	62	33
2 6 8 — -	10	155
2 7 8 — -	7	17
2 8 8 — -	3	2
2 9 8 — -	2	36
2 10 8 — -	8	56
Admitted at an *ad valorem* duty, being damaged -	2,629	—
Admitted duty free, being damaged - - -	—	350
Admitted duty free, for seed	71	—
Total - - -	11,322,085	3,768,335
British Colonial.		
When the rate of duty on wheat was 0 6 per qr.	129,858	426,869
When the rate of duty on wheat was 5 0 —	393,407	596,996
Total - - -	523,265	1,023,865

An Account of the Average Price in Great Britain in the year 184 with the total number of Qu Foreign and Colonial Wheat a Flour imported in the same ye guishing Foreign from Colonia Quantities entered for Home tion: also the Average Prices at Dantzic, Odessa, and Rotte the same year, as far as they can tained.

Average price of wheat at Rotterdam -
.. .. at Odessa - -
.. .. at Dantsic - -
Total number of quarters of wheat and whe flour imported and entered for home co sumption - - - - qr
Total number of quarters of colonial whe and wheat flour imported - -
Total number of quarters of foreign whe and wheat flour imported - -
Total number of quarters of wheat and whe flour imported - - -

Average price of wheat in Great Britain

An Account of the Quantities of W Wheat Flour, in Quarters, en Home Consumption in Great I each Year, from 1760 to 1840; a the Annual Average of each o Period of Ten Years.

Years.	Quantities of F Colonial Wh Wheat Flour e Home Consum Great Bri
	Quantity in each Year.
	qrs.
1761	—
1762	—
1763	71
1764	1
1765	97,175
1766	11,020
1767	497,328
1768	332,114
1769	3,155
1770	23
1771	1,449
1772	20,777
1773	53,950
1774	283,960
1775	455,848
1776	—
1777	212,150
1778	75,574
1779	—
1780	—
1781	116,793
1782	64,836
1783	565,026
1784	201,405
1785	80,620
1786	29,430
1787	48,642
1788	102,148
1789	41,141
1790	182,805
1791	421,038
1792	—
1793	[illegible]

	Quantities of Foreign and Colonial Wheat and Wheat Flour entered for Home Consumption in Great Britain.	
rs.	Quantity in each Year.	Annual Average of each Consecutive Period of Ten Years.
	qrs.	qrs.
	220,249	
	297,416	
	878,165	
	403,037	
	386,694	
	438,152	
	1,256,989	470,342
	1,417,360	
	407,438	
	257,310	
	359,139	
	780,535	
	197,475	
	356,031	
	23,602	
	385,804	
	1,374,897	555,959
	116,385	
	112,952	
	319,466	
	623,086	
	116,382	
	225,263	
	1,024,443	
	1,596,511	
	122,000	
	34,275	429,076
	9	
	2	
	12,137	
	15,778	
	525,231	
	315,892	
	572,705	
	841,828	
	1,363,487	
	1,700,548	534,762
	1,487,807	
	375,788	
	83,691	
	64,552	
	27,525	
	30,096	
	242,594	
	1,821,151	
	2,652,553	
	2,295,419	908,118

PRICES OF WHEAT FROM 1670.

f two half-yearly Prices (Win-
easure), from the Register kept
oks of Eton College.

Year.	s.	d.	Year.	s.	d.
1687 ..	31	8	1704 ..	41	2
1688 .	23	1	1705 ..	26	8
1689 ..	26	8	1706 ..	23	1
1690 ..	30	9	1707 ..	25	2
1691 ..	29	11	1708 ..	36	8
1692 ..	41	9	1709 ..	69	7
1693 ..	60	1	1710 ..	69	4
1694 ..	56	10	1711 ..	48	0
1695 ..	47	1	1712 ..	41	2
1696 ..	56	0	1713 ..	45	4
1697 ..	53	4	1714 ..	44	8
1698 ..	60	8	1715 ..	38	2
1699 ..	56	0	1716 ..	42	8
1700 ..	35	6	1717 .	40	5
1701 ..	31	8	1718 ..	34	8
1702 ..	26	0	1719 ..	30	11
1703 ..	32	0	1720 ..	32	10

Year.	s.	d.	Year.	s.	d.	Year.	s.	d.
1721 ..	33	4	1738 ..	31	6	1755 ..	29	11
1722 ..	32	0	1739 ..	33	2	1756 ..	40	1
1723 ..	30	9	1740 ..	48	10	1757 ..	53	4
1724 ..	32	10	1741 ..	41	9	1758 ..	44	5
1725 ..	43	1	1742 ..	28	5	1759 ..	35	3
1726 ..	40	10	1743 ..	22	0	1760 ..	32	5
1727 ..	37	4	1744 ..	22	0	1761 ..	26	9
1728 ..	48	3	1745 ..	24	3	1762 ..	34	8
1729 ..	42	2	1746 ..	34	8	1763 ..	36	1
1730 ..	32	5	1747 ..	30	11	1764 ..	41	5
1731 ..	29	4	1748 ..	32	10	1765 ..	48	0
1732 ..	23	8	1749 ..	32	10	1766 ..	43	1
1733 .	25	2	1750 .	28	10	1767 ..	57	4
1734 ..	33	5	1751 ..	34	2	1768 ..	53	9
1735 .	38	2	1752 ..	40	8	1769 ..	40	7
1736 ..	35	10	1753 ..	39	8	1770 ..	43	6
1737 ..	33	5	1754 ..	30	9			

(*Parliamentary Paper*, No. 100. — Session 1826.)

The average Prices as published by the Receiver of Corn Returns.

Winchester Measure.

Year.	s.	d.	Year.	s.	d.	Year.	s.	d.
1771 ..	47	2	1795 ..	72	11	1819 ..	72	3
1772 ..	50	8	1796 ..	76	3	1820 ..	65	10
1773 ..	51	0	1797 ..	52	2	1821 ..	54	5
1774 ..	52	8	1798 ..	50	4	1822 ..	43	3
1775 ..	48	4	1799 ..	66	11	1823 ..	51	9
1776 ..	38	2	1800 .	110	5	1824 ..	62	0
1777 ..	45	6	1801 .	115	11	1825 ..	66	6
1778 ..	42	0	1802 ..	67	9	1826 ..	56	11
1779 ..	33	8	1803 ..	57	1	Imperial Measure.		
1780 ..	35	8	1804 ..	60	5			
1781 ..	44	8	1805 ..	87	1	1827 ..	56	9
1782 ..	47	10	1806 ..	76	9	1828 ..	60	5
1783 ..	52	8	1807 ..	73	1	1829 ..	66	3
1784 ..	48	10	1808 ..	78	11	1830 .	64	3
1785 ..	41	10	1809 ..	94	5	1831 ..	66	4
1786 ..	38	10	1810 .	103	3	1832 ..	58	8
1787 ..	41	2	1811 ..	92	5	1833 ..	52	11
1788 ..	45	0	1812 ..	122	8	1834 ..	46	2
1789 ..	51	2	1813 ..	106	6	1835 ..	39	4
1790 ..	53	2	1814 ..	72	1	1836 ..	48	6
1791 ..	47	2	1815 ..	63	8	1837 ..	55	10
1792 ..	41	9	1816 ..	76	2	1838 ..	64	7
1793 ..	47	10	1817 ..	94	0	1839 ..	70	8
1794 ..	50	8	1818 ..	83	8	1840 ..	66	4

(*Thornton on the Corn Laws; Parl. Papers; Statutes at large.*)

CORN MARYGOLD. (*Chrysanthemum segetum.*) In Scotland, this is called *yellow gowans*, *quills*, *gools*; in Kent, *yellow bottle*; in Norfolk, *budland*; midland counties, *golds*, *goulds*, or *gowls*; north of England, *gowlans*, *goldens*, *gules*. Linnæus says there is a law in Denmark which obliges the farmers to extirpate this weed. He recommends the land to be manured in autumn, summer-fallowed, and harrowed in about five days after sowing. Martyn says it can only be eradicated by hand before the seeds ripen. It is abundant in corn and turnip fields, with its blue-green leaves, and broad, brilliant, yellow flowers. The stalks are round, stiff, and branched, growing two feet high. The leaves stand irregularly, and they are deeply indented at the sides, besides being long and very broad, smallest at their base, and growing broader as they advance to the end. The root is tapering and fibrous. (*Smith's Engl. Flor.* vol. iii. p. 450.)

CORN-MILL. See MILL.

CORN-MINT. (*Mentha arvensis.*) This

weed chiefly prevails where the land is moist. Its perennial roots creep extensively, and are said to be difficult to extirpate. The herb is hoary, and has the unpleasant odour of decayed cheese; which, in conjunction with its peculiarly short bell-shaped calyx, covered with horizontal hairs, readily distinguishes it from the other mints. It is not a very common or general tillage weed, except on marshy or fenny land which has been over-cropped. The roots bind the soil much in which they grow, obstructing the pulverisation. It is said to be overcome and got rid of by correcting the effect of such soils as encourage its growth, by draining, paring and burning, and adopting the horse-hoe husbandry. (*Sinclair's Weeds*, p. 41.)

CORN MOTH. (*Tinea granella.*) Among the insects most injurious in their attacks on grain when laid up in magazines, is the larva of this small moth (the mottled woollen moth of Haworth), the caterpillar of which is also called the white *corn worm.* The perfect moth measures, from the head to the tips of the wings, six or seven lines. The insect appears as a moth in May, June, and July. It frequents granaries and other buildings where grain is stored, sits at rest in the day time, and only flies about at night. It is in the summer months, from May to August, and sometimes in September, that the larvæ devour the different sorts of grain; and they attack rye, oats, and barley, with the same zest as wheat. From September to May the larva is sought for in vain in the corn-heaps; it has retired into the cracks and fissures of the floor and walls, and moreover has concealed itself in its cocoon. It does not reappear till April or May, and then in a very different form; namely, as a moth, which flutters about the heaps of store-corn, and deposits upon them the invisible germ of future destruction. After a few days have elapsed, small whitish worm maggots, or more properly speaking larvæ, proceed from the eggs, and immediately penetrate into the grain, carefully closing up the opening with their white roundish excrement, which they glue together by a fine web.

From these considerations, the means which the agriculturist must employ to secure his grain from so dangerous an enemy, are clearly deducible. First of all, the lofts, before the corn is placed in them, must be carefully examined, and the cocoons, if any are discovered, got rid of. Sprinkling the floor with a mixture of strong white wine vinegar and salt, before laying up the corn, is strongly to be recommended. Sweeping the floor and walls thoroughly should not be neglected; and the dust should be removed immediately, in order that the larv
not find their way back into the corn
Common salt will also purify the i
grain. One of the surest remedies a
to be a free ventilation, by means of
tificial degree of cold, as the larvæ ca
live in a temperature of 10° to
Réaumur. Bats and spiders are the
cipal natural enemies of the corn mot
the grey and yellow wagtails and
small birds also feed on them. (*Tre*
Insects, &c. by J. and M. Loudon.)

CORN POPPY. (*Papaver rhœas.*
differently called red-poppy, corn-ros
rose, head-wark, red-weed, red-maik
A troublesome weed in corn fields. A
flowering from June to July. Be
varieties of this species, with semi-
flowers, variegated with rose-colou
white, are easily cultivated for orn
but liable to degenerate in luxu
(*Smith's Eng. Flor.* vol. iii. p. 11.; *Si*
Weeds, p. 46.)

CORN RENT. See Rent.

CORN-ROSE and COP-ROSE.
vincial names for the corn-poppy.

CORN-SALAD, or LAMB'S
TUCE. (*Fedia olitoria*, Smith; *V*
locusta, Lin.) A well-known annu
in corn-fields and light cultivated
which probably took its common
name from the circumstance of the
appearing in flower about the tim
lambs are dropped. There is a
species (*F. dentata*), *oval fruite*
salad. The common variety is cultiv
winter and spring salads, and for th
pose has been long known. The fi
formerly brought to table was a r
ring set in a corn salad. The pl
flourish in any soil that is not parti
heavy. It is propagated by seed
in February and the two following
and once a month during the summ
it is not so palatable during this
Lastly, during August and early
tember, the plants from which will b
use in early spring, or during the w
mild. The seed may be sown in dr
inches apart, or broadcast, and ra
Keep them free from weeds by fr
hoeings, previously thinned to four
asunder. They should always be
quite young. In summer, the whol
may be cut, as it soon advances
at this season; but in spring and
the outer leaves only should be ga
For the production of seed some
spring-raised plants must be left ung
They flower in June, and perfect th
during the two following months.
Johnson's Kitch. Gard.; Smith's En
vol. i. p. 44.; *Sinclair's Weeds*, p. 5

-STONE. A provincial name for
of red limestone.

-STUBBLE. The short straw
left standing in the field after reap-
tting a grain crop.

-STUBBLE RAKE. A sort of
se-rake, which is advantageously
of in some districts.

WEEVIL. (*Calandra granaria*,
; *Curculio granaria*, Linn.) This
extremely injurious insect to corn.
ct beetle is of small size, linear
ith a narrow rostrum, and the
wing cases marked by impressed
dots. The female, like the corn
osits her eggs upon corn in gra-
nd the young larva immediately
nto the grain, of which it eats the
It is sometimes exceedingly
and destructive in old granaries.
preservative against its ravages
ect ventilation and a constant
f the grain. (*Loudon's Insects*
Agriculture.)

IN HORSES' FEET. This
roduced by some hard substance
the sole at the quarters, as from
n till the heels become buried in
the fibrous substance which lies
e sensible foot and the absolute
becomes inflamed by the pres-
the inflammation produces a
f the spot, similar, if I may so
to a knot in a piece of soft timber.
e evil as well as you can, by
e hoof constantly pared away
he corn and the ground, but do
in your vain endeavours to cut
id the hot-irons, &c.; let a bit of
softly put in, merely to keep out
keep the spot moist; and when
rrives, turn the horse out without
into a soft marshy place, where
st be in a constant moist state
onths at least: by that time the
altogether renewed, the diseased
ave grown out, and if there is no
, there will be no new corns.
ell. See also, *Lib. Use. Know.*
, p. 305.)

ER. (Lat. *coronator*.) An office
in Saxon times. The most im-
not the sole function which he
es, is that of holding inquests on
of such persons as either die or
d to die a violent death (4 Ed. 1.
which purpose he is empowered
jurymen out of the neighbour-
witnesses. The coroner was
n some sort, the colleague and
the sheriff; and this officer is
sheriff was formerly, elected by
ders of the county. There are frequently several coroners in the same county, who exercise their functions over different districts. (*Jervis on Coroners*.)

CORONET-BONE. The second of the consolidated phalanges of the horse's foot.

CORONILLA, VARIEGATED. (*Coronilla varia*.) A hardy perennial, blowing purple and white flowers from June to August. Loves a dry soil and open situation. Propagate by parting its roots. Native of the south of Europe.

CORYMBIFEROUS PLANTS or SHRUBS. Such as bear flowers in corymbs. See BOTANY.

COSH. A provincial word sometimes used for pod. It also signifies the husks or chaff of wheat and oats.

COSSART, or COSSET. (It. *cassiccio*, from *casa*, the house.) A lamb left by the death of its dam before it is capable of providing for itself; or a lamb taken from an ewe that brings more than one. The term is also applied to a colt, calf, &c. and sometimes written *cot-lamb*.

COSTIVENESS. In farriery, a complaint to which horses are often subject, occasioned sometimes by violent or hard exercise, especially in hot weather; and at other times by standing long at hard meat, without grass or other cleansing diet, and with very little exercise.

COTS. A provincial name in some parts of the country for lambs that are brought up by hand. See CADE LAMB.

COTTAGE ALLOTMENTS. See ALLOTMENT.

COTTAGER. (From Sax. cot; Goth. *kot*; and Welsh, *cwt*, a little house.) A farming or other kind of labourer who inhabits a cottage.

COTTAGES. These for labourers are commonly constructed merely with a regard to economy; the comfort and health of their future tenants being too often disregarded. Such cottages should never consist of less than two bed rooms, and a kitchen, and outhouse. They will be found to be considerably more healthy with wooden floors, raised above the level of the surrounding ground. They should be well furnished with windows, and the ceilings of the rooms of a fair height, eight or nine feet will not be too much to allow; they should have as good gardens as possible. The plans for their formation, and the materials of which they are composed, must vary with the locality. Mr. Gillespie has given one for a cottage with a roof without wood, which he asserts could be built in Scotland for 30*l*. (*Com. Board of Agr.* vol. iv. p. 469.) There is also an essay by Mr. Smith, on cottages for the labouring classes, which may be consulted with advantage (*Trans. High. Soc.* vol. iv. p. 205.), and on cottage windows (*Quart. Journ. of Agr.* p. 116.), and also on cottage premiums, and on the cottages built on the estate of Lord Roseberry. (*Trans. High. Soc.* vol. vi. p. 527.)

By the erection of small, comfortable cottages on the poor waste lands of our island, and the allotment to each of a few acres of land, a field is opened for the rapid recovery by the spade of barren lands, and the profitable employment of the landowner's capital, too little understood. By merely deepening and mixing the soil, the cottager can bring into cultivation lands, which seem to defy all the powers of even the subsoil plough. This is a noble, a national theme, on which too much can hardly be written. I implore the owners of the waste to consider, to calculate, and to make the experiment. Let them read the report by Provost Baillie, "Of the System of Improvement followed on the Muirs of Drumforskie, now called Charleston, in the County of Kincardine, by the settlement of Crofters on improving Leases, with Allotments of a few Acres of waste Land to each." (*Trans. of High. Soc.* vol. v. p. 97.) The result is, that "at the expiry of the leases, the whole will produce on 357 acres, an actual, permanent, and sure revenue of 750*l.* per annum." (*Ibid.* 116.) And let me also refer the landowner to a paper, "On the Settlement of Crofters," by Mr. Thompson, and on the same noble effort by Colonel Fraser (*Ibid.* p. 379. and 387.); and to the *Quart. Journ. of Agr.* (vol. v. p. 531.), on the cotters who cultivate even the mountains of Switzerland, and the most naturally barren steppes of China. And if they set about the good work in earnest, then let them read the excellent essay of Mr. Blacker, "On the Improvement to be made in the Cultivation of small Farms." But this is not an attempt to be made without consideration. With care it works admirably, diffusing comfort and gladness; but without some attention to the means and instruction of the small farmers, instead of producing a race of bold and happy cultivators, adding out of the mere waste to the riches of their country, it would only be the means of colonising the land with paupers.

COTTER and COTTERAL. Provincial words used to signify a sort of iron key to a bolt.

COTTON, CHARLES, though well known as the editor of *Walton's Angler*, and as a poet, is only one of the *Scriptores minores* of horticulture. He was born at Beresford, in Hertfordshire, the seat of his father, on the 28th of April, 1630. He commenced publishing in 1663, and twelve

years afterwards appeared the
his requiring notice here, viz.
Manual, being Instructions
Planting, and Cultivating all
Trees, 12mo. 1675. He die
1687. (*Walton's Complete A*
by Sir J. Hawkins, edit. 5.)

COTTON-GRASS. (*Erio*
cotone; Fr. *coton.*) A perennia
of grasses, comprising seven
have no particular merit to war
commendation for the purpose
culturist; their productive
powers being very inferior.
us the result of his experim
sorts, the common long-leaved
(*E. angustifolium*), and the
sheathed cotton-grass (*E. vag*
produce of the first per acre,
flowering, from a bog soil, was
proportion of nutriment affo
The produce of the second, on
was 6806 lbs.; nutritive ma
The chief property that woul
to this grass, if its productive
greater, is its early growth,
being one of the earliest o
grasses; flowering in April.
cattle crop the foliage in the
finer natural grasses afford
(*Sinclair's Hort. Gram. Wob.*
Flor. vol. i. p. 65.)

COTTON THISTLE. Se

COTYLEDON. The see
BOTANY.

COUCH, or CREEPIN
GRASS. (*Triticum repens.*)
the French *coucher*, to lie dow
called dog-grass and knot-gr
late years, where botanical s
forded us better information,
rally supposed that all couch
the roots of one species of gras
persons observed that some o
on wet soils, were *black* and
and they had locally obtained
black twitch. This, on soils wh
is much worse than the other,
wiry and small, and not so eas
from the soil; it is also more
harrowing breaks short. This
repens. There are two other
have strong creeping roots, an
ently called couch: these are
rooted soft grass (*Holcus m*
smooth-stalked meadow gras
tensis). There is but one wa
ing couch, and that is by plo
soil and pulverising it. (*Sin*
p. 27.)

COUGH. (Goth. *kueff*, a
suffocation; Dutch, *kuch.*)
convulsive motion of the lu

rt of nature to throw up some offending tter from the air tubes. This is best ated, in mild cases, by cold bran mashes h linseed. But coughs arise from so ny different causes, that it is impossible to scribe any general remedy.

OUGH IN SHEEP. See Diseases Sheep.

OULTER OF A PLOUGH. See ough.

OUNTER. In horsemanship, the breast a horse, or that part of his fore-hand ich lies between the shoulders and under neck.

OUNTY RATES, are levied under the G. 2. c. 29. By this act justices in rter sessions are to make one general e or assessment, "to be assessed upon ry town, parish, or place," which is "to paid by the parish officers out of the r's rates to the high constable of the dred or division." The high constable o hand over the money to the county surer, who is an officer appointed by 12 G. 2. c. 29. s. 6., and may be removed the quarter sessions at pleasure. An eal against a county rate is given to the ish officers by the 55 G. 3. c. 51. s. 14. se rates, by the 4 & 5 W. 4. c. 48. must made in open court. They are chiefly licable to the payment of the coroner's ges, county bridges, shire halls, lunatic lums, criminal prosecutions, and other lic purposes.

OUPLES. A term applied to ewes and bs. Couple is also a chain or tie that ds dogs together.

OUPLINGS, or CUPLINGS. Thongs untanned leather, or other material, ich are used to connect the handle or ndstaff and swiple of a flail. See Flail.

OURSE. (Fr. *course*; Lat. *cursus*.) e Race Course.

OURSER, THE CREAM COLOUR-D. (*Cursorius Isabellinus*, Selby.) A d of plover very rarely met with in this ntry. The general colour of the plumage pale wood brown, tinged with reddish f on the upper surface; and neck, breast, d under surface of body, buffy white. ers brown. Whole length of the bird ten hes and a quarter. Little is known of its its, nidification, or eggs. (*Yarrell's Brit.* ds, vol. ii. p. 376.)

OVENTRY, FRANCIS, was a native Cambridgeshire. He took his degree of A. at Mag. Coll. Cam. in 1752, and en- d into orders, but died prematurely in 9, immediately after being presented to donative of Edgeware. He deserves e here from being the author of an rable essay in *The World*, No. xv. April 753, entitled "Strictures on the absurd Novelties introduced in Gardening, and a humorous Description of Squire Mushroom's Villa."

COVER, or COVERT. (Fr. *couvrir*.) A term applied to a place sheltered, not open or exposed. In sportsman's phrase, the cover is the chosen resort of the fox for kennelling; and such as lie high and dry are seldom without one or more, particularly if the underwood be thick and plenty. Artificial covers are often formed of broom and gorse, intermixed. (*Blaine's Rural Sports*, p. 452.)

COVEY. (Fr. *couvée*, from the Lat. *cubo*.) Provincially applied to a cover of furze, &c. for game. It is also applied to an old bird with her young ones, but is generally used to designate a number of partridges or other game.

COW. (Sax. cu; Dutch *koe*; Pers. *gow*.) See Cattle.

COW-BANE, WATER, or WATER HEMLOCK. (*Cicuta virosa*.) A perennial, fetid, poisonous aquatic herb, found in ditches, and about the margins of rivers, not very common. Root tuberous, hollow. Stems two or three feet high, hollow, leafy, branched, furrowed. Leaves bright green, tapering at each end, from one to two inches long. Umbels large, bearing purplish flowers; fruit roundish, smooth. This is a fatal plant to cattle, if they happen to meet with it before it rises out of the water, in which state only they will eat the young leaves. (*Eng. Flor.* vol. ii. p. 62.)

COW-BERRY. One of the names of the red whortle-berry (*Vaccinium Vitis Idæa*), which see.

COW-CLAGS. A provincial name for the clotted lumps of dirt that hang to the buttocks of cattle and other animals.

COW-DUNG. See Farm-yard Dung.

COW-DUNG FLY. (*Musca*.) This is a standard and almost universal fly-bait for all the fly-taking fish. Few winged insects, if we except the May flies, are so acceptable to them, and the cow-dung fly may be used freely the whole of the spring, summer, and autumn months. (*Blaine's Rural Sports*, p. 1150.; *Walton*, p. 322.)

COWELL, JOHN, was a nurseryman at Hoxton, of whom frequent mention is made in the works of Bradley and other writers of the same period. He appears to have died about 1730, for Switzer speaks of him as "late of Hoxton." Cowell was author of the following works:—

1. Account of the Aloe in Blossom, Torch Thistle, and Glastonbury Thorn. London. 1729. 8vo. 2. The Curious and Profitable Gardener, containing the newest Method for improving Land by Grain or Seed. 8vo. 1730.

COW-HERD. A person whose office it is

to attend upon the herds of cows in places where they run in common fields.

COW-HOUSE. See CATTLE SHED.

COW-KEEPING. The business of keeping cows for the advantage of the milk, by disposing of it in large towns. The principal cow-keepers of the metropolis have their establishments in the suburbs, where they are connected with pasture fields, in which their animals are turned out a portion of every day throughout the year, when practicable. The cows are fed in the house with grains, mangel wurzel, hay, tares, &c. and as the animals get air and exercise, the milk may be considered wholesome. But there are other cow-keepers in the metropolis, who confine their cows in back houses, and even dark cellars, and while they feed them with rich food, give them no exercise; hence, the milk of such cows cannot be considered wholesome. (*Harleian Dairy System*; *Brit. Husb.*) See CATTLE.

COWL. (Perhaps from *cool* or *cooler*, or the Ger. *kugel*, a round bowl.) A term employed in some districts to signify a tub; especially that which is used in making cheese. This word is also applied provincially to raking or scraping any thing together.

COWL-PRESS. A local name for a lever.

COWL-RAKE. A provincial word applied to an implement for raking dirt or mud. It is sometimes pronounced cow-rake.

COW-LEASE. Pasture or meadow-ground kept for the purpose of feeding cows.

COW-MIG. A word provincially used to imply the drainage of a cow-stall or dunghill.

COW-PAR. A provincial word often applied to a cow-yard, straw-yard, or fold-yard.

COW PARSNIP, or HOG WEED. (*Heracleum Sphondylium.*) A biennial pasture weed which is found in hedges, the borders of fields, and rather moist meadows, very common. Root tap-shaped, whitish, aromatic, sweetish, and rather mucilaginous. Stem four to six feet high, erect, branched, leafy, furrowed, and hollow. The leaves proceed from a large membrane or sheath. The flowers, which grow in large umbels, are either white or reddish; the fruit is abundant, and light brown. The whole plant is wholesome and nourishing food for cattle, and is gathered in Sussex for fattening hogs, hence its name of hog-weed. It is also frequently known by the name of wild parsnip, meadow parsnip, and madrep. (*Sinclair's Weeds*, p. 65.; *Eng. Flora*, vol. ii. p. 102.)

COW-POX. In farriery, is a disease affecting the teats of cows. This disease appears in the form of small bluish vesicles surrounded by inflammation, elevated at the edge and depressed in the centre,
taining a limpid fluid. By the use
virus of this disease, has originat
present excellent system of vacci
Experience has demonstrated that, al
cow-pox in the human subject is
ventive of small-pox, yet its influenc
tinues only for a limited number of
Opinions differ respecting the peri
under all circumstances, it is advis
re-vaccinate children and young peop
in seven or ten years. The opera
trifling, and should the habit again
the disease, it is not hazardous, and
vents the extension of a malady at o
flicting, disgusting, and hazardous.

COWSLIP, AMERICAN. (*Dodec*
Meadia.) A hardy perennial from S.
rica, loving shade and moisture. It bl
April and May. Propagated by see
offsets. Sow the seed in pots in a
Plant out the following autumn.

COWSLIP, THE COMMON
PAIGLE. (*Primula veris.*) A nati
rennial weed, growing in meadows a
tures, chiefly on a clay or chalky s
produces sweet-scented yellow
which appear in April, and are u
making cowslip wine or balsamic te
roots have a fine odour, similar to
anise, and give additional strength
or beer, when immersed in the cask.
leaves and flowers are excellent fo
silk worms, and are eaten eagerly by
The leaves are also used as a pot-he
in salads.

The flowers, leaves, and roots are al
cinal portions of the cowslip, and ar
into tea, wine, and conserve. It is a
in its quality, and the ancient writer
herbs speak highly of its effects; bu
opinions have lost their value b
(*Eng. Flora*, vol. i. p. 271.; *Willich*
Encyc.)

COWSLIP OF JERUSALE
LUNGWORT PULMONARIA.
monaria officinalis.) This plant is pe
and flowers in May. It grows eigh
inches high, with long, broad, hairy le
a deep green, spotted on the upper s
white spots. The stalks are slen
hairy, with small leaves upon the
flowers are reddish in the bud b
when blown, small, growing in cl
the top of its stalk. The root is
The leaves have been used med
from the idea that they resemble th
and therefore must be useful in d
those organs. They are inert, an
quently useless.

COW-TIE. A provincial term
to a short thick hair rope, with a
nut at one end and an eye in th

tying the hind legs of the
ing.
EE, or WILD APPLE
Malus.) There are se-
mong the wild crabs, some
f excellent flavour when
ty of sugar, even surpass-
apples. (*Eng. Flora*, vol.
b apples and sloes are the
ally belonging to our north-
th are medicinal. The ex-
f any of them, called ver-
ood housewives in the coun-
lent as an astringent gargle
nd in thrush and ulceration
nd gums. It is sometimes
er-yeast, and applied out-
mmations, bad legs, burns,
ds; but cold water and rest

HEELS OF HORSES.
le clefts which are said to
nstitutional, but more fre-
the want of cleanliness and
.

A kind of bow which is
to a scythe, the better to
when low, into swarths.
rm applied to large rocks
other stones in the north.
ame in some of the northern
common crow.
RRY. One of the names
owberry, or black-berried

RN. A name given in the
l-rail. See Land-rail.
EDLE. The plant termed
e.
. A provincial word used
rge boughs of trees, from
t-wood has been cut.
Y. (*Vaccinium Oxycoccus.*)
RRY.
HE. (*Grus cinerea.*) Is
an English bird as it was
ood is grain, aquatic plants,
, and molusca. Its nest is
mongst reeds or osierbeds,
d buildings; it lays but two
reenish olive colour, spotted
een and brown. The co-
k of the crane is greenish
rkish blue; wings, back, tail,
ce, ash grey; whole length
our feet. (*Yarrell's Brit.*
. 437.)
Y, THE FIELD. (*Tipula*
which is particularly worthy
angler's list: it is an inch and
th, with transparent wings,
markings. The *garden crane*
striped crane fly, and the spider fly, all varieties of the Harry-long-legs, as this fly is called by the vulgar, are good dipping baits for chub and trout in August and September. (*Blaine's Rural Sports*, p. 1009.)

CRANE'S BILL. (*Geranium.*) A genus of plants comprising a large number of species, of which, according to Smith (*Eng. Flor.* vol. ii. p. 221.), only thirteen are indigenous. The blue meadow crane's bill (*G. pratense*) is found in rich, rather moist pastures, and thickets, especially in the hilly parts of England. It is a perennial, flowering in June and July; flowers, of a fine blue, often irregularly striped or blotched with white, sometimes entirely white. The species of crane's bill called Herb Robert (*G. Robertianum*), possesses most medicinal virtues, and is found under hedges and in uncultivated places, flowering all through the summer. The stalks, and indeed the whole plant, is often quite red, as are the flowers, and the fruit is long and slender, resembling a crane's bill, after which it is named. The leaves are large, divided into many parts, and stand in pairs at every joint of their long-footed stalks. It is a very powerful astringent, and may be given in any form, decocted fresh, or powdered when dry.

CRAP. A local name in some places for darnel, and in others for buckwheat.

CRAPULA. See Hoven.

CRATCH. A term in some parts of the country for a rack.

CRAZEY. A word applied to the weed called creeping-crowfoot.

CREAM. See Butter.

CREAM GAUGE, or GLASS. A graduated glass tube to ascertain the produce of cream. In a tube containing ten inches' depth of milk, every tenth of an inch will of course indicate one per cent. of cream. It may be used for many purposes, such as to ascertain the state of the animal's health, regular and quiet feeding, &c. (*Quart. Journ. Agr.* vol. ii. p. 245.)

CREAM-SLICE. A sort of wooden knife, twelve or fourteen inches in length.

CREEL. A provincial word for a sort of bier used in salving or smearing sheep, and for slaughtering them.

CREEPER, COMMON. (*Certhia familiaris.*) This is amongst the smallest of the British birds. It makes its nest in hollow trees, and lays in April seven to nine eggs, which are white, with red spots. Colour of the bird dark brown. Whole length five inches. (*Yarrell's Brit. Birds*, vol. ii. p. 159.)

CREPIS, or PURPLE HAWK'S BEARD. (*Crepis rubra.*) A hardy annual, native of the South of France, blowing a purple flower in June and July. Sow the seed in a hot bed, and plant out.

CRESS. See American Cress.

CRESS, BITTER WINTER. (*Barbarea vulgaris.*) See Winter Cress.

CRESS, INDIAN, or MAJOR NASTURTIUM. (*Tropæolum majus*, diminutive of *tropæum*, a trophy; and *T. minus.*) The major nasturtium being the most productive, as well of flowers and leaves as of fruit, is the one that is usually cultivated in the kitchen garden; the fruit being used in pickling, and the flowers and leaves in salads and for garnishing. They will flourish in almost any soil, but the one in which they are most productive, is a light fresh loam. In a strong rich soil, the plants are luxuriant, but they afford fewer berries, and those of inferior flavour. They like an open situation. Sow from the beginning of March to the middle of May; the earlier, however, the better. The seed may be inserted in a drill, two inches deep, along its bottom, in a single row, with a space of two or three inches between every two, or they may be dibbled in at a similar distance and depth. The minor is likewise often sown in patches. The major should be inserted beneath a vacant paling, wall, or hedge, to which its stems may be trained, or in an open compartment with sticks inserted on each side. The runners at first require a little attention to enable them to climb, but they soon are capable of doing so unassisted. The minor either may trail along the ground, or be supported with short sticks. If water is not afforded during dry weather, they will not shoot so vigorously or be so productive. They flower from June until the close of October. The fruit for pickling must be gathered when of full size, and whilst green and fleshy, during August. For the production of seed, some plants should be left ungathered, as the first produced are not only the finest in general, but are often the only ones that ripen. They should be gathered as they ripen, which they do from the close of August to the beginning of October. They must on no account be stored until perfectly dry and hard. The finest and soundest seed of the previous year's production should alone be sown; if it is older, the plants are seldom vigorous. (*G. W. Johnson's Kitchen Garden.*)

CRESS ROCKET. (*Vella annua*, from *velan*, the Celtic name of the cress.) A species of cress which is found, but very rarely, in sandy fields. The root is small and tapering; the stem erect, bushy, leafy, about a span high. Flowers rather small, pale yellow, with purplish veins. (*Eng. Flor.* vol. iii. p. 156.) When cultivated, this shrub is commonly grown as a green-house plant, but it is sufficiently hardy to endure the winter if planted in a dry warm south border. It
is increased by young cuttings
under a glass. (*Paxton's Bot. Dict.*

CRESS, WALL, or ROCK
(*Arabis.*) A genus of plants of v
ferent habit from the last, of wh
species are numerous, and chiefly
of the northern hemisphere. There
species described by Smith (*Eng.*
vol. iii. p. 209.), but the wall cress (
Thaliana) is preferred. All the speci
a pungent flavour. The plants are
for ornamenting rock work, and are
gated from seeds or cuttings. Th
sorts are found frequent on old walls,
banks or rocks, dry sandy ground, a
tage roofs.

CRESS, WATER. (*Nasturtium.*)
are several native species of water
which may be included in the fol
summary. Creeping yellow cress,
yellow cress, amphibious yellow c
great water radish, and common wate
They are branching herbs, almost inv
smooth, throwing out numerous radic
either altogether aquatic or at least
in wet ground. (*Eng. Flor.* vol. iii.
5.) Water cress (*N. officinale*) was
admitted as an object of cultivation,
never to any extent, until Mr. Bradb
West Hyde, Herts, undertook its cult
for the London market. Mr. Bradber
siders that there are three varieties
green-leaved, which is easiest cult
small brown-leaved, which is hardie
the large brown-leaved, which is th
having most leaf in proportion to th
and is the only one that can well b
vated in deep waters. (*Trans. H*
Lond. vol. iv. p. 538.) The plants
best in a moderately swift stream, a
inch and a half deep, over a gra
chalky bottom, and the nearer its
the better: when there is choice,
tuations, therefore, should be exc
planted. If mud is the natural bo
should be removed, and gravel sub
The plants are to be set in rows,
most conducive to their health a
flavour, inasmuch as that they are r
exposed to the current of water, o
if there is not a constant stream, the
thrive. In shallow water, as abo
tioned, the rows may be made only
inches apart, but in deeper curren
five to seven feet are sometimes ne
The beds must be cleared and re
twice a year, for in the mud and
which quickly collect, the plants
will not grow freely, but it is diff
separate them in gathering; it is
rendered imperative by the heads b
small from frequent cutting. Th
for planting and renewal are in succ

during May and June, the plants
h will come into production in
and again from September to
, those in the last month being
the spring. In renewing the
, the bed of the stream, com-
owards its head, being cleared of
rubbish, from the mass of plants
the youngest and best rooted
elected. These are returned into
n, and retained in their proper
a stone placed on each. After
have been cut about three times,
n to stock, and then the oftener
ut the better. In summer they
cut very close. The situation
ourable, they will yield a supply
week. In winter the water should
four or five inches deep; this is
ected, by leaving the plants with
ads, which impedes the current.
ts ought always to be cut off;
greatly injures the plants. (*Trans.*
d. Soc. vol. iv. p. 537–42.)

Sometimes applied to a rack for
aw for cattle, and sometimes to a
r corn or chaff; also to a small
in a cow-house or shed for calves

BITING. A vice to which some
re subject; consisting in their
hold of the manger, and it is said
n the air. It generally proceeds
ranged state of the stomach, but
es brought on by uneasiness oc-
by diseases of the teeth, or by
in the person who currycombs
Brande.) There are several straps
s in use to prevent crib-biting,
best being that invented by Mr.
(*Blaine's Encyc.* p. 318, 319.)

BLE. A coarse sieve, or screen
sand, gravel, or corn; the term
pplied to a sort of coarse meal,
but one degree better than bran.

. In farriery, is when a horse
rn his neck any way, and when
ted he cannot take his meat from
d without great pain.

ET. The common or hearth
ryllina). This insect frequents
nd bakers' ovens, on account of
h of those places. An easy me-
stroying them is to place phials
f beer or any other liquid near
, and they will crawl into them,
n be easily taken. A hedgehog
a kitchen.

LE. A provincial word applied
r rope for fastening a gate with;
cringle up" signifies to fasten

S. (*Crocus vernus.*) An indigenous well-known bulb. There are many varieties, and all are handsome. Plant in clumps; move them once in three years, to separate the offsets; they like a good light soil. Plant them two inches deep in the ground. Smith (*Eng. Flor.* vol. i. p. 46. and vol. iv. p. 262.) describes four species of native crocuses, viz. the saffron crocus, purple spring crocus, naked flowering crocus, and net rooted crocus. See SAFFRON.

CROFT. A small field or inclosure. In the northern counties, one end of it generally contains the dwelling-house and kitchen-garden. It sometimes also means a common field.

CROFTERS. See COTTAGERS.

CRONES. A provincial word applied to the different descriptions of old ewes.

CROOK. A provincial term applied to a hook, as a *yat-crook* means a gate-hook.

CROOKS. In Devonshire a word applied to a sort of pack-horse furniture.

CROOM. A provincial term applied to an implement with crooked or hooked prongs. There are muck-crooms, turnip-crooms, &c. It is sometimes written *Crome.*

CROP. The produce or quantity of corn, roots, or grass, &c. grown on a piece of land at one time; hence we have corn, root, and green crops. There is an able paper in the *Quart. Journ. of Agr.* vol. i. p. 55. by Mr. Henry Stephens, on the causes of destruction to crops, which may be consulted with advantage by the farmer. For course of crops, see ROTATION OF CROPS.

CROPPING. An operation performed with a pair of shears, on the ears of horses, dogs, or other animals.

CROSSBILL, THE COMMON. (*Loxia curvirostra.*) The crossbills are visiters of this country, but their nests, eggs, and other habits are little known There is also *the parrot crossbill* (*L. pityopsittacus*), and the *white-winged crossbill* (*L. falcirostra*). They are all, however, only occasionally seen in this country; but will be found described at length by Yarrell. (*Brit. Birds,* vol. ii. p. 14. 34. 38.)

CROSS-FURROW. The grip or furrow which receives the superfluous rain-water from the outer furrows, and conveys it from the land into a ditch or other outlet. The operation of making these cross-furrows is sometimes performed by the spade, and at others by the plough.

CROSS-WORT BED-STRAW, or MUG-WORT. (*Galium cruciatum.*) This is a pretty perennial wild plant, growing a foot and a half high, and flowering all the summer in moist and fertile soils. Its stalks are square, hairy, and pale green. Its leaves grow four together at each joint of the stalk, like a star in form, and are short and broad in their shape. Its small yellow flowers stand in clusters of eight, on a slender corymbose stalk, just where the leaves spring. The plant must be drawn up whole and dried when it is budding. A decoction of it is astringent. See BED-STRAW.

CROTCH. A country term for a hook.

CROWBERRY, BLACK, or CRAKE-BERRY. (*Empetrum nigrum.*) A dwarf-trailing heath-like shrub, with numerous leafy smooth branches, growing on mountainous heaths in the north abundantly. Leaves crowded, dark green; flowers, reddish; berries, half the size of a currant, purplish black, with a mild flavour of elder-berries; chiefly food of mountain birds and quadrupeds. It flowers in May. (*Smith's Eng. Flor.* vol. iv. p. 233.)

CROWD and CROWDING-BARROW. Provincial terms, in some districts, for a wheel-barrow and the occupation of wheeling a barrow.

CROW, THE CARRION. (*Corvus Corone.*) This bird keeps in pairs all the year. Lives in woods. Preys upon carrion, young lambs and leverets, dead fish, young poultry, game, and even pigeons. It builds its nest in February, on a tree. Eggs, four or five, of a pale green colour. The male feeds the female while on her eggs. Sometimes pairs with the hooded crow. Colour, black. Length, eighteen inches.

The Hooded Crow (*Corvus Cornix*) resembles the carrion crow in appearance; but is only a constant resident of the northern parts of our island and the western isles of Scotland; it is more destructive to the farmers' lambs, &c. than the carrion crow. Its colour is black. Length, twenty inches. (*Yarrell's Brit. Birds*, vol. ii. p. 79—83.)

CROW-FOOT, or CRANE'S BILL. (*Ranunculus acris.*) There are several sorts of crow-foot, and all the varieties are poisonous. The common creeping crow-foot is the medicinal plant, and that is only used externally. The most poisonous of the species is spearwort. The common crow-foot grows a foot high, its stalks being thick and branched, but rarely upright, and of a pale green; few leaves grow upon the stalks, and they are divided into narrow segments. The leaves, which rise from the root, are large, divided into three parts, and sometimes spotted with white. The leaves or root, when recent and bruised, blister.

CROW NEEDLES. See SHEPHERD'S NEEDLE.

CROW NET. A net made of double thread or fine packthread, principally used for catching wildfowl in the winter season; but which may also be employed on newly sown corn-fields for catching pigeons, crows, and other birds; and, even in stubble-fields,
if the stubble conceals the net fr
birds.

CROWN, IMPERIAL. (*Fritilla*
perialis.) Native of Persia, with
scaly, bulbous, or orange coloured, di
ably smelling root. Blows pende
flowers in April and May. There ar
varieties, the red-flowered, the red
flowered with striped leaves, and the
flowered; that blowing a yellow fl
the handsomest. Propagate by offse
third year, taking up the bulbs in J
that purpose. It loves a sandy loa
is averse to manure or wet. See
LARY.

CROWN LANDS. Lands held
the crown; such as those belonging
Board of Ordnance, the Departm
Woods and Forests, &c.

CRUPPER A term applied
rump of a horse; also to a roll of
put under a horse's tail, and drawn
strap to the buckle behind the saddl

CRUSHERS FOR CORN, CA
are evidently coming fast into use;
saving of food, by giving the cor
broken state, is certainly very consid
It is a practice at least as old as th
of Samuel Hartlib, who mentions
approbation in his "Legacie." T
graving opposite represents perhaps
form of the modern crushing machi
am indebted for it to the Messrs. R
of Ipswich. It is adapted for bruisin
oats, or linseed. It is made with two
to admit of being worked in case of
an extra hand; and has two acc
turned up rollers, which are readily
a greater or less distance from each
according to circumstances.

CUB. A provincial word appli
cattle-crib.

CUBIC PETRE. See NITRATE O

CUCKOO, THE COMMON. (
canorus.) Appears in April; usual
heard about April 20th, but somet
week sooner; lays its eggs in the
other birds, such as those of the
redstart, whitethroat, chaffinch, gre
blackbird, linnet, &c. in May and
which, compared with the size
bird, are very small, and of a pale
grey colour. The day after the
is hatched, he begins to shoulder out
the eggs or other birds which may b
nest with him; he is always found in
possession of it. The colour of th
back, and head, bluish grey; tail
black; the whole length about 13 in

The yellow billed American Cucko
cyzus Americanus) is but rarely
England. He has a yellow beak; th
neck, and wings, yellowish brow

tipped with white; whole length of rd about twelve inches; his form is t. (*Yarrell's Brit. Birds*, vol. ii. —189.)

KOO-FLOWER, or MEADOW 'S SMOCK. (*Cardamine pratensis.*) ery pretty wild plant is a gay and ble decoration to our fields in April, nd June. It rises a foot high; the s thick and firm; and the leaves g upon it are small, and stand singly. leaves which rise from the root are l regularly, and spread in a circular r. The flowers grow in little clusters, e large and white, frequently tinged ale red. The fresh leaves are pleasa salads. The juice of the leaves is ic and anti-spasmodic. Cuckoos were formerly given in epilepsy, me other spasmodic diseases; but they w rarely prescribed; and were, when ue, more praised than they merited. are of no value in scurvy.

CKOO BREAD. A name for the on wood sorrel.

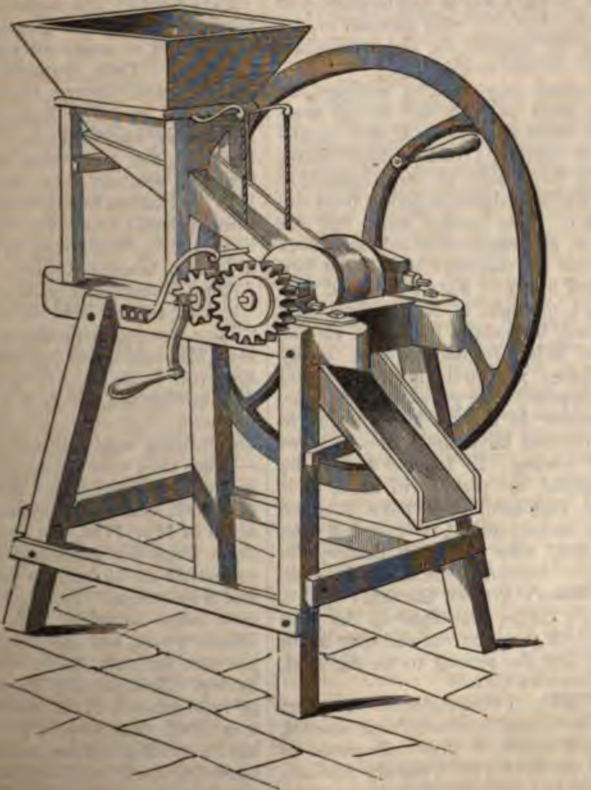
CKOO LAMBS. A term applied in some districts to such lambs as are yeaned in April or May, because they fall in cuckoo time.

CUCKOO PINT. See Arum.

CUCKOO SPIT. Provincially applied to a kind of frothy substance frequently found on plants, containing one or two aphides.

CUCUMBER. (*Cucumis sativus.* From *κικυος* or *σικυος*. Varro says, "Cucumeres dicuntur a curvore, ut curvimere dicti.") The following are the chief varieties;—1. Early short green prickly; 2. early long green prickly; 3. most long green prickly; 4. early green cluster; 5. white Dutch prickly; 6. long smooth green Turkey; 7. large smooth green Roman; 8. Flanegan's; 9. Russian; 10. white Turkey; 11. Nepal; 12. fluted (from China); 13. the snake.

The early short prickly is about four inches long, and is often preferred for the first crop as being a very plentiful bearer, quick in coming into production, and the hardiest of all the varieties. The early long prickly is about seven inches long; it



SUFFOLK CRUSHER.

is a hardy, abundantly bearing variety, but not quick in coming into production. It is generally grown for main crops. The longest prickly is about nine or ten inches in length; it is a hardy, good bearer. There is a white sub-variety. The early green cluster is a very early bearer. Its fruit is about six inches long. It is chiefly characterised by its fruit growing in clusters. The whole plant grows compact, and is well suited for hand-glass crops. The white Dutch prickly is about six inches long, it has an agreeable flavour, though differing from most of the others. It comes quickly into bearing.

The other varieties are slow in coming into production, and are chiefly remarkable for their great size. The Nepal often weighs twelve pounds, being occasionally eight inches in diameter and seventeen in length. It is a native of Calcutta. The snake cucumber is very small in diameter, but attains the length, it is said, of several feet.

A fresh loam, rather inclining to lightness than tenacity, as the top-spit of a pasture, is, perhaps, as fine a soil as can be employed for the cucumber. It will succeed in any open soil of the garden, for the hand-glass and natural ground crops.

Open ground crops.—The sowings for these crops must be performed at the close of May, or early in June. A rich south-west border, beneath a reed or other fence, is peculiarly favourable, as they then enjoy a genial warmth without suffering from the meridian sun. The border being dug regularly over, and saucer-like hollows, about fifteen inches in diameter and one or two deep, formed five feet apart, the seed may be sown six or eight in each. Seed may also be sown beneath a hedge of similar aspect, and either trained to it or bushy branches placed perpendicular; this is said greatly to improve their growth and flavour. If the weather is dry it is requisite to water the patches moderately two or three days after sowing. In four or five, if the season is genial, the plants will make their appearance, and until they have attained their rough leaves, should be guarded from the small birds, who will often destroy the whole crop by devouring the seminal leaves. (*G. W. Johnson's Kitchen Garden.*)

CUD. In cattle, the food in the first stomach, which is to be chewed over again and passed into the second to be digested. See CHEWING THE CUD.

CUDWEED. (*Gnaphalium.*) A vast genus of plants, overburdened with species, among which there is great diversity of habit; and the exotic ones, chiefly African, undoubtedly require skilful investigation;
roots annual, or more generally per
herbage cottony; stem shrubby.
describes ten native species. The
cudweed (*G. germanicum*) is found
most all pastures, fields, and waste
on a barren gravelly soil; stems
to eighteen inches high; whole he
and cottony. (*Eng. Flora*, vol. iii.

This is a somewhat singular wil
and has many varieties; all of wh
formerly regarded as medicinal, part
that variety called the "herb impi
name derived from the circumstanc
young flowers rising above the old
suggesting the idea of children con
and discarding their parents. Cudw
low plant, seldom rising to a foot hi
stalks are white, slender, and
thickly covered with leaves, which a
white, pointed at the ends, and ob
form. The flowers are yellowish,
at the tops and in the division of th
A decoction of the herb in small
remedy among the poor in many pl
quinsies. The herb laid among li
prevents the breeding of moths.

CULLEY. The name of a distin
family of farmers, to whom the agri
of England is under very considera
ligations. Two brothers of the
Matthew and George Culley, were
originally on their paternal prop
Denton, at Gainsford near Darlingto
1841, in the possession of Mr.
Culley), whence they migrated i
1767, to Fenton, in Glendale, county
thumberland; and "On the 4th of
in that year, on my road to a fair at
says Mr. George Culley, in a le
Arthur Young (*Ann. of Agr.* vol. xx.
"I first saw a field of drilled
"They carried with them into Gl
says Mr. John Grey (*Journ. of R*
Soc. vol. ii. p. 152.) "superior kn
and intelligence, which they at once
to bear in their extensive undertaki
unremitting application and perse
—That they were successful in thei
is an undoubted fact. Thus on t
of Wark, near Coldstream, which
tered in May 1786, the crop was v
them from the preceding tenant,
estimated at 15 bushels per acre
and 9 for wheat. But the crop on
farm after being in their occupat
fifteen years, was estimated at 84
per acre for oats, 62 for wheat, an
barley. (*Ibid.* p. 158.) The rent of t
of 1200 acres in 1786, was 800*l.*; in
was 3200*l.* Matthew Culley died in
the 73d year of his age, and George
aged 79, both in Glendale. The
were the warm friends and corres

elebrated Bakewell, of Dishley,
e flock they introduced the breed
er sheep, which is still a prevail-
in Northumberland; and this
till preserved in a state of purity
resent owner of Denton, Mr.
Culley, to whom I am indebted
l of the facts of this memoir.
tion which they paid to the im-
of their breed of live stock was
g, and with a success which was
their labours. They had the
rit, too, not to conceal the im-
s which they effected: they pub-
or two valuable works, and were
quently contributors to the agri-
eriodicals of the day. Thus in the
Agr. vol. xiv. p. 180., there is a
Mr. George Culley, in praise of
y breed of sheep; and at p. 470.
ol, sheep, and corn of Northum-
again on sheep in vol. xvii. p. 347.
ix. p. 147.; on turnips, vol. xx.

36 George Culley published a
ctical little book (*Observations on*
t), which was reprinted in 1795.
oung describes its author (*Ann. of*
xxiii. p. 519.) as "a man of the
nsive practice, and the deepest
e of his art." He also published,
ction with Mr. Bailey, the agri-
eports of Northumberland, Cum-
nd Westmoreland, 1797—1805.

. Among botanists, signifies straw
; defined by Linnæus to be the
m of grasses, scitamineous plants,
like, which elevates the leaves,
d fruit. This sort of stem is tu-
hollow, and has frequently knots
distributed at certain distances
s whole length.

IFEROUS PLANTS. Such as
ulms, or have a smooth jointed
their seeds enveloped in chaffy
ss-like.

IVATOR. A name given to imple-
he horse-hoe kind, invented for stir-
arth. See Grubber and Scarifier.

OR, or COULTER. The strong
bar of iron that is fixed in
for the purpose of cutting open
before the share. See Plough.

ER. A provincial term applied
n, in some places. Hence culver-
lies a pigeon-house or dove-cot.

N SEED. The seed or fruit of
um *cyminum*, which is imported
ly and Malta. It has been occa-
grown in this country, but as it
produce its seeds until the second
requires a rich, and consequently
ed soil, the double rent adds
heavily to its culture. (*Brit. Husb.* vol. ii. p. 328.) Cumin is a plant of little beauty, and in a garden merely requires to be sown in any open border to succeed.

CURATE. (Lat. *curare*, to take care of.) Properly an incumbent who has the cure of souls; now generally restricted to signify the spiritual assistant of a rector or vicar in his cure. Curates form the lowest order of the clergy; and are divided into two classes, perpetual and stipendiary. (*Brande's Dict. of Science.*)

CURD. The coagulum of milk, from which cheese is made. See Cheese.

When milk sours, free acetic acid is formed, and by its action the coagulation of the caseous part of the milk takes place; rennet causes the same effect in milk which is not sour, which probably depends on the gastric fluid in the rennet. Curd is a white, insipid, inodorous substance, insoluble in water, but soluble in alkalies. By alcohol it is converted into a substance like spermaceti, which gives out a very fetid odour.

When dry curd procured from sour milk is well washed, and then mixed with its own bulk of alcohol, and the soluble matter filtered and separated from the insoluble, and thickened by gentle evaporation, it becomes viscid, and forms an excellent cement for glass and china.

CURING BEEF and PORK. See Salting. A report of the committee for the premium offered for curing beef and pork, appears in the *Trans. High. Soc.* vol. v. p. 55.

CURL. A disease in potatoes. "No disease," says Mr. G. W. Johnson, "appears to me so evidently to arise from impaired vital energy in the plant, as the curl, which of late years has made such extensive ravages upon our potato crops. Any one can insure the occurrence of this disease, at least I have found so in the county of Essex, by keeping the sets in a situation favourable to their vegetation, as in a warm damp outhouse, and then rubbing off repeatedly the long shoots they have thrown out; sets that have been so treated, I have invariably found to produce curled plants. Is not the reason very apparent? The vital energy had been weakened by the repeated efforts to vegetate, so that, when planted in the soil, their energy was unequal to the perfect development of the parts; for the curl is nothing more or less than a distorted or incomplete formation of the foliage, preceded by an imperfect production of the fibrous roots. The following experiment I consider as very decisive: — it was made in the year 1830, in my garden at Great Totham, in the county of Essex. The soil in this case, and in all others that will be stated hereafter, unless otherwise specified, is light, deep, moderately fertile, resting on a substratum of silicious gravel, and is constituted as follows —

Water	30·5
Stones and coarse sand	15·5
Vegetable fibres	5
Saline matters	4·5
Oxide of iron	2·4
Carbonate of lime	17·5
Decomposing matter	7
Alumina	15
Silica	102·5
	200

The variety employed in this experiment was the early. An equal of whole, moderately sized potatoes, that had been treated in three different modes, were planted the last week of March. No. 1. twenty sets that had been carefully kept cold and dry throughout the winter, firm, unshrivelled, and with scarcely any symptoms of vegetation. No. 2. twenty sets that had been kept warm and moist, and from which the shoots, after attaining a length of six inches, had been thrice removed. No. 3. twenty sets which had been kept warm and moist for about half the time that No. 2. had, from which the shoots, three inches in length, had been removed only twice. All the sets were planted the same morning, each exactly six inches below the surface, and each with an unsprouted eye upwards. The spring was genial; of No. 1. nineteen plants came up. The twentieth seemed to have been removed by an accident. Of the nineteen, not one was curled. The produce of a full average crop of No. 2., all came up, but twelve days later than those of No. 1., and three of the plants sixteen days later. Fourteen of the plants were curled. Of No. 3. all came up, but from ten to fourteen days later than No. 1. Four plants were as severely curled as those in No. 2.; eight were less so and the remainder not at all. But of these the produce was below an average, and a full fortnight later in ripening.

Dickson, Crichton, Knight, and others (*Caledonian Hort. Mem.*; *Hort. Trans.*; *Loudon's Gard. Mag.* &c.), have found that tubers taken up before they are fully ripened, produce plants not so liable to the curl as those that have remained in the ground until completely perfected: and I believe, under ordinary treatment, this to be the fact, for it is rational. The process of ripening proceeds in the potato as in the apple. After it has been gathered, and until that is perfected, it is accumulating vigour, shows no appetency to vegetate, consequently is not exhausting its vitality, which is a great point, c
careless mode usually adopted
through the winter, for this
mences its decline from th
begins to develope the parts
plant. Tubers taken from
perfectly ripe, never are so e
symptoms of vegetation. Cric
and Young in some of the
referred to, have also agr
posing the sets to light and
them to become dry and shri
duces the curl in the plant
them. This result of experi
firms my conclusion that the
from deficient vital energy;
more than this drying one
to the light and air, tends
from a tuber altogether the
tating. Mr. G. Maker, a fa
in the same village that I d
1836 rather small sets, cutti
sized potato into at least tw
favourable weather, other
a somewhat dilatory habit,
leave those sets upon a bar
for more than a week. H
them a two acre field, and
three-fifths vegetated, of whi
a fourth were in various
Similar results were obtaine
riments of Mr. Wright, a m
of Westfield. When the set
to ferment in a heap, and to
had a crop, one-fifth of whi
(*Gard. Mag.* vol. x. p. 436.)

Every one acquainted wit
tion of the potato, is awar
difference existing in the
their early and rapid vegetat
excel in this quality, of cour
easily excitable. A consequ
that they are always plante
spring, before their vital pow
very active; and, of all cro
monstrates these early ones
to the curl. But what is th
on the contrary; if an e
planted for a main crop late
when extraordinary pains i
cold and dry have not bee
check their vegetation, a
decrease of vital energy, su
more than any other, are li
ease. The statements of a
in the *Gardener's Magazine*
entirely support my views
He remarks that, in 1826, t
valence of rain, the late c
never sufficiently ripened s
ketable. They were reserv
next season, and the conseq
the curl affected the crops

tent: but those who planted well-
tubers, had crops free from the
and as productive as usual. Now
now that the vital energy is always
powerful in a bulb or seed that is
ripened. The results of my view
isease, sustained by numerous ex-
s, are, that it will never occur if
wing points are attended to: 1st,
sets are from tubers that exhibit
any symptoms of incipient vege-
To effect which, they ought,
ut the winter, to be preserved as
dry, and as much excluded from the
ssible. 2dly, that the tubers should
ctly ripened; 3dly, that they should
ed immediately after they are cut;
at the manure applied should be
egularly, and mixed with the soil,
along a trench in immediate con-
the sets; 5thly, that the crop is
d for several successive years on
e area. (*Quart. Journ. of Agr.*
p. 206.)

EW, THE. (*Scolopax arquata.*)
of snipe. Its bill is six to seven
g. The head and neck pale brown,
d; breast and belly white, marked
ng black spots. Nest made of
gs from three to five, of an olive
ed with brown. It frequents
nd utters a peculiar note or
Montague's Ornith. Dict. p. 124.)

NG. A natural and favourite
cotland, which is practised in
the ice, and consists of sliding,
ark to another, great stones of
to seventy pounds' weight, of an
emispherical form, with an iron
handle at top. The object of
is to lay his stone as near the
sible; to guard that of his part-
had been well laid before; or to
at of his antagonist. (*Blaine's*
ts, p. 118.)

NT. The fruit of two species
iz. *R. rubrum*, which furnishes
n red and white currants, and
which produces the black cur-
e are five or six species of this
plant. The rock currant (*R. pe-*
acid mountain currant (*R. spi-*
the tasteless mountain currant
), all grow wild in woods in the
gland; and the common red and
nts are also found wild in many
country, but their fruit is in-
pale currant is a variety between
white.

e, black, and red currant ripen
s very early in July, in which
rant jelly should be made. All
ts may, by being matted, be
preserved till the middle of winter, and on north walls and shaded situations sometimes hang, and are good till the end of November. They will thrive on almost any soil; but their fruit is more savoury when produced in a dry and open ground. They are very easily propagated by planting slips or cuttings at any time from September to March. After standing about two years, they will be fit to be removed to those places where they are intended to remain.

The currant, one of the most wholesome and grateful of fruits, has medicinal properties. Red currants are very cooling in fevers. They quench thirst, and create appetite. When the fruit is not to be had fresh, red currant jelly, mixed in water, is equally refreshing. Black currants are useful in sore throats. (*Brande's Dict.*; *Phillips's Fruits*; *Willich's Dom. Encyc.*; *Eng. Flor.* vol. i. p. 330.)

CURTIS, WILLIAM, was born at Alton in Hampshire, in 1746, and is known as the founder of the *Botan. Mag.* In 1773 he was appointed Lecturer of the Chelsea Garden. He died in 1779. The following are brief notices of those of his writings which claim our particular notice: —

1. Flora Londinensis. 1777—1798. 2 vols. Folio. Containing six fasciculi of seventy-two plates each. 2. Botanical Magazine. 1787. In monthly numbers. 8vo. Still continued. 3. Practical Observations on the British Grasses. 1782. 8vo. Second edition. 1790. 4. A History of the Brown-tailed Moth. 1782. 8vo. 5. A Catalogue of British Medical, Culinary, and Agricultural Plants, cultivated in the London Botanical Garden. 1784. 12mo. 6. Directions for the Culture of the Crambe Maritima or Sea Kale, for the Use of the Table. 8vo. with a Plate.

CUSHAT. A local name for the ring-dove, supposed to be derived from the Saxon cusceate, from *cusc*, chaste, in allusion to the conjugal fidelity of this bird.

CUSHION, LADIES'. (*Saxifraga hypnoides.*) See SAXIFRAGE, MOSSY.

CUSPATED FLOWERS. Those whose petals or flower-leaves end in a sharp point.

CUSTOMARY-LANDS. Such lands as are granted by lords of manors to their tenants.

CUSTOMS OF COUNTIES. With regard to the usual relation of landlord and tenant these vary considerably. But in cases where there is a written agreement, no enquiry can be made as to the custom of the county (*Liebenrood* v. *Vines*, 1 Mer. 15.); and when an express stipulation is made, the custom of the county is excluded entirely. (*Roberts* v. *Parker*, 1 C. & M. 808.) The following epitome, chiefly abridged from the work of Kennedy and Grainger on the Tenancy of Land, must, of course, be regarded as having only a *very general* application.

Bedford. — The tenant commonly enters, in this county, at Michaelmas, some at Lady-day. Leases 7 years. Rents paid half yearly. Tenant generally restricted from breaking up pastures, or selling hay and straw, quitting at Michaelmas, is at liberty to plough and sow wheat, if at Lady-day; then may sow spring-corn till day of quitting; but in either case has the option to do it himself or let his successor do it. When the outgoer sows, they are valued to the incomer so as to include all labour; has barn allowed him, but cannot carry away straw. Incomer takes all dung found on premises free of charge; but pays for grass seeds, and that of the labour, and for fallow-ploughing, or spring-ploughing, which his predecessor, quitting at Lady-day, had not time to sow; but with respect to any fallow, either for wheat or turnips, when the outgoer takes the crop, there is no demand made upon the incoming tenant.

Berks. — Farms commonly lease for 7 or 14 years from Michaelmas, entering to plough fallows at Lady-day; from which time the incomer has part of the house allowed him, and room for one team; the outgoer retains the rest of the premises till May-day or Midsummer. The rents are commonly paid half-yearly, and in general there is no restraint upon the tenant's cultivation, except that he covenants to leave a stated number of acres for fallow. Usually he has power of selling hay and wheat-straw, although in other portions of the county only to exchange it for dung. Wheat-straw he must leave to his successor as well as the hay. Incomer has to pay for clover or other grass-seeds, the seed, and labour, and hay crop, at a feeding-out price.

Berwick. — The farms in this county are let in a very peculiar manner, viz. on lease for 19 or 21 years. Tenant enters at May-day; 18 months allowed, after he takes possession, before called upon for any rent, and then only for half a year, leaving a twelvemonth due; and this arrearage continues till the end of the lease, when he is allowed 12 months after the expiration of his lease; but if the landlord has any doubt of his tenant's solvency, he, of course, prevents the removal of the stock, crops, &c. Tenant, prohibited from taking two white crops successively, must lay the land down in regular rotation, to have a proportion in turnips, or fallow in corn, seeds, or grass every year, and so must leave it at the expiration of his lease. Cannot sell either hay or straw. On leaving, harvests his last crop and threshes his corn on the premises; leaving straw and the fallows, grass and seeds, as well as the dung, for the incomer.

Brecknock. — Mostly tenants at will, who enter at Lady-day, or Candlemas, and
take full possession on May
is little restrained in mode
cannot carry away hay or s
annually sow about one-third
land with wheat, and bring a
tity of lime into the farm.
part of the house, and one
use of the yards, until Ma
cattle. For his dung he rec
for his wheat-crop he takes tw
land which was fallowed, b
sown after any other crop;
as much of the land in seeds
it; if he leaves more, he is pai
not for fallows.

Buckingham. Leases com
terms. The tenant enters
sometimes at Michaelmas.
yearly; but most commonl
stricted as to mode of cu
tenant may sell hay and stra
he pleases. An outgoer ca
corn till Lady-day; is to be
on the ground, for carting m
any ploughing, of which his
the sole benefit. If the inc
take the spring-corn and whe
Lady-day, the outgoer can
self, paying rent and taxes
stands upon till the followin
but he gives up all the dung

Cambridge. Tenants chie
leases for 4 or 5 years, are
breaking up pasture land, and
or straw; but otherwise unre
cultivation. Outgoer usuall
Lady-day, and having sown
spring crops, he harvests the
the wheat, paying no rent fr
leaves. He must thresh and
upon the premises before th
after harvest. Incomer take
only the seed, pasture, and
old Lady-day, but pays the re
of the farm, for the seeds
done to the fallows; he takes

Carmarthen. Farms were
let upon leases for 3 lives; b
years are now more common.
made upon both house and la
mas. The tenant is under
cultivates as he pleases, and
and dung.

Cheshire. Farms let up
many only by the year, and
more common practice than
nant takes from Candlemas,
possession of the house at
tenant is commonly restrain
more than a given proportion
one-third under plough. Thi
ever, he may till in his own w
may dispose of his hay and st

er ceases to work on the farm
s; but cuts the wheat crop at
the wheat was after a fallow he
irds of the crop, otherwise only
l he houses his own portion. He
y not paid for grass seeds, but
ustom varies, he cuts the clover
l takes half the hay; the incomer
remainder, and paying the rent:
valuation to pay of any kind.
e does not pay for.

. Leases generally from 14 to 21
Lady-day, with privilege of going
the preceding Midsummer to pre-
r wheat, and to plough for spring
Candlemas. The outgoer is al-
main in part of the house, or in
ith his stock for the purpose of
raw, till the old May-day fol-
iving up possession. He leaves
wever, for the incoming tenant.
s bound not to exceed two white
it manure, using 101 bushels of
e for the first crop. When the
 with grass seeds it must re-
or 3 years, and, except in water
can only cut his grass once in
nless he dresses it with manure.
 hay, but the straw of wheat
obliged also to feed a certain
res of grass, and whatever ma-
es must be left by the outgoing
f charge.

d. Tenants enter at Lady-day
, but not into the house till May-
ommonly for 3, 7, or 9 years. The
only bound to plough the land
ortions that a certain part may
ass for 3 years. Is prohibited
2 white crops in succession, and
as much land sown with grass
ound on the farm. Cannot sell
, and must apply not less than
f lime per acre for his wheat or
 a fallow. The outgoer retains
f the house and premises for
ay-day. Is paid for whatever
ves which he himself paid for
ok the farm. Leaves all the
anure for the incomer's benefit.

Tenants yearly, farms small;
ds entry at Lady-day; in the
St. Andrew's day (30th of No-
ut in either case the house
he following May-day. As to
o restrictions; may sell hay and
oing tenant is paid for manure
. The wheat crop is divided
sower and the reaper, the last
nt.

enants chiefly yearly tenants
ay. The land almost entirely
The tenant is usually restricted from breaking these up without permission, even if he lays down arable land in lieu of it. He cannot sell either hay or straw. The outgoing tenant is not paid for either manure or straw; he always sows the wheat, but is not paid for any fallows or ploughings which may have been done at his expense to promote the growth of it; he receives, however, two-thirds of the wheat if a fallow crop, or one-half if a brush crop, and for the seed crops he is allowed for seed and labour.

Devon. In the west, entry at Michaelmas; in the east at Lady-day, with privilege of entry on the land at Midsummer to prepare for wheat. The tenant usually restrained from taking more than 2 white crops for a fallow, or sowing 2 wheat crops successively, without a fallow or green crop between them. Must use a certain quantity of lime per acre for his barley or wheat crop, and leave the same quantity of land for wheat at the expiration of his lease that he found on taking possession. He has the liberty of selling hay and wheat, straw, and at the end of his lease the hay also. A Lady-day holder receives from his successor the value of the wheat upon the ground, and the young clovers or other grass seeds by valuation. A Michaelmas tenant can only receive the value of the seeds; but in either case he freely leaves all the dung for his successor.

Dorset. Leases for 14 or 21 years are common; entry at Michaelmas, with privilege of entry for wheat crop at Midsummer; but in the western side the period of entry is very commonly Lady-day. The cow and sheep leases are entirely separate takings from the rest of the land; the former under a Lady-day entry, generally terminating at the Candlemas preceding the expiration of the farm lease; and the latter at the ensuing Midsummer, under a Michaelmas entry; the sheep and farm leases both commonly end at the same time, and the low leases at Candlemas.

Durham. The holdings are in the eastern portion of this county chiefly yearly; in the western, leasehold. Entry at May-day of the house and land, but the pasture lands are given up at Lady-day. The tenant usually covenants to farm on the four shift system. The outgoer takes an off going crop of all the corn; but he is restrained from sowing more than two-thirds of the arable land, and is bound to leave the seeds and fallow for the incomer: if the quantity of corn exceeds the given number of acres, the incomer takes all over the stipulated quantity free from payment.

Essex. The farmer in Essex commonly holds by leases of 7 or 14 years; entry at

Michaelmas both of house and land. He usually covenants to farm on the four shift system, dressing and fallowing after every third crop, and never to take two white crops in succession: on pasture land, however, he is commonly unrestrained. He may carry also hay or straw, but for every load of either he is bound to bring back a load of dung, and near London two loads are required for every load of straw, and one for every load of hay.

The outgoing tenant sows the Michaelmas crop, and is paid by valuation for one year's improvement, which includes the labour, the seed, and the manure he has laid out upon the ground from the preceding Michaelmas. He is allowed for the seeds, for ploughing, harrowing, and rolling, which a summer fallow has undergone, for the manure laid on, and for the carting of it, and for all the unspread dung, or other manure on the farm. The outgoer has the use of the barns for his crop. The incomer claims the straw and chaff on condition of his thrashing the corn, and carrying it to market. The incomer has the Michaelmas crops, the hay, turnips, and young seeds valued to him, with all the seed, labour, and manure bestowed upon them.

Glamorgan. Farms are here usually let on short leases of 7 or 14 years. Entry in the south at Lady-day and May-day; but in the north and east it is usually at Candlemas and May-day. The tenants may usually remove not only hay and straw, but dung, and he is seldom restrained in his mode of cultivation. The outgoing tenant commonly sows the wheat crop, and is paid for it by the valuation of three neighbouring farmers, and likewise for the seed and labour of the grass seeds. The incomer has the option of ploughing for his own fallows, and for his spring crop; but he cannot enter for this purpose without leave before Lady-day.

Gloucester. The farm leases are usually for 7 or 14 years. Usual entry at Lady-day, sometimes at Michaelmas. The outgoer retaining certain barns and offices for the sake of his crop, and feeding the straw.

The tenant is commonly restrained from carrying away either hay or straw from the premises, and he must leave the farm in the same state of cropping as he found it. He commonly is directed to fallow on the four-shift system.

The outgoer at Lady-day sows what corn he can previous to that period, and takes an off-going crop of the wheat and spring corn which he sows; but he pays rent for the standing crop until the ensuing Michaelmas. An incomer at Michaelmas has the option of sowing the wheat, but he cannot go upon
the land before that time for the purp
ploughing, without permission from the
goer. On the Cotswold Hills, however
incomer has sometimes the privilege o
tering for this purpose on the 1st of
tember.

Hants. In this county farms have
generally, till lately, held upon leases;
of late, a practice has sprung up of ho
from year to year, at Michaelmas,
the privilege of entering at May-da
prepare the land for turnips and Mic
mas seed corn. The tenant is comm
restrained from removing either ha
straw from the farm, or taking two w
crops in succession, but he may hav
white ones. The incomer may en
May-day to sow his seeds, while the
goer is sowing his barley. The ou
cuts and feeds the hay and straw o
premises, leaving the dung to the in
free from charge.

Hereford. Farms are chiefly let b
year, general entry at Candlemas; the
going tenant retaining one meadow,
part of the house, barns, &c. till May-d

The tenant usually agrees not to re
either hay or straw; nor is he allowe
an outgoer, for either dung, or fallow
labour: he cannot, during the last y
sow more than one third of his arable l
with wheat; but, otherwise, he may culti
the land as he pleases. If the incomer
not take the wheat crop by valuation,
outgoer cuts and claims the whole
himself, but he pays no rent after Candle
The incomer, however, is bound to
the seeds at a valuation, but the dung
the farm he takes free from charge.

Hertford. Leases, 7 or 14 years
Lady-day. Mode of cultivation varies
times two crops and a fallow, in other
four-course system. The tenant ma
hay and wheat straw, but no other
The outgoing tenant takes an o
crop of both Spring and Michaelmas
and pays for the ground they stan
till harvest. He must use, however,
year's straw upon the premises,
leaves all the dung for the incoming

Huntingdon. Chiefly yearly holdings
old Lady-day, when the incomer
possession of the house, seeds, past an
fallow land; the outgoer taking the
and yards until the Midsummer succ
harvest time. The tenants are com
restricted from carrying away hay or
but not as to any particular mode of
vation. Leaving at old Lady-day, h
time to sow barley and other spring
which, with the wheat crop, he harvests
takes; but he pays no rent after the p
he quits. He must thresh the corn a

and leave or feed all the straw; paid for the young seeds, the value nd labour, and for his winter fal-

Much of the land of Kent, as in nties, is held by the year, but a rtion is rented under leases of 7 or ; the tenant entering at Michael-

rmer is usually restrained from y or straw; or if he is allowed to f them it is on condition of his on to the farm a certain quantity He is usually not much restricted e of cultivation. He is commonly from having more than two white fallow.

tgoing tenant threshes his last sells the straw to the incomer; is obliged to feed the hay upon es, this is commonly valued also g out price. He is paid also for r bestowed upon the summer hich he has the privilege of to the time of his quitting the is also paid for the seed and for the turnips and the grasses; le of the manure, and labour of d spreading the manure of the nd for half of the preceding — the hop poles make the pay- uired of an incoming tenant ry.

r. The farms are most com- by 7 years' leases, from Candle- e house, &c. at May-day.

ant is commonly restrained from re than a certain proportion of nder the plough at one time; — that portion in tillage he may he pleases: — or, he is allowed what he pleases, provided he takes hite crops before he lays down d with seeds. He may sell his traw, but he is compelled to lay a antity of manure on his soil every e outgoing tenant giving up pos- Candlemas is allowed to retain r his stock until May-day. From crop after a fallow, he receives , but if after beans or potatoes, if after a white crop, he has no- e is not paid for the manure. He e cutting of the wheat crop.

r is chiefly farmed by yearly ten- enter at Lady-day, and occa- Michaelmas. They are not al- reak up their pastures or sell or straw. Sometimes they en- an annual amount of lime on the

tgoing tenant is paid for all clear r which he is allowed three ploughings; but if he has taken a green crop he is allowed nothing. For his wheat crop, if it has been sown on a clear fallow, for instance; he is allowed for seed and labour, and for the ploughings, but otherwise only for seed and labour. He is allowed for his seed crop, labour, and seed; but nothing for a turnip fallow, either fed or pulled: if he leaves at Michaelmas, however, he is allowed for his turnips one year's rent. The incomer cannot enter to plough without permission till Lady-day.

Lincoln. Farms commonly held by lease, of from 7 to 14 years from Lady-day.

The tenant is usually restrained from selling either hay or straw, or from taking more than two white crops to a fallow; these restrictions, however, do not apply to the fen land.

The outgoing tenant has commonly the right of sowing spring-corn until Lady-day, and of taking an offgoing crop, both of wheat and other corn, all of which, however, he must thresh on the premises. But a very common way is for the outgoer to be paid for all his crops, the value of seed and labour, and also for the manure. The crops are valued at harvest time, and the price is set according to the average of three market days, taken once a month, between harvest time and the ensuing Lady-day.

Monmouth is principally farmed by yearly tenants, who enter upon the meadow land at Christmas, and upon the arable at Candlemas, the outgoer retaining one field and part of the house till May-day. He has two thirds of the wheat crop after a fallow, but only half of a brush crop.

The tenant is not much restrained as to his mode of cultivation; the incomer pays for the seeds and labour of the seed crops, but he does not pay for the manure.

Norfolk. Farmers hold chiefly by leases of 7 or 14 years, some for 21, and they enter at Michaelmas. They generally covenant to farm on the four-course system, are often restrained from sowing above a certain number of tares of oats. This crop being considered to be much more impoverishing to the land than barley, he is not allowed to sell either hay or straw. The outgoing tenant either threshes his harvest himself or he agrees with his successor, who carries out the corn and keeps the straw and chaff; the incomer pays for the growing crops on the ground, but not for the labour; thus if the turnip crop fails he receives nothing for the labour.

The incomer sows the wheat crop, but he cannot enter the farm before Michaelmas-day; to do this without leave, he has to pay for the hay on the farm; but he takes the dung free.

Northampton is tenanted chiefly by yearly holders who enter at Lady-day, and are restrained from selling hay or straw, or taking more than two white crops without a fallow. The outgoing tenant gives up possession of the house, land, and premises together; is paid by his successor for the seed, wheat, and labour, and fallow, if it was a clear one, but not for bastard fallows; for the labour and seed of seed crops, and for any winter ploughing; but he does not without authority plough the land intended for spring-corn. The incomer, however, cannot enter to plough without leave before Lady-day; he does not pay for the manure found on the farm.

Northumberland. Leases for 7, 14, or 21 years are general from May-day. The tenant is commonly bound not to cut or feed seeds during the last year of his lease after harvest: in some places the landlord when he lets the farm sows the seeds himself, and the tenant is bound, when he quits, to leave the same quantity of seeds upon the ground. The tenant must not sell either hay or straw, or where he is allowed to sell them, he must bring back a load of manure for every load carried off: he cannot have more than two white crops and a green one after a fallow.

An outgoing tenant takes all the corn crops that are upon the ground, threshing them on the premises and leaving the straw to the incomer, who carries the corn to market for him.[*] The incomer pays for the grass seeds, the fallows, and the manure.

Nottingham is cultivated chiefly by yearly tenants, who enter at Lady-day. They are commonly not allowed to sell either hay or straw, not to take more than three crops to a fallow, and never two white ones in succession. When the incomer enters at Michaelmas the outgoer is paid by valuation, either upon wheat or turnips, for all the seed and labour he has bestowed upon that crop, and for all the ploughing he has done before the time he quits; for all artificial manure, such as bones, &c. if for the first crop then the full

The outgoer sows the whe
must have this done by Mi
paid for the wheat, the val
labour; and in a similar m
and turnips, and ploughin
and carting dung during th
mer and winter: but he is
dung.

Rutland. — Tenants usual
year from Lady-day: they
to sell either hay or straw,
wise farm as they please.

The incoming tenant pay
crop, turnips and seeds, plo
fallows, and dung carting;
takes free: he pays also for
ings. In the southern part
he also pays for the dung, a
plough for and sow the s
charge it to the incomer.

Salop. — Farms are gen
yearly tenants, who enter at
on to the meadow land, in
Candlemas, that he may wa
He is restrained from sellin
but not to any particular m
tion. When he quits, he is
lime he may have brought
within the last two years;
for that of the last year; ha
that of the preceding: h
thirds of the value of the w
value of the seed crops; b
either fallows or dung. He
for fallows or spring crops
thority of the incomer, wh
himself to plough without lea
day.

Somerset. — Farmers hav
of 8 or 12 years from Lady-
retaining the wheat crop, th
premises, and leaving the s
dung for the incomer; an
pose he commonly holds o
summer twelvemonth after
sion. A tenant cannot sell
straw, or take more than t
and a green one without a
restrained from breaking u
he very commonly consent

are fed off. For all the wheat
fallow, sown previously to his
uit, he receives two thirds of the
brush crop, only one half: but
sows after notice, only the value
and labour. The incomer cannot
lough before Lady-day; he pays
he dung and straw left on the

—The farmers commonly cultivate
es of 7 or 14 years, from old Mi-
lay. They are restricted from
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lling either hay or straw. The
enant sows the crops, and the in-
es them at a valuation, paying
the ploughings, harrowings, dung
nd other work performed during
us twelvemonth; the value of the
labour bestowed on the turnip
crop, for all the seed crops, and
ng in or on the land.

—Farmers usually hold under
14, or 21 years from Michaelmas,
akes possession, the outgoer re-
May-day part of the house and
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ant is commonly restrained from
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he is not restricted to any par-
le of culture; the soil being so
erent in different portions of the
d the proximity to London, of
enders a variety of modes of cul-
ble.

omer pays for all fallows of the
nd half those of the preceding
ll manure in or on the land, for
sed the preceding year; for fold-
alf foldings, in the same way as
gs; and for seeds, lays, and un-
The hay and straw at a feeding
nd the rent and taxes of the fal-
e previous twelvemonth.

—The farmers of this county are
monly yearly tenants from Mi-
the outgoer retaining a portion of
and the outbuildings until May-
are not much restricted as to their
cultivation; he is allowed to sell
ded he draws back a load of dung,
t take more than two straw crops
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ee years. The soil of this county
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t portions, for any general rule
down for the farmer's guidance.

goer takes his crop, and if the
reshes it and carries it out, he is
e straw and chaff, otherwise he
, or the dung produced from it.
er pays for all the wheat and turnip fallows; the value of the seed and labour on turnips, grass seeds, or corn in the ground, and manure in the ground for turnips or Michaelmas crops, and half the value of all manure expended on the farm during the year preceding the last twelve months; but only half of that spread on meadow lands after a crop has been taken. The incomer pays also the rent and taxes of the fallows from the time they were first ploughed.

Warwick.—Lands are chiefly held by yearly tenants from Lady-day. They cannot take away hay or straw, cannot take more than three crops to a fallow, but there is no restriction as to the kind of white crops.

The outgoing tenant is paid for his grass seeds, seed, and labour. If his wheat has been sown upon a clean fallow, he has the option of taking it upon payment of rent and taxes for the land it grows upon till Michaelmas; but if it is a brush crop, then the incomer has the option to take it, or let the outgoer take it on the above terms. The outgoer is paid for his winter fallows, but not for a turnip fallow, even if fed off. The incomer may either plough the ground himself for the spring corn, or pay the outgoer for doing it; but he cannot enter to do this without leave till Lady-day; he neither pays for hay, straw, or dung.

Westmoreland.—Leases in this county are commonly granted for 7, 9, 11, or 21 years from Lady-day. The house, and one field, however, is usually retained till May-day: he has the privilege, however, of going upon the land at old Candlemas to plough for his fallow and spring crop.

The tenant is commonly restricted from having more than two white crops before he sows the land with seed, and that between the two white crops he is to have either a green one or a fallow. He is to manure his meadow ground once in three years, and leave the farm in the same working plight as he found it. The outgoer retains the house and one field till May-day, paying rent and taxes, however, for what he thus holds; with this exception, he is bound to free the land by the 6th of April. In the south of this county, the outgoer receives for the wheat crop on the ground, two thirds if fallowed for, and one half after a bastard fallow. He pays for this, however, no rent after the 6th of April. He may plough for barley and take half the crop, but not for any other spring crop.

Wilts.—The farms in this county are commonly held in leases for 7, 14, or 21 years from Midsummer. The incomer then enters upon grass seeds, fallows, and grass lands, with a portion of the house and stable room. The remainder of the land he enters upon at Michaelmas; and finally upon the house and buildings at the following Midsummer.

The tenant is restrained from carrying away either hay or straw from the premises; covenants to farm on either the three, four, or five field system, and not to take two white crops in succession. The outgoer must free the whole of his land from stock by Michaelmas. He may feed all the fallow land up to Midsummer, and the clover stubble till Michaelmas, but he must leave the meadows at Midsummer. He takes the abode of his corn crop, threshing it upon the premises, and leaving the straw for his successor by the Midsummer succeeding. The incomer most commonly cuts the hay crop, paying the outgoer the value of the crop of meadow hay, and the value of the seed, labour, carting the manure, and folding on the grass lands, but he takes all the dung without payment.

Worcester.—Leases are commonly granted in this county for 3, 5, or 7 years, sometimes for 14 and 21. The tenant cannot sell either hay or straw. He is restrained for the last year of his term in his mode of cultivation, not to sow more than one third of his arable land with wheat, otherwise he may cultivate as he pleases.

The outgoer is not paid for his dung, or for his fallows, or any thing else except the young seeds. He cuts and claims the whole wheat crop himself, except the tithe; he pays no rent for it, and is entitled to hold the barn, and yard room allowed him for making use of the straw upon the premises.

Yorkshire. — In this great county, the customs vary with the Riding. In the W.R. the entry is Old Candlemas, or New Year's day. In the N.R. it is Lady-day: may go on to the land at Candlemas, and into the house at May-day. In the E.R. the entry is at Lady-day. In all three Ridings a yearly tenancy is the most common.

In the N.R. the outgoing tenant sows his wheat, and has an off going crop, which he may either thrèsh himself, or sell to his successor or to a stranger; but he cannot

plough for his spring crop and f
takes the young seeds. In the
of the West Riding, the custon
the incomer and outgoer are the
the north; but below Aberford t
are quite different, being, as the
"good ones to come out with, b
to enter upon." For there the o
the wheat crop, which the income
to pay for, together with the
and to pay for the tillage and ha
those crops and on the turnips,
the manure laid upon the land
the premises; the incomer wh
Candlemas has two and a half yea
and one and a half year's tillage
In the East Riding, the outgoe
wheat crop and the spring-corn,
day, and takes what he sows as
crop along with the wheat, payi
after Lady-day: he must thresh
ever, on the premises, and leave t
An incomer has here only to pa
(*Kennedy and Grainger on Tenan*

CUT. In farriery, a hurt or cl
made with any sharp-cutting i
The way of treating such an
to bring the two incised surface
and bind them up, if possible,
lint or tow, without any balsams o
applications being used. It is
moisten the lint with cold water.

CUTTING. When a hors
wounds one leg with the opposit
best remedy is to put on the cut
shoe of even thickness from heel
projecting in the slightest degree
crusp, and the crusp itself to
little at the quarters. This shoe
have one nail on the inside, and
close to the toe. (*Lib. Useful K*
HORSE, pp. 252. 341.)

CYCLAMEN, or SOW BRE
clamen europæum.) A perennial
tive of Austria, which blows a w
shaded with pink in April. It l
tered situation, and south east asp
in heath mould. Sow the seed
and the seedling remains three y
sufficiently strong to blow.

Cynosurus erucæformis. Linear-spiked dog's tail grass, flourishes best on a rich deep loam; next best on a clayey loam; in which soil Sinclair obtained of this grass, when in flower, 6806 lbs. per acre, containing nutritive matter 365 lbs.

Cynosurus echinatus. Rough dog's tail grass. It is a scarce, and an inferior grass. When in bloom, it yielded Sinclair per acre from a sandy loam 5445 lbs., containing of nutritive matter 191. (*Paxton's Bot. Dict.*; *Sinclair's Hort. Gram. Wob.*)

CYPERUS GRASS, MILLET. (*Scirpus sylvaticus.*) The wood club-rush. See Scirpus.

CYPERUS, SWEET, or ENGLISH GALINGALE. (*Cyperus longus.*) This is a wild perennial plant, growing, but not common, in our marshes and moist places, two or three feet high. Its stalk is green and leafless, except two or three small leaves at the top from which the tufts of flowers rise. The root leaves are a foot long, narrow, grassy, and bright green. The flowers are brown. The root is long, moderately creeping, highly aromatic, and astringent. There is a smaller species, the brown Cyperus (*C. fuscus*), which is an annual, and grows much smaller, not reaching to above six inches high; root of many simple fibres. (*Smith's Eng. Flor.* vol. i. p. 53.)

CYPHEL, MOSSY, or DWARF CHERLERIA. (*Cherleria sedoides.*) A peren- al plant, found on the loftiest mountains in otland; root densely crowded, strong, and mewhat woody, bearing close moss-like fts of leafy stems; flowers, yellowish en. The generic name given by Haller mmemorates J. H. Cherler, the coadjutor John Bauhin in his general *History of nts.* (*Eng. Flor.* vol. ii. p. 312.)

CYPRESS TREE. (*Cupressus sempervirens.*) A hardy shrub, native of the Levant; growing from fifteen to twenty feet gh, which throws out yellow blossoms in y. Its wood is red, very hard, and sweet nted. It likes a good soil. It is the bel of sorrow all over Europe, in the st, and even in China. Its wood from ng sonorous is used for harps, violins, d other musical instruments. Worms ver attack it. (*Phillip's Shrub.* vol. i. 188.; *M'Culloch's Com. Dict.*)

CYTISUS, or LABURNUM. (*Cytisus burnum.*) Originally from the Alps, enty and thirty feet high. Blows a pendu- s raceme of yellow papilionaceous flowers May and June. The common Cytisus (*C. ilifolius*) reaches to twelve feet high, ring yellow flowers in May and June. A ive of Provence. The hairy Cytisus (*C. sutus*), is a shrub from the southern parts Europe, less than the above, and blowing a yellow flower in June. The three sorts are equally hardy, and grow well any where. Propagate by seed. They require no pruning.

The seeds or peas of the laburnum, when occasionally eaten by children, have proved poisonous. They excite nausea, vomiting, great heat of the stomach, fever, a dry mouth, and after a time a fatal collapse. Although they excite vomiting, yet the stomach should be cleared of the seeds by an emetic; and acidulated liquids afterwards administered.

D.

DABBING. A term sometimes applied to dibbling; also a term in angling. See Daping.

DAB-CHICK. The country name for a chick newly hatched. Also a name given to the water hen.

DACE. (*Cyprinus leuciscus.*) A fish found in most of the still, deep rivers of this country, and in many standing waters which have any feeding current running through them, where it is very prolific. It seldom exceeds ten inches long, or weighs more than a pound, or a pound and a half. This fish is also known under the different names of dare, dart, shallow, and showler, in different counties. Dace spawn from beginning of March to middle of April. Bait, in spring, worms of most kinds, caddies, larvæ of beetles, grub and bobs of all sorts, small caterpillars, and water-snails. In summer, gentles; in autumn, greaves and pastes, particularly salmon's roe, are killing. Fly-fishing for dace is sometimes practised. (*Blaine's Rur. Sports*, 1045-7.)

DACTYLIS. A genus of grasses which are of but little value for cultivation. See Cock's-foot Grass.

DAFFODIL, COMMON. (*Narcissus Pseudo-narcissus.*) This perennial plant is found wild, in rather moist woods and thickets, blowing its pale yellow flowers in March and through April. The double yellow daffodil, so extremely common in gardens, evidently by its greener leaves, and the uniform golden yellow of its flowers, belongs to a different species. See Narcissus.

DAFFODIL, CHEQUERED, or Snake's Head. See Fritillary.

DAFFODIL, ONION-LEAVED. (*Asphodelus fistulosus.*) A perennial, native of the south of France, blowing its white flowers with a red stripe from June to September. It loves moisture and good soil. Propagate by separating the roots, or by seed in a hot-bed.

DAG. A term provincially applied to dew hanging upon the grass.

DAHLIA. (Lat.) A hardy perennial tuberous plant, native of Mexico, growing many feet high, if placed in rich soil. Dahlias are divided by gardeners into 1. globe-flowered, 2. anemone-flowered, and 3. camellia-flowered; and this division, though not quite botanically correct, is sufficient for practical purposes, and has, therefore, been employed by the nurserymen in making up their lists of the varieties of dahlias for sale, although they divide the last species into two; 1. that including the spotted, shaded, and striped dahlias; and 2. those of a single, or *self-coloured* dahlias. (Mr. Huet on "Culture of the Dahlia," *Quart. Journ. of Agr.* vol. vi. p. 72.) Dahlias bloom large, beautiful flowers of every colour, simple and variegated, by culture, in September, till frosts set in. They blow well, even in poor soil. Propagate by parting the roots, by cuttings, or from seed. When the stems turn black, dig up the tubers and secure them from frost. The best method of securing dahlias from the frost, and to preserve them through the winter is to dig a pit eighteen inches deep; to line it with straw, and to lay the tubers upon the straw with the crown, or part from which the herb springs downwards. Over them layers of straw and turf should be placed alternately, and earth heaped over the whole to the height of a foot above the mouth of the pit. Take the offsets from the mother plant; replant in April. For a list of good dahlias, see *Flor. Cab.* Dec. 1834; *Gard. Mag.* vol. x. p. 151.

DAIRY. The place where milk is kept, and butter and cheese prepared and preserved. The proper construction and management of a dairy are questions of considerable importance to the farmer. It should be situated, if possible, on a dry porous soil. The room should be made of brick or stone, with a floor of the same materials, for the sake of its being more readily and frequently washed with cold water, not only on the score of cleanliness, but that the temperature of the place may in summer be kept down to the most advantageous degree. And to this end, the dairy is commonly placed on the northern side of the house, where it may be readily shaded from the sun by other more elevated buildings, or by trees. A temperature between 50° and 60° is the best, and the less occasion there is to reduce the temperature of the dairy by washing the floor with cold water the better, since, amongst other disadvantages, the damp air thus produced is not so advantageous as a dry atmosphere for the retention of sweetness in milk and cream (*Farm. Rep.* p. 30.); and, therefore, the dairy-house
is generally covered with thatch
hardly be too well ventilated. It sh
removed from stagnant ponds and
drains; and furnished with wire
dows, by which insects are readily
without impairing the necessary
Adjoining to it should be place
house, furnished with a chimne
copper kettle to heat the water, or
dairies the milk. This is comm
ported by a crane.

The wash-house should have
door, near to which the dairy ute
be set on benches, to be dried
and air. In Holland the dairy
kept with the greatest order, nea
comfort, so much so, that the
family often take their meals in t
the economy of the dairy the foll
cellent directions, abridged from th
up by the Agricultural Society of
shire, may be studied by the fa
advantage. They refer chiefly
butter: —

1. The milk-house or dairy sh
no internal communication with
building. It must be kept free fr
well aired, and clean, and no pota
onions, cheese, or any thing likely
a strong or bad smell, should be kep
in short, nothing but the dairy
which must also be kept sweet a
2. The milk when brought in from
should be strained through a fine h
or drainer, and when cool put in
well-seasoned oaken kegs, keeler
pans, the latter to be preferred.
skimmer with holes in it is the
taking off the cream, which shoul
be churned while the cream is
The churn, whether plunge or barr
be made of the best well season
oak, and as cleanliness is of the fir
ance, great attention should be p
washing, drying, and airing of th
immediately after use, otherwise
sure to contract a sour and unw
smell, which must injure the quali
butter. 4. The butter *immedia*
being churned should be thrown i
spring water, where it should re
hour at least, that it may grow *fir*
butter should be *immediately* salte
is a very injurious practice to keep
of butter uncured till the next chu
the purpose of mixing the two tog
invariably injures the flavour of t
and renders it of too soft a qua
afterwards to get firm. 7. The
new calved cows should never b
butter, until at least four days afte
as a small quantity of biestmilk b
injure a whole firkin. The p

alding cream in cold weather should also avoided, as cream thus treated will never ake good butter. 8. Great care should be ken not to steep the firkins, or other dairy sels, in boggy or unwholesome water; ly the purest spring or clear running ater should be used. 9. Old butter should ver be mixed with new.

Lime-tree yields perhaps the best wood for utter firkins; and the St. Ubes' Bay or arine sweet salt, free from bittern, is the st salt to use for dairy purposes: this should e kept in a dry clean cask, in a place where moke (which is apt to impart a bad flavour it) cannot reach it. The management nd construction of the dairy of necessity aries with the articles for which it is chiefly tended to be devoted, as BUTTER, CHEESE, ILK: see these heads. The farmer will nd a good article on the dairy in Professor ow's *Breeds of British Animals* — a beau- ifully illustrated work, which should be atronised by all the Farmers' Clubs, as well s by those agriculturists to whom its price is ot an object. The following authorities may lso be consulted with advantage: "On e Meadows and Dairies of Holland" *Trans. High. Soc.* vol. i. p. 202.); "Re- orts upon Dairy Management" (*Ibid.* 341.; vol. ii. p. 254.; vol. vi. p. 406.); Mr. Aiton "On the making of Butter and heese in the Dairy District of Scotland" (*Quart. Journ. of Agr.* vol. v. p. 350., and *Com. to Board of Agr.* vol. iv. pp. 214—337.); also the article "Dairy" in vol. viii. of the *Penny Cyclo.* in *Baxter's Lib. of Agr. Know.*, and in vol. iii. of *British Husbandry, Lib. of Use. Know.*)

DAISY, COMMON, or DAY'S EYE. (*Bellis perennis.*) These large white *gawky-looking* flowers are so universal in our pastures and meadows, that description is almost needless. They flower all the year, principally dotting the meadows early in May: in March they begin to be common, and after Midsummer to be less numerous. The root is slender, and the plant flowers from March to September. Double, as well as proliferous daisies, are common in gardens, and the proliferous variety is now and then found wild. Domestic cattle scarcely touch this plant. Notwithstanding its beauty, and its celebration by poets, the daisy is thought a blemish or intruder in neat grass-plats, and can be overcome by perpetual stubbing only. (*Eng. Flor.* vol. iii. p. 444.)

ISY, MICHAELMAS. (*Aster Tra- anti.*) See ASTER.

AISY, MOON, or MIDSUMMER AISY. (*Chrysanthemum Leucanthemum.*) See OX EYE, GREAT WHITE.

DAITLE. A provincial phrase, signifying any thing done by the day. Thus daitleman, is a day-labourer, and daitle-work such work as is done by the day.

DALLOP. A provincial name for a tuft or clump of grass, &c.

DAM. The mother of any young domestic animal. Also a mole or bank to confine water. See EMBANKMENT.

DAMASK ROSE. (*Rosa centifolia.*) The rose of Damascus; a red rose of a very sweet odour. See ROSE.

DAMEWORT, or DAMES' VIOLET. (*Hesperis matronalis.*) An indigenous perennial plant, which grows in hilly pastures and hedges, especially near rivulets, but rare; and flowers in May or June. The flowers are purplish white, or brownish, exhaling a powerful scent, for the most part, in an evening. Boerhaave says, "it is anti-scorbutic and diaphoretic, and of great service in asthmas, coughs, and convulsions." It has also been recommended externally, in inflammations, cancers, gangrenes, and contagious disorders; but it has no reputation in the present day. (*Eng. Flora*, vol. iii. p. 207.)

DAMSON. A small useful black plum, brought originally from Damascus; whence the name.

DANDELION, COMMON. (*Leontodon Taraxacum.*) A corruption of the French name *dent de leon*, or lion's tooth. An indigenous, perennial plant, growing in meadows and pastures on road sides, ditch banks, and indeed every where. Root tap-shaped, very milky, externally black, difficult of extirpation; leaves numerous, spreading, of a bright shining green, quite smooth, and they may be called lion-toothed; flowers one and a half inches wide, of a uniform yellow colour, which blow from April to August, and have the remarkable property of expanding early in the morning, in fine weather only, and closing in the evening. (*Eng. Flora*, vol. iii. p. 349.) It is a valuable medicine, is aperient, powerfully diuretic and alterative in its qualities; and if persevered in, it is excellent in liver complaints; it must be taken in decoction, or in the form of extract. Its deobstruent influence in torpid conditions of the liver is striking; but its use must be persisted in for a considerable length of time. It should now and then be omitted for a few days, as it is apt to derange the stomach.

By culture, and especially by blanching, this herb, though, like the garden lettuce and endive, originally full of bitter milk, becomes sufficiently mild to be eaten in a salad, nor is its bitterness of a disagreeable kind. In France the roots and leaves are eaten with bread and butter. The marsh dandelion (*L. palustris*) is a distinct species, smaller in size than the foregoing, and naturally a bog plant, growing in low boggy meadows. Dandelion is relished by goats and especially by hogs, who devour it eagerly; but sheep and cows dislike it, and horses totally refuse it. (*Willich's Dom. Encyc.*)

DANDELION HAWKBIT. (*Apargia Taraxaci.*) See HAWKBIT.

DANDRIFF. A species of scurf which is brushed out in grooming the horse, and consists of scales or portions of the cuticle or scarf skin, detached in its gradual change or renewal.

DANE-WORT, or DWARF ELDER WALL-WORT. (*Sambucus Ebulus.*) The green leaves of this plant have a narcotic smell, and are said to expel mice from granaries; nor will moles come where these leaves or those of the common elder are laid. Cattle will not eat the foliage. Its berries impart a violet colour, and their juice mixed with vinegar dyes raw linen, as well as morocco leather, of an azure blue. (*Eng. Flora*, vol. ii. p. 108.; *Willich's Encyc.*) This perennial plant is frequently mistaken for the common elder. It grows four or five feet high, and dies away every autumn to the ground. The stalks are green and round, very like the shoots of common elder; but having no woody part about the plant, they rise green from the ground. The leaves are longer than common elder leaves, and they are serrated round their edges. The flowers are small and white, succeeded by black berries, which the birds rarely suffer to ripen. It loves untilled ground, hedgeways, &c. flowering in summer, and ripening its berries in autumn.

DANGEROUS ANIMALS. See NUISANCE.

DANK. A country term made use of to signify damp, humid, moist, or wet.

DANNOCKS. A provincial name for hedging-gloves.

DAPING, DABBING, or DIBBING. In fly-fishing is a term used when you have your line flying before you up or down the river as the wind serves. (*Walton*, p. 296.)

DAPPLE. A term sometimes used to signify marked with various colours.

DARGUE. A local word signifying the quantity of peat turf one man can cut, and two men wheel, in a day.

DARNEL. (*Bromus secalinus.*) Smooth rye brome-grass. (*Bromus mollis.*) Soft brome grass. Both these grasses pass under the common name of darnel. Professor Martyn supposes the annual bearded rye-grass (*Lolium temulentum*) to be the darnel of the Romans (*Virg. Georg.* i. 153.) Mr. Holdich, of the *Farmer's Journal* (*Essay on Weeds*), observes that he never found this grass among corn crops. Sinclair (*Hort.*
Gram. p. 32.) says, I have found
mus mollis and *Alopecurus agrestis*
Bromus secalinus to be the most
weeds (of the annual grass kind)
fields; these, therefore, may be c
the darnel of the British farmer.
Essay of Mr. Pitt, he treats of da
plant which he had often seen
crops, and perfectly well knew. I
ering, in his *Botany*, also ment
darnel (*Lolium temulentum*) as "c
corn fields, mostly among barley a
and that it is a very troubleso
among wheat, in Norfolk and Suff
doctor also describes another s
Lolium (*L. arvense*), as being muc
other, only it is smooth, and call
darnel. He observes that it is co
many parts and places, and "very
to a crop of wheat," for which h
Mr. Pitt's authority. Mr. Pitt,
names his darnel white darnel, but
ately calls it *L. temulentum*. Both
annuals, and flower in July and
Now it seems never to have occ
writers on this subject, that when t
in any difficulty about agricultur
they should have recourse to the c
of the seeds of the plants. It is
possible that any grass seed s
darnel, either ancient or modern,
seeds are heavy enough to resist t
ation of *dressing*, and to remai
wheat in part, in spite of all effor
rid of them. The ancients had
sieves, and they no doubt exerte
selves as much as possible to rid th
of such seeds as those of the *L. te*
while such deleterious effects are a
them, if baked in bread, &c.
these plants be common in corn
any part of England, or whether, i
their seeds are heavy enough to r
samples of wheat and barley, must
left undecided. I can only say, th
my experience, and as far as I h
seen or heard from practical aut
know of no darnel but the *Bromus*
and, less generally, the *Bromus moll*
Flora, vol. i. p. 151-3.; *Hort. Gra*
Sinclair's Weeds, p. 4.)

DARNEL. (*Lolium.*) There
species of this darnel enumerated
(*Eng. Flora*, vol. i. p. 173.) The
darnel (*L. perenne*), common in
pastures and waste ground, and we
to the farmer by the name of rye-
ray-grass. It yields an early cro
upon high or sandy lands, and ma
turf, which, however, is said n
lasting except upon a rich soil.
valuable information concerning
vation and merits is collected by

oker in his continuation of the *Flora* *dinensis*. The result seems to be that grass is best suited to the light land of rfolk, where it first obtained its reputation. e Rye Grass.) 2. The bearded darnel. *temulentum*.) The seeds of which are of y evil report for causing intoxication in n, beasts, and birds, and bringing on fatal vulsions. Haller speaks of them as com- nicating these properties to beer. 3. rt-awned annual darnel (*L. arvense*), her smaller and smoother than the pre- ling, of which it is probably but a va- ty. (*Eng. Flora*, vol. i. p. 172-5.)

DARTFORD WARBLER. (*Melizo- lus provincialis*.) A bird whose habits very like those of the wren, frequents se commons; food principally small in- ts, which it captures on the wing; nest ong furze of dry vegetable stalks, par- ularly goose-grass, and the tender dead nches of furze with a little wool. Eggs ee or four like those of the whitethroat, t rather less, weighing only 22 grs. eckled all over with olivaceous, brown, and ereous grey, on a greenish white ground. neral plumage greyish black and shaded own; belly, white; legs, toes, and claws, own; whole length of bird rather more n five inches; the tail feathers alone are arly half the length of the bird. (*Yarrell's rit. Birds*, vol. i. p. 311.)

DARTARS. In farriery, a sort of scab ulceration taking place on the chin, to ich lambs are subject.

DARWIN, ERASMUS, was born at ston, near Newark, in Nottinghamshire, the 12th of December, 1731. He was ucated at Chesterfield Grammar School, d St. John's College, Cambridge. He ed April 18. 1802. The only work which is necessary for me to mention, is

ytologia, or, The Philosophy of Agriculture and dening, with the Theory of Draining Morasses, and th an improved Construction of the Drill Plough. ndon. 1800. 4to.

DAUBING. A word meaning provin- ally plastering with clay.

DAUBY. A word applied to land when et, signifying clammy or sticky.

DAVYING. A provincial word applied the getting of marl out of the face of the iffs on the sea-coasts, when it is drawn up y a wince.

DAVY, SIR HUMPHRY, was born ecember 17. 1779, at Penzance in Corn- ll. In 1802 he commenced his lectures efore the Board of Agriculture, which he ontinued for ten years. The course is efore the public in his "Elements of Agri- ltural Chemistry." He died at Geneva n the 29th of May, 1829.

In private this illustrious individual was esteemed for his virtues, his amiability, his warmth of friendship, and his sincerity. In tracing his public progress, the truth, which cannot be too strongly maintained, is evidenced, that he who advances with steady pace along the path of Analysis, aiming at the demonstration of facts, rather than the illustration of previously formed theories, must always be a permanent benefactor of mankind, whatever may be his pursuit: — such was Cavendish, such was Davy. With an equal love of science, with patience equally exhaustless, and with perseverance equally unsubduable, their text and illustrations were furnished by the laboratory. The few theoretical inductions they have given us are the results from facts they had previously discovered; as such, they are among the few immutables of Science; like all truth, they will descend unimpaired amid the discoveries of ages. (*G. W. Johnson.*)

DAY BOOK. See Book-Keeping.

DEADLY NIGHTSHADE. See Belladonna and Nightshade.

DEAD-NETTLE. (*Lamium.*) A genus of perennial or annual European herbs, of which twenty species are described. The white dead-nettle (*L. album*) and red dead-nettle (*L. purpureum*) have already been noticed under the head Archangel as far as their medicinal properties are concerned. The herbage of the former is scarcely eaten by cattle, and has a slightly fetid scent. The flowers abound with honey. Low says (*Prac. Agr.* p. 446.) it is sometimes common in corn fields, and having a strong, creeping, perennial root, it should be carefully extirpated. There are three other indigenous species: — the spotted dead nettle (*L. maculatum*), which is a naturalised plant; the leaves are marked, either with a white central line, or with scattered white spots, flowers crimson, the lip beautifully speckled: the cut leaved dead-nettle (*L. incisum*); and the great henbit dead-nettle (*L. amplexicaule*), which require no notice. (*Eng. Flor.* vol iii. p. 89—92.)

DEAD-TOPS. A disease incident to young trees, which may be cured by cutting off the withered parts close to the nearest sound twig or shoot, and *claying* them over, in the same manner as practised in grafting.

DEAF. A provincial word signifying blasted or barren, as a deaf ear of grain, a deaf-nut, &c. or such as have no grain or kernel. In such cases it is probable that the pollen has been scattered, and never communicated the fertilising principle to the seed, which resembles in this respect an addle egg.

DEAL. (Sax. ðelan, to divide; Ger. *dielen*; Dutch, *deelen*; Dan. *daeler*.) The small thicknesses into which a piece of timber of any sort is cut up; but the term is now improperly restricted in its signification to the wood of the fir tree, cut up into thicknesses in the countries whence deals are imported. Their usual thickness is three inches, and their width nine. They are purchased by the hundred, which contains 120 deals, be their thickness what it may, and reduced by calculation to a standard thickness of one and a half inches, and a length of twelve feet. *Whole deal* is that which is one inch and a quarter thick, and *slit deal* is half that thickness. It has been improperly supposed, that the duties on timber, encouraging the importation of deals, have been hurtful; but this is a mistake, and the true interest of the consumer is best consulted by this form: the wood is better seasoned, it stows better, and there is less waste in using it than if it were imported in the log. See CUT DEALS, *Penny Cyclo.* vol. viii.

DEANETTLE. A provincial name for the weed wild hemp.

DEATH-WATCH. (*Anobium tessellatum; Termes pulsatorium* Lin.) The popular name for a small insect that harbours chiefly in old wood. It is produced from a very minute white egg, hatched in March; in the perfect state these insects are about $\frac{5}{16}$ths of an inch in length, and of a dark brown, spotted colour. They make a ticking noise, which is an expression of mutual affection between the male and female, but which has and is still superstitiously imagined by some to be an omen of death. (See *Penny Cyclo.* vol. viii.)

DEAZED. A provincial term signifying killed, or much injured by cold, as vegetables that are frost-nipped, or chicks that die in the shell.

DEBRIS. (Fr. *debrée.*) In Geology, any worn materials, such as fragments of rocks, ruins, or rubbish.

DECANDOLLE, M. PYRAME, a distinguished botanist and friend to Agriculture, was born on the 4th Feb. 1778. In 1806 he was appointed to make a tour through France for the furtherance of botanical and agricultural knowledge. For six years he published an annual report; and they at present form a portion of the "Memoires" of the Royal Central Agricultural Society of Paris. In these reports he gives the results of his observations upon Geographical Botany and Agriculture; and his Vegetable Statistics of France are the result of his various travels. In 1808 he became a Professor of Botany, and was appointed Director of the *Jardin des Plantes* by the Montpelier Faculty of Medicine. In 1813 he published his elementary treatise on Botany, one of the most profound works ever written on this
branch of science. In 1815, and
the hundred days, M. Decandolle
pointed Rector of the University
pelier; but on the restoration
Bourbons he was replaced by M.
as Professor, and nominated to the
of the Faculty of Sciences. Feari
ever, that this appointment would
voked, he tendered his resignation
and then retired to Geneva, wher
sided to the period of his death.
he published the two first volume
Prodromus Systematis Naturalis R
getabilis, and from that period he
sceptre of Botanical knowledge in
He died at Geneva on the 9th
1841. Of his numerous publicat
Organograpie, and *Physiologie*
his *Théorie élémentaire*, and his c
Prodromus, are doubtless the works
posterity will most commonly refer

DECEMBER. (Lat. *decem*, te
twelfth month of the year.

FARMER'S CALENDAR. — The
month of the year is the one in
agricultural work is ever the spo
weather; for this reason every kin
work, such as ploughing, wheat sow
carting manure, should, if pos
finished in the previous months.
yet, however, much work to be
carried on for the out-door
ditches may be cleansed, fences
plantations of fruit and timber trees
turf may be collected, earths car
ditches, old banks, marl, or clay,
pits, either as beds for future du
or for the temporary foundations
yards, to absorb the liquid matte
cattle and afterwards be mixed
dung. Towards the end of the
also, is a good period, especially
frosts, to commence carting nigh
other heavy distant fertilisers. L
now will require a regular supply
the thrasher should be steadily
in the barn; the chaff-cutter sho
be kept regularly to his work.
may be steamed, and advantageous
with chaff. Flood your water-
and extend and improve them.
portance of these meads is much
understood, or the theory of their
the water. Irrigation is, in truth
of applying the weakest of liquid
on a very bold scale, to grass-lands.
every farmer has a mode of accou
the highly fertilising effects of
Davy added another to the list of
tions. He thought that a winter
protected the grass from the inju
fects of frost; he examined with
meter, and with his usual add

neadows near Hungerford, in Berk-
nd ascertained that the temperature
oil was ten degrees higher than the
of the water, and that too on a
larch morning. He remarked, also,
hich most farmers will confirm, that
aters which breed the best fish are
e best fitted for watering meadows.
ltural Chem. p. 352.)
ave no doubt but that, hereafter,
of liquid manures will be very
xtended, and that water meadows,
l even by artificial means, will be
to a much larger extent than at
Look to the regular littering of
n-yard, be careful that no drainage
The sheep now require consider-
tention: give them dry food and
Vood-cutting should be proceeded
Attend to your land-drains; see
water lodges on the land.

ener's Calendar. — *Kitchen Gar-*
Artichokes, dress. *Asparagus*, beds,
, plant to force, attend that in
Beans, plant. *Beets*, red, dig up
re *b.* *Borecole* earth up. *Cab-*
plant, earth up. *Cauliflowers*, in
&c. attend to. *Carrots*, dig up and
Celery, plant, and earth up. *Cole-*
lant. *Cucumbers*, sow *e.*, attend to
vancing. *Composts*, prepare and turn
Dung, prepare for hot-beds. *Earth-*
attend to. *Endive*, blanch. Hot-
ttend to. *Kidney beans*, force *e.*
fallen, remove. *Lettuces*, plant in
s, attend to those advancing. *Li-*
dig up. *Mint*, force. *Mushroom*
ake, attend those in production.
s, dig up and store *b.* *Peas*, sow,
the open ground and in hot-beds,
o those advancing, plants to produce
tend to *b.* *Radishes*, sow *b.* *Small*
, sow in frames, &c. *Spinach*, clear
s. *Tansy*, force. *Tarragon*, force.
drain, &c. vacant ground. *Weed-*
nd to.

er Garden. — Protect the more deli-
nts from severe frost, by strewing
and, or litter over them; prune
and dig between them. If the
is open, you may still plant hardy
flowering shrubs.

ral Monthly Notices. — The
of December, so named by the
from being the tenth, or last month,
ich they divided the year, was de-
ted by the Saxons *Winter Monath;*
er their conversion to Christianity,
ndy gave it the name of holy month,
gh Monath.
e vegetable kingdom the researches
naturalist are most circumscribed;
e month in which the generality of plants are in their profoundest torpor. The evergreens alone retain an appearance of life amongst the larger tribes, and of these of the holly (*Ilex Aquifolium*), whose berries are, as it were, hallowed by the season, and the lauristina, are particularly conspicuous. The liverworts and mosses are the only plants that, midst the rigours of winter, persist in vegetating. These Esquimaux of the vegetable world, the lowest species of which are scarcely organised beings, or superior to crystals, are, like those inhabitants of the polar regions, delighters in continued cold. Far beyond, where the pine, still hardier birch, and Arctic raspberry, are unable to endure an increase of cold, even on rocks from around which the snow never dissolves, these *Cryptogami* retain their vigour, and afford a relief to the eye, weary of surveying the snowy waste. They are the most simple of organised beings. After being preserved in a state of dryness for years, they will, in general, regain their vegetative powers by being restored to moisture. Their individual utility is instanced in their employment by the dyer, and as an article of food. The lichen rocella, or orchill, from which the dye called litmus is procured, is an instance of the first; the Iceland moss (*L. islandicus*) of the second. Hedwig, Schreber, Dickson, Swartz, Bridel, Weber, Mohr, and Turner, need only be mentioned as travellers in this path of botany, to stamp its importance.

The elder (*Sambucus nigra*) is always of the first amongst our common plants that exhibits symptoms of reviving animation.

In the animal creation almost all the subjects of entomology are either wrapt in their winter's trance or actually destroyed. A few gnats only, on warm days, are now and then seen dancing in the sun-beams. All the larger animals that pass this season in a state of torpidity, are also retired to their places of concealment, as the badger, hedgehog, lizard, and frog. It is a curious fact that the one last mentioned may be frozen so completely as to be chipped with a chisel, like stone, yet, if gradually thawed, will be reanimated and as lively as ever.

The birds of more northern climes, compelled by a scarcity of food, leave their native haunts, and arrive in this country to vary the scene of animated nature. Those of our native animals, likewise, that retain all their functions, notwithstanding the severity of the season, become more interesting from their increased sociality. The timidity of the hare even is overcome, and she ventures to seek shelter, and to steal a frozen meal from the beds of our gardens. But the redbreast is most remarkable for his boldness; he is indeed at all times confiding, and fond of the society of man. Who ever saw a cottage, however sequestered, without a robin that claimed its protection, and whistled from its thatch? But now he enters the window, by degrees picks up the crumbs from its sill, and at length ventures to cherish himself before the fire. It is his confidence and inoffensive habits that have rendered him sacred to the household gods, from time immemorial, and hallowed him even to the feelings of the urchin schoolboy.

Frost and snow are the usual accompaniments of December; but in our fickle clime they are varying in their degrees of intensity, sometimes lasting uninterruptedly for weeks, while in other winters the farmer complains that he has not had frost and snow sufficient for the fertilisation of his land. Many erroneous ideas were formerly entertained of the causes of the fertilising properties of snow; it was supposed that snow contains saltpetre, and poetry failed not in its assistance to perpetuate the fiction.

> " Is not thy potent energy unseen,
> Myriads of little salts? . . .
> While through the blue serene,
> For sight too fine, the ethereal nitre flies."

But modern philosophy has shown other reasons for the good effects produced by snow upon the lands of the farmer. Melted snow is extremely prejudicial to the numerous animalculæ of the soil; for snow water is so totally free from vital air or oxygen gas, that even fish perish if placed in it. But this is one of the least valuable properties of melted snow. Its softness and freedom from foreign matters make it an admirable solvent; and it consequently holds in solution many substances of the utmost importance in agriculture.

In the year 987, the frost, which set in on the 22d of December, lasted 120 days; and that of 1729, which lasted nine weeks, began on the 24th. But the great frosts which have visited England have generally commenced much earlier; the greatest frost of which we have any account, that of 759, set in on the first of October, and lasted till the 26th of February. (*Farmer's Almanac.*)

DECIDUOUS. (Lat. *decido*, I fall off.) In zoology, a term applied to parts which have but a temporary existence, and are shed during the lifetime of the animals, as certain kinds of hair, horns, and teeth. In botany, it is applied to such trees and plants as shed their leaves in the autumn, in contradistinction to evergreens. Thus the oak, the elm, the beech, &c. are called deciduous trees.

DECOMPOSITION. (Lat. *decompositus.*) The reduction or dissolution of any

mixed body to the separate parts
it is composed. It is of great imp
be assured, that, in every process
position, whether by heat, air, or pu
nothing is lost, nothing is ultin
stroyed; the components of the d
substance form new compounds.
sition is therefore not, in strict la
destructive process; but merely
of affinities, and a transformation
new compounds.

DECORTICATION. (Lat.
The act of stripping off the bar
or husks of corn.

DECOY. (From Dutch *koey*
A device by which aquatic bir
ducks, are enticed from a river
a winding canal or ditch, which
narrows, and at last terminate
cover of net-work of several
length. The birds are enticed
bird, or by the smoothness of th
the margin of the canal, whic
them to leave the water and begi
their plumage. When so engage
distance up the canal, they are
surprised by the decoy-man and
who have been concealed behind
reeds; and, having again taken to
they are driven up by the dogs
enter within the net-work which
the decoy, and are then readil
(*Blaine's Rural Sports.*)

A curious mode of decoying
practised in China, and it migh
lowed in this country where th
sufficiently deep. A man wade
river up to his neck, and place
head an earthen pan, with a few
for the admission of air and for
he moves slowly in the water, th
pears as if it were floating in the s
a short time the ducks approach
dread; and as soon as they are
reach he lays hold of their legs
them under water. Two or thr
acting in concert in this manner
ture many ducks in a short space

DECOY-DUCK. A duck
lead others into a decoy. The F
ducks, Blaine tells us, are the be
and most successful. The Itali
cruel practice of putting out th
their call-birds, that, having noth
they may clamour the more.

DEER. (Sax. ꝺeoꞃ; Swed.
cervus.) The general name of
the stag kind, of which there
species. These may be primaril
into two groups; of which on
those with antlers more or less
the others those with rounded an
elk is the most characteristic spec

p. The reindeer differs from the e genus in the presence of antlers exes, and in the great development ow-antlers. The third species of able to the flat-horned group, is the ark, the fallow deer (*Cervus Dama* he period of gestation in the fallow ht months. We have in England ties of the fallow deer, which are e of foreign origin; the beautiful ind, and the deep brown sort, now in this country. These have mul- ceedingly in many parts of this which is now become famous for f superior fatness and flavour to ny other country in the world. ed deer of the *Dama* species must onfounded with the spotted deer om India, which is a distinct spe- ely the *Cervus* (*Axis*) *maculatus*, changes its spots, whereas the ow-deer becomes a uniform brown This species has been domesticated l, and propagates freely in parks. er and more elegant in form than leer, and furnishes as good venison. ies of deer of which the beam of gives a rounded form in section, r (*C. elaphus*) and the roe-buck *us*) are indigenous species. The deer, in the language of "*the f venerie*," is called a "hart," male a "hind." She goes with it a week longer than the fallow rings forth in May a single fawn, The young of both sexes are led "calves." In the common l deer, the shedding of the horns about the end of February, or rch. The fallow-deer sheds his about the middle of April to eeks of May. The roe-buck is t species of European deer; the nogamous, and the female brings fawns. In our own island they oundant, but not confined to the ountains. They are still found the rugged woods of Westmore- umberland. The roebuck in its ls does not keep in herds in its ions; but it only congregates in s. The food of the roebuck in nds of Scotland is the *Rubus* r roebuck-berry; but in winter e on the tender twigs of the birch r. The flesh of the roebuck is l delicate, when the animal has ed. The horns are used for knives, and other instruments. ieties of the genus *Cervus* are objects of the chase; the stag, the r, and the roebuck; *each of which been followed with great ardour,* according to the tastes of different sportsmen, and their means of gratifying them: the roebuck is, however, becoming scarce. (*Blaine's Rur. Sports; Brande's Dict.; Penny Cyclo.* vol. viii.; *Willich's Dom. Ency.*)

DEER-NECK, in horsemanship, signifies a thin ill-formed neck.

DEER'S HAIR. A name in the highlands of Scotland for the scaly-stalked spike-rush (*Eleocharis cæspitosa*).

DEER STEALING. See ANIMALS, STEALING OF.

DEFÆCATION. (Lat. *de*, and *fæx*, dregs.) The act of purifying or separating any liquor from the lees, or dregs, and impurities. The term is particularly applied to vegetable juices, which on standing throw down a thickish precipitate, which is usually termed fæces; hence defæcation is simply freeing fluids from the fæces. In general, rest only is requisite to accomplish this, but sometimes the aid of heat and additions of gelatine or isinglass to the fluid are necessary.

DENMARK. The Agriculture of Denmark, especially that of the Duchies of Sleswic, Holstein, and Lauenberg, has been described by Mr. Carr. A large portion of this extensive district is alluvial soil, of a very fertile description, composed of—

	Parts.
Silicious earth - - -	0·860
Clay - - - -	0·040
Oxide of iron - - -	0·030
Chalk - - - -	0·002
Gypsum - - - -	0·009
Organic matters - - -	0·014
Loss - - - -	0·045
	1·000

The size of the farms are between 50 and 200 acres, a portion of which is commonly left for eight or ten years in pasture. The meadows in the marshes are not uncommonly let for two guineas per acre. The usual rotation of crops commonly followed is, after grass, oats, fallow, winter barley, rape for seed, wheat, oats, beans, oats. The Danes plough deep, with four heavy horses; crops usually heavy, often returning as much per English acre, according to Mr. Carr, as—

			lbs.
Rape seed -	20	sacks of	200
Wheat - -	12 to 14	—	220
Winter barley -	25 to 30	—	200
Oats - -	30 to 36	—	160

This, however, seems an enormous produce. Their horses, sheep, and cattle are large, but coarse. Jutland is the great breeding district, the cows commonly yield from thirty to forty quarts of milk per diem. Their *implements* of husbandry are poor. The wheel ploughs, with wooden mould-boards, are drawn by two horses. The harrows, with the exception of the brake, have generally wooden teeth. The rotation on arable lands, is fallow dunged, rape seed, wheat or rye, barley, oats. In reference to seeds, red clover is sown in the proportion of 8 lbs., timothy or rye grass 6 lbs. per acre. Clover is made into hay; and then pastured for four years. There are three distinct breeds of cattle in these duchies. 1. The native cow, middle sized with not very long legs, fine head and horns, moderately thick neck, colour usually red or brown: these give most milk in proportion to their food. 2. The marsh cows, of a larger size, larger boned, colour red, requiring luxuriant pasturage, giving, when in full milk, twenty-four to thirty-two quarts per day, but their butter is smaller in quantity and of inferior quality to the others. 3. The Jutland cow, of fine bone, rather long body, colour grey or dun, more valued for its fattening than its milking qualities. (*Journ. of Roy. Agr. Soc.* vol. ii. p. 371.)

DENSHIRING or DEVONSHIRING. A term formerly used for the operation of paring and burning.

DESS OF HAY. A country term sometimes used to signify a cut of hay.

DESS UP. A provincial phrase, meaning to pile up neatly.

DEVIL IN A BUSH. (*Nigella damascena.*) Blows a sky blue flower from June to September, when it sheds its seed. It is an annual which loves a warm situation: sow the seed where it is to remain.

DEVIL'S-BIT SCABIOUS. (*Scabiosa Succisa.*) This perennial weed, delighting in moist pastures, woods, and hedgeways, grows a foot high, with slender stalks and dark purplish blue flowers, often milk white, resembling the garden scabious. It is also frequently seen in corn fields. The stalks are round, firm, and upright, divided into several branches, and having two small leaves at each joint. The leaves which grow from the root are four inches long, dark green, harsh, and somewhat hairy. The root is blackish, tapering, the end appearing bitten off. It was called "Devil's-bit," from the idea among the superstitious of the olden time that the devil had endeavoured to seize upon a plant so useful in its properties to mankind, but could not effect his purpose. He only bit off a piece of the root in the struggle, and carried with it all the virtue of the plant. (*Eng. Flor.* vol. i. p. 194.)

DEVON SHEEP. See SHEEP.

DEVONSHIRE CREAM. See BUTTER.

DEVONSHIRE OXEN. See CATTLE.

DEW. (Sax. ðeaƿ; Dutch, *daaw;* Germ. *thau,* moisture.) The deposition of water from the atmosphere, occasioned by cold, which falls on the ground, and on the leaves of plants, blades of grass,
night. The phenomena of
considered by all writers o
from Aristotle downwards;
first successfully investigat
Dr. Wells, who gave the tru
meteor in an admirable essay
first published in 1814. De
different quantities on diffe
under the same circumsta
metals, it is sparingly deposi
forms abundantly, as it doe
grass, cloth, paper, and oth
stances. Animal substances
which acquire dew in the gr
The temperature of grass co
is always lower than that of
air. On calm and very cl
periods when dew falls most
Wells very frequently found
eight, or nine degrees, and
fourteen degrees, colder tha
four feet above the ground.
dew probably begins to app
in places shaded from the su
and calm weather, soon afte
atmosphere has declined;
four hours after midday.
dew is only found in the morn
is incorrect. See ATMOSP
TION, and HYGROMETER.
of Science; Penny Cyclo. v
Brit. art. "Dew;" *Edin.*
Nos. 21. 28.)

DEW-BERRY. The fr
bramble (*Rubus cæsius*), so t
resemblance of the glaucous
secretion upon the black shi
dew. (*Eng. Flor.* vol. ii.

DEWLAP. (From lappi
dew.) A term applied to t
fleshy substance that hangs
throats of neat cattle.

DEY. An old English
now obsolete, but from wh
dairy.

DIARRHŒA. See DIS
CATTLE, and HORSES.

DIBBLE. (From *dipfel,*
point.) An instrument or
make holes in the ground f
plants, &c. To *dibble* in ang
dape. See DAPING. "The su
by machinery," say the Mes
Ipswich, "naturally sugges
ation of whether the opera
may not be similarly accom
ingenious contrivances hav
time been projected for th
several patents have also be
we are not aware of any tha
cessfully and advantageou
therefore unnecessary to de

culiarities. We noticed one at the Royal Agricultural Society's exhibition at Cambridge, invented and manufactured by Thomas Woodlake, a gentleman of Hornchurch in Essex; but at present we have had no opportunity of ascertaining whether in practice it justifies the good opinion formed of it.

List of patents taken out for dibbling machines:—

April 17. 1806. Plucknett, dibbling and drilling machine for grain and pulse.

1827. Coggar, dibbling machines.

Dec. 2. 1839. Clerk and Newbery improved machine for dibbling or setting wheat.

March 12. 1840. Peter Bradshaw, Kimbolton, machine for dibbling grain.

DIBBLING is a mode of sowing corn, especially wheat, much practised in some parts of England. It is found to answer the best on the clover leys of the lighter descriptions of land. It is performed by a man walking backwards with an iron dibble in each hand, with which he makes the holes, on the furrow slice, into which the seed is dropped by children, who place one or two seeds into each hole. By this mode there is a very considerable saving of seed, the quantity employed of wheat being usually from three to five pecks. The wheat plant obtains a more solid soil, and considerable additional employment is afforded to the labourer and his family. It is, however, a rather tedious process, and is not adapted to the stiffer descriptions of soil, for on these the dibble forms little cups, in which the rain is apt to lodge to the destruction of the seed corn. A good dibbler with three active attendants will plant about half an acre per day. The expense for labour is commonly about 7*s.* to s. per acre for wheat.

Dibbling was first pretty extensively introduced into the East of England about the commencement of the present century. It is spoken of as a novel practice in 1805, by Mr. Curtis of Lynn (*Com. Board of Agr.* vol. iv. p. 158.), and by Mr. Pung of Sudbury, and Mr. Jones of Wellington in Somersetshire (*Ibid.* 159.); they had previously to this time made some rude attempts to employ the dibble near Yarmouth in Norfolk, for, in 1784, Mr. Oxley describes the farmers of that district dibbling 6, 7, and pecks per acre, in 2 rows on each furrow, or 4 droppers to one dibbler, at an expense of half a guinea per acre (*Young's Annals of Agr.* vol. iii. p. 220.)

In Norfolk, and the neighbouring counties broad-casting is now almost unknown. J. Barton, of East Leigh, Hampshire, 1836 (*Hints to Schoolmasters*, p. 2.), I brought a man from Norfolk, twelve months ago, for the purpose of instructing my labourers in dibbling, and he brought with him the implements, which are made in the following manner. The body of the dibble is a core of hard steel, round which is soft iron, so as always to wear itself sharp; at the upper end is a handle.

The instrument is three feet long, all iron excepting the handle; it weighs six pounds; a man walks with one in each hand backwards, and makes from 3000 to 3050 holes in a day, giving a slight twist with the wrist at the moment of plunging the iron into the ground, which makes a hole, that does not again fill up by the crumbling in of the earth. The ground should be even, then the rows are dibbled, the holes 4 inches apart, so that four of them can be covered at once by the foot; the rows are about 4½ inches apart; the holes are filled in by a rake, or harrow with a few bushes woven into it. I pay nine shillings per acre of 160 rods for the work, out of which the dibbler pays the children who drop the wheat; three grains should be dibbled in each hole, which will take about one bushel and a half per acre. The Norfolk farmers say the yield by dibbling exceeds that by broadcasting by four bushels per acre.

Dibbling costs in Hertfordshire only 6*s.*, and in Norfolk and Suffolk from 7*s.* to 10*s.* per acre, according to the distance of the holes, but where they are thickest, and 3 or 4 grains placed in each hole, it does not use more than two bushels of seed per acre.

A writer in the *Mark Lane Express* says, drilling wheat is the most generally practised in the eastern part of the county of Suffolk, and dibbling wheat has been upon the decline for the last twenty years; I believe, because it is more *trouble* to attend to dibblers than to drilling; but I was in the habit of dibbling wheat when I took business for myself in 1807, and I continue the practice to the present day, for the following reasons:—1st. It encourages the poor man and his family, by increasing his wages, and gives employment to his children which they would not have if wheat was drilled. 2dly. It shows the children, when young, that Providence has ordained them to get their bread by the sweat of their brow; and I grow upon the four-course shift 100 acres of wheat every year. For wheat I pay for dibbling 7*s.* per acre, which is done by seven men that have the largest families: those men earn 5*l.* each in five weeks, generally, but if the weather be fine in less time. Another and 3d reason why I prefer dibbling is, that the men and children tread the land with their feet, which makes the land firmer and better for the crop. 4thly. It is better to clean the land, because you can only hoe between the rows of the drilled wheat, when you can hoe all round the dibbled plant. 5thly. The seed goes farther into the ground from dibbling than drilling, the small end piercing deeper than it appears, while the drill appears deeper than it really is, the coulter of the drill raising mould on each side, so that when harrowed the corn is not so deep as when dibbled. 6thly. There is always more under-corn, that is, small ears, from the drill than from the dibble, and dibbling takes less seed. Six pecks is about the quantity of seed it takes unless it be very early in the season. I am a great advocate for dibbling, for the above reasons; I have tried both on the same field, and generally found the dibbled wheat the most productive; and it stands up better against wind and rain:—

Thus dibbling saves half the 3 bushels usually broadcast	1½
And the gain in the crop being	4
Makes	5½
Worth at 80*s.* per quarter	55*s.*
And after paying per acre for dibbling	7*s.*
Leaves, per acre	48

And even at 5*s.* gives a gain over broadcast wheat of upwards of 20*s.*

DICK, DIKE, or DYKE. A provincial word applied to the mound or back of a ditch, and dick-hole is the excavation or ditch itself. In Scotland it means a stone wall. See DITCH.

DICKSON, JAMES, F.L.S., was born at Kirkhouse, Peebleshire, in 1738. He was a good botanist, and more particularly devoted his attention to the mosses. He died at Croydon, Aug. 14th, 1822.

His first publication commenced in 1785, being a Fasciculus of his "*Plantarum Cryptogamicarum Britanniæ,*" which was completed in 1801. In 1793 he began publishing his "*Hortus Siccus Britannicus,*" which was finished in 1802.

DIG. A low provincial term for the mattock.

DIGGING. See SPADE HUSBANDRY.

DIGITARIA SANGUINALIS. Slender spiked finger-grass, or cock's-foot finger-grass. See FINGER-GRASS.

DILL. (*Anethum graveolens*, from ἄνηθον, on account of its running up straight.) A plant kept in our kitchen gardens. It flowers and seeds in August; the stalk is round, hollow, and upright, three feet high, and divided into many branches. The
flowers are yellow and sma
in umbels on the top of its
root is long. Its leaves an
used in pickling, and the fo
and sauces. It is a hardy
grown merely for domestic us
tivated in any open compar
for seed, a sheltered situati
rather dry than damp, is t
for it. It is propagated by
best sown immediately it i
kept out of the ground until t
often incapable of germinatin
are produced they usually
perfecting their seed; if negl
spring, it may be sown from
February until the comn
May: the earlier, however, th
may be sown in drills a foot ap
cast, very thin and raked in.
to remain where sown, as they
removing. When of three
growth they must be thinne
inches apart; for if not allow
spindle, their leaves decay
branches are thrown out, an
not good. To prevent thes
in every stage of growth, they
kept clear of weeds. The lea
gathering as wanted, and the
July and August. In Septen
ripens, when the umbels m
diately cut and spread on a
as the seed is very apt to sca
tile oil and a distilled water
from the seeds. Both are u
natives; the water is a goo
powders prescribed for chil
Johnson's Kitch. Garden.)

DILL. A name sometimes
two-seeded tare, a species of

DINDLES. A provincial
to the common and corn s
well as to the taller hawk-wee

DINGLE. (From the S
a hollow.) A small clough
tween two steep hills.

DIOTIS. (*Diotis candidissi*
of little beauty, native of Sil
eight or nine inches high, and
low flowers in August. It
prefers a stony soil; increased
cuttings.

DIPPER, THE COMMO
aquaticus.) Considerable inter
to the natural history of the d
ouzel, from the diversity of
exist even to the present tim
not only to its power of di
believed by some to be accor
out any perceivable muscul
that it can also walk at the
under water with the same

k on dry land. The dipper fre- des of rivers, swimming and diving at facility, and feeding principally various aquatic insects with which oms of streams abound. It builds d conceals its large moss nest with t in cavities of rocks, and under pro- stones by the sides of rivers. Eggs six, one inch in length by nine lines dth, pointed at the smaller end and general plumage, brownish and grey- ck; chin, neck, and upper part of pure white; legs, toes, and claws, (*Yarrell's Brit. Birds*, vol. i. p. 173.)

EASES OF CATTLE. See Sheep, s, and Cattle.

TEMPER is frequently used in the ense as disease, but is particularly to cattle. In racing stables it is the ishing names for epidemic catarrh uenza in horses. Bleeding in the age is recommended, and it is im- that the bowels should be evacuated, tive medicines given. (*The Horse*,

In dogs distemper is one of the l diseases; a little emetic powder s of tartar emetic and 1 grain of recommended to be given (*Clater's* 392.), followed by a dose once 4, 5, or 6 grains of Turpith's min-

RESS. (From *districtio; Fr. dé-* Signifies commonly any thing which or rent in arrear. So long as there t unpaid, so long has the landlord r of distraining for it; and nothing ayment of the rent due, or tender of nt, will prevent the landlord exer- h power — even waiting on the land house with the money ready to pay suffice if the money is not abso- dered; but the tenant will be in he tenders the money when the comes to distrain, or any time be- goods are impounded. "The court *Purvis* (5 T.R. 433.) thought that after the impounding of the dis- de was insufficient." In case of ade and refused, the landlord can ver his rent by an action of debt ant. (*Anon.* 1 Ventr. 21.) There an actual letting or demise at a nt before the landlord can distrain. *Hunter*, 5 B. & A. 322.) The ement for a lease, *without rent has* will not suffice. (*Ibid.*) But an of the rent due on an account l justify a distress. (*Cox* v. *Bent*, 185.) A tenant from year to erletting may distrain upon his t. (*Curtis* v. *Wheeler*, M. & M.

al of Stock to avoid Distress. — By the statute 11 G. 2. c. 19. 31. s. 1. goods and chattels removed from any premises to avoid a distress for rent, may be followed and taken as a distress at any time within thirty days of their removal; but such power of seizure is declared by sect. 2. not to extend to goods *bonâ fide* sold and for a valuable consideration, before such seizure, to persons not privy to the fraud; see also the stat. 8 Anne, c. 14. ss. 2, 3. & 5.

And by sect. 3. persons so removing or assisting to remove goods, are liable to pay to the landlord double the value of the goods so carried off or concealed, to be recovered by an action of debt; or in case the value of such goods shall not exceed 50*l.*, the landlord or his agent may recover the same by an application to a magistrate, who is authorised to summon, hear, decide, and levy by his warrant a distress: and by sect. 7. the landlord is empowered to break open any gates, barns, stable, or other outhouses; and in case oath is previously made of reasonable ground of suspicion before a magistrate, dwelling-houses also: in every such case, however, the act directs a peace officer to be present. And to entitle the landlord to follow and seize, the removal need not be clandestine; if they are removed, for instance, in open daylight, that makes no difference. (*Oppenheim* v. *Smith*, 4 D. & R. 33.)

DITCH. (Sax. dic.) A trench cut in the ground, usually round the fences of a field. Trenches of this kind are formed differently in various localities, but they should always be made so as to keep the water in them as pure as possible.

DITTANDER. Broad-leaved pepperwort. (*Lepidium latifolium.*) This is a tall plant with broad leaves at the base of the stalk, growing smaller as they proceed upwards, upon firm, pale green, branched stalks, a yard in height. The lower leaves are indented; the flowers are small and white, growing in loose spikes; the whole herb is smooth, of a dull glaucous green; its flavour disagreeably pungent and bitter. (*Eng. Flor.* vol. iii. p. 165.)

DIURETICS. In farriery, such remedies as have the power of forcing urine, that is, of stimulating the kidneys to a moderate degree, so as to augment their secreting power. Nitre, iodide of potassium, turpentine, cubebs, and juniper, are diuretics. See Ball.

DOCK. (*Rumex.*) A large genus of perennial plants, of which ten are natives. The bloody-veined dock (*R. sanguineus*) has already been described under the head Bloodwort. The curled dock (*R. crispus*) a very troublesome and unprofitable weed, abounds in waste ground, pastures, and by road sides; root tapering, yellowish stem, two or three feet high, somewhat zigzag; leaves smooth of a lightish green; clusters of numerous rather crowded tufts or whorls of drooping pale green flowers. The sharp dock (*R. acutus*) is also not uncommon in low meadows and watery places. Root blackish and rather slender. The broad-leaved dock (*R. obtusifolius*) is a rank and very troublesome weed, common everywhere, which can only be conquered by stubbing up the root. Mowing is to little purpose; stems a yard high; root black; many headed; yellowish within. The other docks are the golden dock (*R. maritimus*), the yellow marsh dock (*R. palustris*), and the great water dock (*R. Hydrolapathum.*) (*Eng. Flor.* vol. ii. p. 190.) All these docks are purgatives, and may be used instead of rhubarb. A decoction made with an ounce of the root of *Rumex obtusifolius* and a quart of water, reduced by boiling to a pint, then strained and sweetened, is a valuable remedy in that species of skin disease called fish-skin (*Ichthyosus*).

Dock. A term signifying to trim the buttocks, &c. of sheep.

DOCKEN. A term provincially applied to the dock: it is prevalent in Scotland.

DOCKING. In farriery, the art of cutting off the tails of horses; and for a description of which see *The Horse* (*Lib. Use. Know.*) p. 327.

DODDED SHEEP. Such as are without horns.

DODDER. (*Cuscuta europæa.*) The name of a species of bird-weed, which is not very commonly met with. This curious plant is unlike all others in appearance, having no leaves. The thread-shaped, red, or purple stalks, twining about other plants, headed with small reddish flowers, are easily to be recognised; they grow upon heaths and commons, intersecting the furze and nettles, and twisting themselves round every thing they can meet with. The common people, who speak truly, but not in courtly terms, call it devil's guts and hell weed, because it does great damage among their tares and flax. The lesser dodder (*C. epithymum*) is of similar habit, but smaller than the preceding. (*Eng. Flor.* vol. ii. p. 25.)

DODMAN. A name given, in some of the northern counties, to the shell snail.

DODOENS, or DODONŒUS, REMBERT, a botanist, who was born near Mechlin in Flanders in 1517, and died in 1585-6. He wrote *Frugum Historia*, 8vo and *Herbarium Belgicum*, 8vo. But his chief work appeared in 1583, in which he included all his other botanical writings under the title of *Stirpium Historiæ Pemptades*, in folio. Each pemptade is divided into five books. The first pemptade contains numerous dissimilar plants
order; the second, florists'
umbelliferous plants; the
roots, purgative, climbing
plants; the fourth, grain,
water and marsh plants;
plants, gourds, esculent
and spinous plants; and
and trees. The appendix is
from Dioscorides, Cato, an
to the progress of Botany
among the Romans, as well
mendation of gardens.

DODRED WHEAT.
vincially applied to the re
as are without beards.

DOE. In the technical
hunter, the female of the bu
The female of the red deer

DOG. (Lat. *Canis.*) An
of animals, consisting of
species, of which that most
is the domestic dog (*C.*
arrangement of M. Cuvier
of the present day into th
properly so called, *wolves*,
will be sufficient for our p
speak of the dogs under thre
dogs; 2. hunting dogs; 3.
The first includes the she
mastiff, and the bull dog.
terrier, the hound, the ha
and the greyhound. The
cludes the pointer, the
spaniel. All these will be fou
their separate heads. Th
turalist Mr. James Wilson
the question of the origin
breed of dogs. (*Quart. Jo*
vii. p. 539—681.) Col. Ha
also taken up the natural
(*Naturalist's Lib.* vols. xx
notice in the *Quart. Journ.*
p. 511.) All zoologists ag
no trace of the dog to be
mitive state of nature, alt
exist in India and America
finity to the wolf, and the p
being the same, have led
that the wolf is the origina
animals will breed togethe
both are born blind, and
of the same time, namely, t
the puppies of both acqu
vision. But one fact render
at least doubtful, — none
living in a state of natur
turned to the true form o
minute examination of thi
ever, would be out of pl
cation. In all the varietie
following circumstances in
constant: he is born with

opens them on the tenth or twelfth day;
teeth commence changing in the fourth
nth; and his full growth is attained at
expiration of the second year. The
iod of gestation is sixty-three days, and
m six to twelve pups are produced at a
th. The dog is old at fifteen years, and
dom lives beyond twenty; his vigilance
d bark are universally known. The dog
iable to so many diseases, that to treat of
m here would be impossible. Among the
ncipal are the distemper, rabies, canker
the ear, the mange, diseases of the eyes,
diarrhœa, &c. all of which are treated
nder their several heads.

n this country the shepherd's dog (*C.*
domesticus, Lin.) offers the example
e of the purest races of this domesticated
al, and that which, in its straight ears,
ir and tail, approaches nearest to the
al stock. The sagacity of this variety
e peculiar department in which his
s are rendered to man, is well known,
as been illustrated by a hundred in-
ng anecdotes. It is a curious fact,
e brain of the shepherd's dog is larger
at of any other of the race; but how
is connected with his sagacity we shall
tend to affirm. Notwithstanding the
variations in size met with in the
or shepherd's dog, in different
es of the globe (for he is probably the
xtensively diffused of the race), yet
ywhere preserves some personal cha-
tics, which mark his adherence to the
l type in a greater degree than in any
reed over which man has so arbitra-
ercised his dominion. One of these
teristics is his quantity of covering,
is invariably great, particularly about
k. The large drover's dog, which at-
he beast markets, is larger, and usually
onger build, than the sheep dog. The
ous colly of Scotland is a dog deserv-
rized, though much smaller than either
glish sheep-dog, or the drover's cattle-
The ears are never wholly pendent in
the race; but in the British varieties,
any others also, they are half erected
pricked, as it is called. The prevailing
is very generally grey, more or less
the tail is bushy, somewhat pendent
ecurved; visage more or less pointed.
Eat. Know. vol. i. p. 49.; *Brit. Husb.*
p. 479.; *Brande's Dict. Science;*
's Rural Sports, p. 398.)

G BRAMBLE. (*Ribes cynosbati.*)
a valuable genus of plants, which con-
e gooseberry and the currant: some of
cies are well suited for ornamenting
eries. They will grow in any soil,
ated by cuttings, planted in autumn,
y in spring. (*Paxton's Bot. Dict.*)

DOGBRIAR and **DOG-ROSE.** (*Rosa canina.*) The wild briar bearing the hip, or hep.

DOG DAYS, or **CANICULAR DAYS.** The name given to certain days of the year, during which the heat is usually the greatest. They are reckoned about forty, and are set down in the almanacs as beginning on the 3rd July, and ending on the 11th August. In the time of the ancient astronomers, the remarkable star Sirius, called also *canicular* or the dog star, rose heliacally, that is, just before the sun, about the beginning of July; and the sultry heat which usually prevails at that season, with all its disagreeable effects, among which the tendency of dogs to become rabid is not one of the least disagreeable, were ascribed to the malignant rage of this star. Owing to the precession of the equinoxes, the heliacal rising of Sirius now takes place later in the year, and in a cooler season; so that the dog days have not now that relation to the particular position of the dog-star, from which they obtained their name. (*Brande's Dict. of Science and Art.*)

DOG FENNEL. One of the provincial names of the weed corn-camomile.

DOG FLY. (*Cynomia*, Lin.) A genus of insects common in woods and among bushes, that is particularly troublesome to dogs, fastening upon their head and ears. They sting very severely, and always raise a blister in the part they touch. (*Willich's Dom. Encyc.*)

DOG POISON, FOOL'S PARSLEY. (*Æthusa Cynapium.*) An umbelliferous plant, frequently found in gardens. It is easily distinguished from the other umbellifera by the partial umbels, consisting of three narrow, long, linear leaflets, which hang down. The leaves have short sheathing footstalks, are doubly pinnate, with decurrent, pinnatifid leaflets. It has been eaten for parsley, and has proved fatal. The stem and leaves are poisonous, and contain a peculiar alkali, called *Cynapia.*

DOG'S-BANE. (*Cynanchum monspeliacum.*) A perennial, native of Montpelier, which loves warmth and a good soil. Blows pale pink flowers in July and August. Cover the roots in frosts. Propagate by suckers.

DOG'S CABBAGE. (*Thelygonum cynocrambe.*) A common garden soil suits this species; propagate by seeds.

DOG'S GRASS. See COUCH.

DOG STEALING. See ANIMALS, STEALING OF.

DOG'S MERCURY. (*Mercurialis perennis*, Lin.) An indigenous plant, growing under hedges, and in woods, in many parts of Britain, root perennial, creeping stalk, single without branches, rising ten or twelve inches high with rough leaves; these have their male flowers growing in spikes upon plants different from those which produce seeds. The juice of this plant is emetic, while the seed is purgative and highly dangerous.

DOG'S TAIL GRASS. See Cynosurus.

DOG'S TONGUE. (*Cynoglossum.*) See Hound's-tongue.

DOG'S TOOTH GRASS, CREEPING. (*Cynodon Dactylon.*) This grass was identified by A. R. Lambert, Esq. (*Trans. Linn. Soc.* vol. vi.) as the celebrated hallowed doob-grass of the Hindoos. In the East Indies this grass grows luxuriantly, and is highly valued as food for horses, &c.; in this climate, however, it scarcely begins to vegetate till the month of June, and experiments made by Sinclair and others shew that its produce and nutritive powers here are not sufficiently great to hold out any hope that its valuable properties in the East Indies can be made available in the climate and soil of Britain. The doob-grass flowers in September, and the seed is ripe about the end of October, and sometimes in November. The plants, natives of the English coasts, flower about a month earlier than the above. It is found on the sandy shores of Cornwall abundantly, and was first noticed by Mr. Newton in the time of Ray. (*Hort. Gram. Wob.* p. 290.; *Eng. Flor.* vol. i. p. 94.)

DOG'S TOOTH VIOLET. (*Erythronium*, from *erythros*, red, in allusion to the colour of the leaves and flowers.) These are handsome, though dwarf growing plants, which will thrive in common garden soil, and are increased from offsets. (*Paxton's Bot. Dict.*)

DOG-WHEAT. See Couch.

DOGWOOD. A name applied to two different plants: in England to any of the shrubby species of *Cornus;* in the West Indies to the *Piscidia Erythrina.* The former are of little interest, except as ornamental shrubs; the latter is a powerful narcotic, the real value of which in medicine has still to be determined.

There are two indigenous species of cornel or dogwood; the *C. sanguinea*, a bush of four or five feet high, with smooth branches of a dark red when full grown; fruit dark purple, very bitter, like every other part of the plant; found common in hedges and thickets, especially on a chalk or limestone soil: and the dwarf cornel (*C. suecica*), growing in moist alpine pastures, on an herbaceous stem four to six inches high. (*Eng. Flora*, vol. i. p. 221.) The English names of this shrub, says Phillips (*Syl. Flora*, vol. i. p. 183.), are scarcely less numerous than the tints of its leaves. It is often called female cornel, to distinguish
it from *Cornus mascula*, and houn
tree, dogberry, &c. (because, says
the fruit is not even fit for the
hence the name of dogwood.

The Cornelian cherry (*Cornus*
is a native of Austria, growing fro
twenty feet high. See Cornelian

The American dogwood (*Corn*
is a native of N. America, where
fifty feet high. It blows large
pink flowers at the end of its b
May and June.

DOKE. A provincial term ap
deep furrow.

DOLE, or DOOL. A long n
of green in an arable field, which
ploughed; or a piece of land up
or common, of which only one
person has a right to cut fuel.

DOLE-STONE. A local ter
to a land-mark or boundary-ston

DOLPHIN-FLY. The name
sect of the *aphis* tribe, very dest
beans. (See Beans.) It is someti
the *collier* The destruction whic
sect causes is not wonderful wh
flect on the astonishing fecundity
aphides family. The sexual inte
one original pair serves for all th
tions which proceed from the fem
succeeding year; and Réaumur i
that, in five generations, one aph
the progenitor of 5,904,900,000 de
in one year there may be twenty ge
At one season they are viviparous,
oviparous. The dolphin-fly or c
a black colour: it begins its depre
the top of the bean, and continu
plying downwards. The only m
preserving the crop is to top the p
to burn the tops.

DOO. A word provincially sig
pigeon or dove; much used in Sc

DOOB-GRASS. See Dog'
Grass.

DOSOME. (Apparently from
An epithet applied in some plac
beasts as improve very rapidly.

DOSS. (A corruption of *toss.*)
vincial word signifying to strike
horn or gore slightly, as cattle f
do each other.

DOTTEREL. (*Charadrius m*
This species of plover is a summ
only to this country, making its a
in the south eastern counties of
towards the end of April. Food
slugs, insects, and their larvæ.
favourite breeding haunts of these
always near to, or on the summ
highest mountains: they make no
deposit their eggs, which seldo
hree, in a small cavity on dry

E. A species of pigeon, of which cipal varieties are the ring-dove or geon, the stock-dove, the rock-dove, turtle-dove. See PIGEON.

E-COTE. A structure usually of wood for the accommodation and of tame pigeons; the only essential e between which and a common house is, that the entrance for the ust be raised to a considerable om the ground, because pigeons fly n the atmosphere than most other

tmost cleanliness ought to prevail n houses, hence the holes should be r examined before the breeding rrives. They should be frequently hed out, and the dung and other es removed; but this should be ly in the day, when the birds are that they may not be disturbed. l dove-cotes are circular buildings, lerable size, with ranges of square rned in the anterior wall, in which make their nests. From this fea- old dove-cotes, the term pigeon-desks is derived. These dove-cotes red by a door below; and by means lder the young pigeons are easily om the nests. Many dove-cotes of l exist in Scotland. (*Brande's Dict. ce, &c.; Willich's Dom. Encyc.*)

LED. A term signifying flat or in liquor that has lost its head.

LER. The provincial name for a g.

N-DINNER. A country term ap- the afternoon luncheon.

NS. (Sax. ꝺun; Erse *dune*, a hill.) ltural parlance, large, open, elevated,

of being continually and perfectly ventilated, these pastures are particularly healthy for sheep, by reason of their not being naturally rich, though for the most part easy to work; they are also better adapted for the alternate husbandry, including turnips, than they are for meadow or pasture, or for heavy beasts. There are, however, some few parts where either a cap of strong soil left on the summits, or a greater depth of alluvial soil washed together into hollows, throws out a pasturage so strong that a cow can obtain a tolerable bite, and such parts obtain the honourable pre-eminence of being called "cow-leases." The upper soil of these tracts is usually in a principal degree calcareous, with a greater or less mixture of silicious sand, and some portion of argillaceous matter. In some spots the argil, in some the silex, in some the calcareous matter predominates. The natural grasses which generally abound in these downs are of small bulk, but they are wholesome and palatable, particularly to sheep. Mr. Taunton expresses little doubt that in a sandy chalk down, with a tolerable depth of soil, and with such a proportion of argil as not to starve the cock's-foot, the union of cock's-foot, meadow fescue, narrow-leaved brome-grass, yellow oat-grass, upright brome-grass, barley-like fescue, common quaking grass, downy oat-grass, and meadow oat-grass, would afford a permanent crop of a ton of hay per acre per annum. The natural grasses most prevalent on the downs are as follows: on argillaceous soils, smooth-stalked meadow-grass (*Poa pratensis*), perennial rye-grass (*Lolium perenne*), hard fescue (*Festuca duriuscula*), crested dog's-tail (*Cynosurus cristatus*), yellow oat-grass

grass (*Aira præcox*), the sweet-scented vernal-grass (*Anthoxanthum odoratum*), the common quaking-grass (*Briza media*), and the flat-stalked meadow grass (*Poa compressa*). In soils where the calcareous matter predominates, those which will be found in the greatest abundance are, the pinnate and upright brome grasses (*Bromus pinnatus* and *erectus*), the knee-jointed meadow cat's-tail (*Phleum nodosum*), and the smaller varieties of *Phleum pratense*, the sheep's fescue (*Festuca ovina*), and the meadow oat-grass (*Avena pratensis*). Interspersed with these natural grasses, and spread over the downs, will be found some species of orchis, sedge, clover, scabious, plantain, bell-flower, lotus, &c. (*Hort. Gr. Wob.* p. 335–6.; *Quar. J. of Agr.* vol. ii. p. 148.)

DOWNY OAT GRASS. See AVENA.

DOZZAND. A provincial term signifying shrivelled, not plump and fine.

DRAFFE. A name sometimes given to malt-grains.

DRAG. An implement of the harrow kind used in breaking down and reducing land into a fine state. Also an iron catch to fix on the wheels of heavily laden carts or carriages when descending steep hills or declivities.

DRAGON-FLY. A common name for the Neuropterous insects belonging to the genus *Agrion* or *Lobellula*.

DRAGON'S HEAD. (*Dracocephalum Austriacum*.) A perennial from the South of Europe, sending up many stems, with tufts of red or blue flowers blowing in July and August. It likes rich mould, and is readily propagated by parting the roots, or from seed.

DRAG RAKES. See RAKES.

DRAINING. The very first care of the farmer, that on which the success of his future crops almost entirely depends, is the removal of unnecessary supplies of water — whether arising from the tenacity of the surface retaining too much water, or from springs exuding to the surface. For it is evident that as different crops require very varying quantities, so the cultivator must adapt the moisture of the soil to the crops he purposes to produce; — the supply which is necessary, for instance, for the profitable growth of the rice plant would destroy the meadow grasses of England: — and again the damp soils, of which many of the richest meadows of England are formed, would be much too moist for the cereal crops. The nature of the climate, the soil, and the subsoil, must all be taken into account. The plants growing on sandy soils, of course, will bear a much larger proportion of water than those vegetating on clay soils: — and thus the very soil which, in the dry eastern side of E
excellent crops of corn, w
western counties, where twic
of rain falls, on an average, th
be found materially to injur
(See WATER, *its Uses to*
Placed as the farmer is under
of circumstances, cultivating
kinds, it is useless, in this artic
to assist him with more tha
rections.

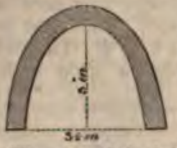
The water carried off the so
drainage is either by boring,
by under-ground drainage,
Boring was first recommende
ton. It is chiefly adapted for
surrounded by high lands, and
sists in boring with an auge
a well in the land intended t
until a spring of water is p
head is lower than that of t
the field; and hence it follo
the water is suffered to drain
made by the auger, or the w
cessity drains from the land o
tom of the well, as fast as it f
the top. This plan might be
ployed to a much greater exten
sent. When combined with su
it saves, by shortening the w
a considerable portion of the e

In open surface drains, t
the soil, its declinations, and
composition, can alone guide
In either case too much car
be bestowed upon it; it is a
the legislature has deemed t
national importance; for by
Vict. c. 55. landowners po
limited interests in estates ar
to raise money, by way of mort
property, to be employed for
of improving them by drain
government has promoted the
tiles by exempting them from
confine my observations, ther
to the formation of under-d
commonly vary in depth from
and, in peat soils, on account of
terial settling which takes plac
brought into cultivation, from
feet. The first operation ne
a field intended to be draine
amination of the strata, or vei
which it is composed; and thi
effected with the boring auger,
small pits, or open drains, as
the oozings or weepings will sp
themselves, and indicate pr
the source whence the s
water proceeds. This being
the direction of the under-d
the more easily decided. If

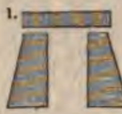
lescription that the subsoil plough
sed with advantage, then the top of
es, bricks, or tiles by which the
formed and preserved, should not be
n 2½ feet from the surface of the
the formation of these drains the
n always commences on the lowest
y; by this means, besides other ad-
, the water, as he arrives at it,
way from him, and shows him, by
e, that he is preserving a proper
hen the drain is cut to the re-
epth, he proceeds to fill it up with
rials through which the drainage
re to flow, to within such a distance
s out of the reach of the plough;
the earth is shovelled back again
drainage materials. The descrip-
hese materials, of necessity, varies
nature of the country and its
in Essex, brushwood and straw
y employed; in the northern parts
and, stones, broken lime, or sand-
used. Bricks and tiles are resorted
ricts where cheaper materials are
e procured; and these are made
ety of forms; and recently one
aluable improvements have taken
he construction of them by machi-
that, by those of the Marquis of
e and Mr. Beart, draining tiles
made at a very reduced price.
-making, in general, there is a good
Mr. Wiggins, *Journ. Roy. Agr.*
. p. 350. The tiles of the Marquis
ldale are described *Trans. High.*
vi. p. 50. and *Journ. Roy. Agr. Soc.*
148., and those of Mr. Beart, with
s of his machine, in the *Journ. of*
Eng. Agr. Soc. vol. ii. p. 93.; by
seems that in Huntingdonshire the
he tiles made by his apparatus is
. per 1000: this varies, of course,
rice of coals, of which variation Mr.
s constructed the following table.

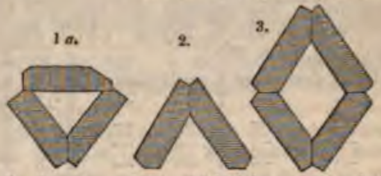
oals .	Making the Tiles at the Proprietor's Yard, per 1000.	Selling Price, per 1000.
	s.	*s.*
	11	18
	12	19
	13	20
	14	21
	15	22
	16	23
	17	24
	18	25

are commonly used with the flat
tiles, which cost, in Huntingdon-
m 8*s.* to 10*s.* per 1000. The clay
pted for tiles is that which con-
mall proportion of sand or marl, or sand may be mixed with the clay. The annexed cut gives the shape of the Tweeddale patent drain tile. It is commonly made three inches deep, three and a half wide, and about twelve in length.

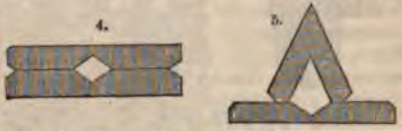


The use of draining tiles is evidently on the increase, and every improvement which is made in them naturally extends their field of usefulness; they are by far the most permanent and effective of all the materials used for draining land. Of draining bricks there are various shapes; the annexed figures represent a few of the most common, and the mode of placing them.

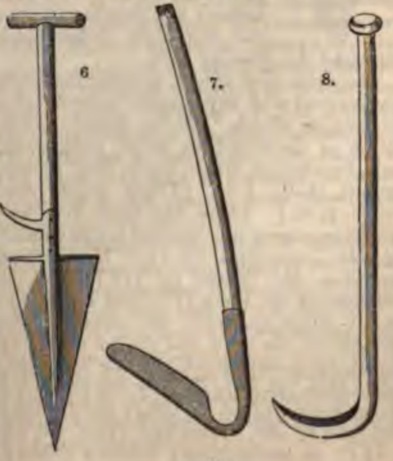




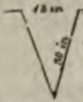
In figs. 1. and 1 *a*, 84 bricks are required for every 8 yards. In fig. 2. 55 bricks are required for every 8 yards. In fig. 3. 110 bricks are required for every 8 yards. Figs.



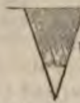
4. and 5. have been found very useful in the drainage of peat-bogs or quicksands. They are all, however, for most purposes inferior to the draining tile.



In the formation of drains, a shovel tapering to a point, and scoops of a peculiar shape, are commonly used. These are represented in the figures 6, 7, 8. The old-fashioned way of forming a drain is depicted in figures 9. and 10.; in these the bottom of the drain was filled up partially with brushwood, stones, long ropes of twisted straw, others of ling or heath, which are much more tough and permanent. The expense of digging and filling in any of the above drains (exclusive of the brushwood or other materials) varies from 4*s.* 6*d.* to 5*s.* 6*d.* per score rods (120 yards local measure). The expense per acre will be, according to Mr. S. Taylor (*Brit. Farm. Mag.* vol. ii. p. 359.),



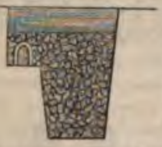
9.


10.

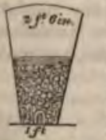
	£	*s.*	*d.*
If the drains are 8 yards distant	1	13	9
— — 7 — —	1	17	6
— — 6 — —	2	0	0
— — 5½ — —	2	5	0
— — 5 — —	2	8	9
— — 4 — —	2	17	6

In many situations, where a spring is to be reached it is very desirable to form a well by the side of the drain according to the annexed outline. (*Trans. High. Soc.* vol. i. p. 223.) A very common modern mode of constructing the drain is according to the form in fig. 12. Loose mould or gravel is placed at the top to the depth of one foot. Sod, straw, heath, or rushes four inches; and then land stones one foot eight inches thick surround the draining tiles.

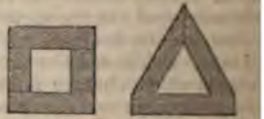
11.



12.



The drain tiles, bricks, or other materials are covered with any porous material that the locality affords. Stones, gravel, scoria, refuse of the foundries, ashes, peat, moss, sods, brushwood, straw, heath, ling, rushes, broken chalk, &c. (*Trans. High. Soc.* vol. vi. p. 89.) There are three very valuable papers on tile draining in this volume by Mr. Carmichael (p. 81.), Mr. Stirling (p. 100.), Mr. Wilson (p. 112.); and on drainage, by Mr. Black (*Ibid.* vol. i. p. 214.); by Mr. Adam (p. 375.), who considers the best sloped tile to be one similar to that of the Marquis of Tweeddale's; by Mr. Dudgeon (*Ibid.* vol. ii. p. 71.); by Mr. Macleord of Lockmore (*Ibid.* p. 103.); on draining clay soils by Mr. Carmichael (*Ibid.* vol. iii. p. 34.); on underground draining (*Quart. Journ. Agr.* vol. v. p. 232.); on n
drain tiles of peat (*Ibid.* vol. vii. p
as a source of profitable outlay for c
(*Ibid.* vol. viii. p. 318. 540.); on dr
and on the mole plough, by Mr.
(*Ibid.* vol. ix. p. 388.); on plug or
draining, by Mr. Evans (*Ibid.* v
p. 501. and vol. ii. p. 68.); on substi
tubes made of larchwood for drain
certain localities, by Mr. Scott (
High. Soc. vol. xiii. p. 431. and *Ibi*
xiv. p. 99.) He estimates that these
tubes, having a clear water way
inches by two and a half, made by th
prietor, having his own wood and
mill, to be, for workmanship, abo
penny per rood of eighteen feet: th
pierced with auger holes in every pa
made in the following shapes, being fa
together with wooden pegs.



Mr. Wilson calculates the avera
pense with stones per rood to be
(*Quart. Journ. Agr.* vol. i. p. 242.)
Yule at per rood of 21 feet, 2 feet 9
deep with 3 inch tiles, at 1*s.* 0½*d.*;
inches, 4½ to 5 feet deep, 1*s.* 3½*d.*; with
tiles, the same depth, 1*s.* 5¾*d.* (*Ibid.* p

The expense of tile draining has
thus estimated by Mr. Carmichael (
High. Soc. vol. vi. p. 98.) at per im
acre; tiles being 2*s.* 6*d.* per 100, and
1*s.* 6*d.* per 100.

ON AN ALUMINOUS CLAY.

Distance of Drains.	Depth of Drain.	Breadth at bottom.	Yards in Acre.	Number of Tiles.	Number of Soles.	Total Ex-
ft.	in.	in.				£ s.
15	20	5	968	2500	1250	6 7
15	22	5	968	2500	1250	6 9
15	24	5	968	2500	2500	7 12
18	20	5	806	2080	1040	5 4
18	22	5	806	2080	1040	5 6
18	24	5	806	2080	890	6 7
21	20	5	691	1780	890	4 9
21	22	5	691	1780	1780	4 11
21	24	5	691	1780	..	3 9
			On a mixed Clay.			
15	18	5	968	2500	..	5 14
15	20	5	968	2500	..	3 18
15	22	5	968	2500	..	6 1
15	24	5	968	2500	1250	7 8
18	18	5	806	2080	..	4 15
18	20	5	806	2080	.	4 19
18	22	5	806	2080	..	5 1
18	24	5	806	2080	1040	6 4
			On Alum Clay.			
18	20	5	806	44⅕*		5 11
18	24	5 5	806	44⅗	..	5 17
18	27	5 5	806	44⅘	..	6 3

* Carts of stones. † Stone drai

es effected by a drain or mole
which on some soils answers very
a moderate expense. In this the
draws a long tubular orifice in the
a heavy sharp-pointed rod instead
are, which on some adhesive soils,
open, provided the fall for the wa-
fficient, for years. It is, however,
too many casualties for general in-
ion. It is commonly worked, either
windlass or otherwise, by 18 or 20
drawing from strong whippletrees.
Husb. vol. i. p. 455.)

xcellent and improved imitation of
e plough system is sometimes prac-
heavy clay lands. A stout piece of
cable four or five yards long is laid
ottom of the newly cut drain (one
narrow wedge-formed drains); to
of this piece of rope is fastened a
T-headed piece of wood, by means
h it is drawn along the bottom of
n, *after the clay and other materials*
n filled over it; an arch or opening
eft, similar to that formed by the
ough: the expense, in this case, is
that of digging and filling up the
(*Brit. Farm. Mag.* vol. ii. p. 367.)
ite, however, of open and under-
drainage, and of all that these or
ing system can effect, there are yet
housands of acres in the east of
d, that without the aid of the pump
steam-engine would still be co-
with water. These were recom-
many years since for this purpose
Savory, of Downham. (*Com. Board*
vol. iv. p. 52.) The gigantic powers
great engines will be readily seen
e report of Mr. Glynn (*Brit. Farm.*
ol. iii. p. 380.) Deeping Fen, near

wet soils. See Ploughs.

DRANK, or DRAUK. A very common name in many parts of England for darnel; but is properly only the provincial name for the scaly brome-grass.

DRAPE. A local term applied to a barren animal. Drape-cow is frequently applied to a farrow-cow, or one whose milk is just dried up. And drape-ewe to an ewe from which the lamb has been some time taken.

DRAUGHT. A provincial word signifying a team of either cattle or oxen. See Traction.

DRAUGHT-HORSE. A horse destined for the cart, plough, or some other team. See Horse.

DRENCH. In farriery, a large drink or draught of any liquid remedy, given to an animal, usually by means of a horn properly cut for the purpose. A very able paper on drenching horses, by Mr. John Stewart, veterinary surgeon, appears in the *Quart. Journ. of Agr.* vol. x. p. 626., which may be consulted with advantage. A drink is not so portable as a ball; it is more troublesome to give, and a portion of it is usually wasted. (*The Horse*, p. 392.) Mr. Stewart strenuously urges the following propositions: 1. That draughts, particularly when pungent or disagreeable, are dangerous. 2. That by no care can the danger be altogether avoided. 3. That no draught should be given unless the horse be in danger of dying without it. 4. That the safest way of administering draughts is to give them when the horse is lying. 5. That a draught is seldom or never absolutely necessary but in diseases which make the horse lie. 6. That a bottle is a better drenching instrument than a horn. (See *Veterinarian* ultimately connected with it, and for the most part forms part of the same system.

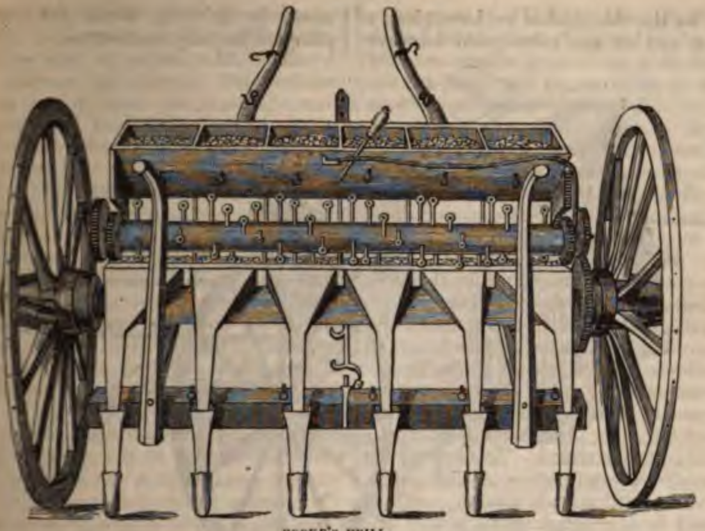
DRILLING. The act of putting different kinds of crops into the ground in the drill-method. Mr. Bramston gives the result of an experiment on the comparative advantages of narrow and wide drilling. (*Journ. of Roy. Eng. Agr. Soc.* vol. i. p. 294.)

DRILL-MACHINES. Implements for distributing seed and manure easily, and at regular distances. A rude kind of drill has been used in agriculture from a very remote period. The cultivators of China, Japan, Arabia, and the Carnatic, have drilled and dibbled in their seed from time immemorial. (The Chinese drill, or drill-plough, is noticed *Quart. Journ. of Agr.* vol. i. p. 675.) After the Hindoos have thus deposited their seed, they use a kind of subsoil plough, which passes under and loosens the soil to the depth of about eight inches three drills' breadth at a time. (*Com. Board of Agr.* vi. 355.) Gabriel Platte, in 1638–1653, describes a rude dibbling machine formed of iron pins "made to play up and down like Virginal jacks;" and John Worlidge in his *Husbandry*, published in 1669, not only advocated the use of the seed drill, but of the manure drill. Evelyn, in the same year (*Trans. Roy. Soc.* vol. v. p. 1056.), mentions with much commendation a drill-plough which had been invented in Germany, whence it had found its way into Spain, and had been noticed by the Earl of Sandwich, the English ambassador, who forwarded it to this country, as the invention of a Don Leucatilla. Jethro Tull at a later period (1730–40) devoted all his

and turnip seed, in drills three
time. There were two boxes for
and these with the coulters wer
one set behind the other, so that
of seed might be sown at the sa
A harrow to cover in the seed was
behind.

Jethro Tull also invented a tu
somewhat similar to the other in
arrangement, but of a lighter con
The feeding spout was so arrang
carry one half of the seed backwa
the earth had fallen into the ch
harrow was pinned to the beam, an
arrangement one half of the see
spring up sooner than the other, an
of it escape the turnip fly. When
to turn the machine, the harrow w
lifted and the feeding would st
manner of delivering the seeds to
nels in both the above drills was by
barrels, and Tull was the *first*
cavities in the surfaces of solid cyli
the feeding. Nothing material in th
of the drill occurred afterwards till
but little progress appears to h
made to that period in drill-husba

About this time Sir John An
near Edinburgh, presented the mo
improved drill-plough of his own i
to the Bath and West of England
having had one in use for eight y
vious without its getting out of o
was a double drill-plough of sim
struction, by which two furrows
sown at a time, the horse walking
them, and by this means the injur
done by the horse's feet to the fin



COOKE'S DRILL.

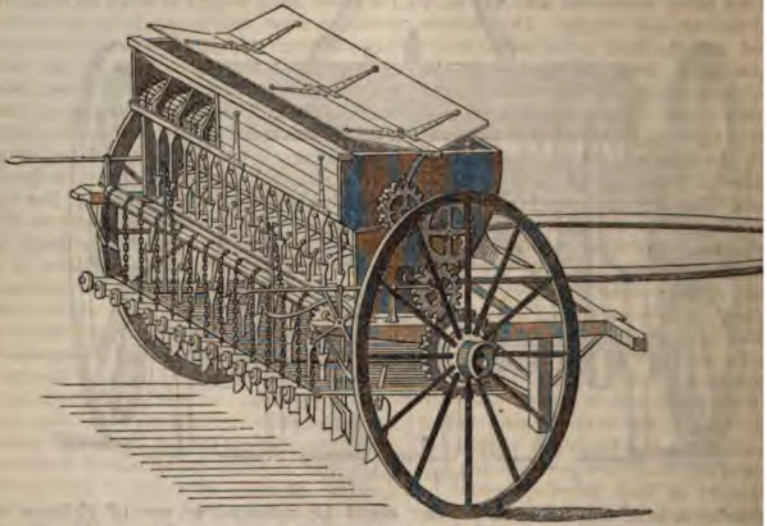
he seed-box is of a peculiar shape, the er part extending lower than the fore . It is divided by partitions, and so orted by adjustable bearings as to pre- e a regular delivery of the seed whilst nachine is passing over uneven ground. feeding cylinder is made to revolve tooth-wheel, which is fixed on each of the main axle, and gears with other hed wheels on each end of the cylinder; surface of the cylinder is furnished with ies of cups which revolve therewith, and of various sizes, according to the dif- nt seeds. These deposit the seed re- rly in funnels, the lower ends of which immediately behind the coulters, which connected by a beam, so as to be kept n even line, and are capable of being out of working when desired by a hook link in the centre. The seed, as it is sited, is covered in by a harrow fixed nd. The carriage wheels are larger in than usual, by which means the machine ore easily drawn over uneven ground; the labour of working is reduced.

bout the year 1790, Henry Baldwin of dham near Harleston in Norfolk, a farm- ided by an ingenious workman named uel Wells, then in his employment, im- ed upon the drill known as Cooke's drill, h by this time was in use in several parts orfolk. The improvement consisted— in making a *sliding axletree*, by which arriage wheel could be extended at ure to the width of the "stetches" or , and by which means another box with and more coulters could be used. a drill containing fourteen coulters could be enlarged to one of eighteen or twenty. Second, in making *self-regulating levers*, to which the coulters were attached; this was done by hanging each coulter on a distinct lever, placed at right angles with the cross bar of the framing, upon which each lever was made to swing by an ordinary hinge joint, and had a moveable weight at its opposite end, to press the coulter into the soil. By the levers being thus contrived to work independently of each other, they accommodated themselves to the irregularity of the surface of the land, and the impediments which they might meet, without disturbing the whole. The above were two very important improvements; and they are both in use to this day.

2. *Suffolk Corn and Manure Drill.* — Following the improvements just referred to, are those by James Smyth of Peasenhall, and his brother Jonathan Smyth of Swefling, who have been engaged in the manufacture upwards of forty years. A brief summary of which is as follows: — 1. A mode of adjusting the coulters to distances apart from each other, from four and a half inches and upwards. 2. An improved manure box and cups, for the delivery of manure with the corn. 3. A plan to drill in manure and corn, and sow small seeds at the same time. 4. The swing steerage, by which means the man attending the drill can move the coulters to the right or to the left hand, so as to keep the straight and parallel lines for sowing the seeds. 5. Various improvements in gearing and driving the wheels, barrel, &c.

The following engraving is taken from one of Smyth's most perfect corn and manure drills: by the description we have given of Cooke's, and of the subsequent improve-

ments by Baldwin, Wells, and Sm
plan will be fully understood.



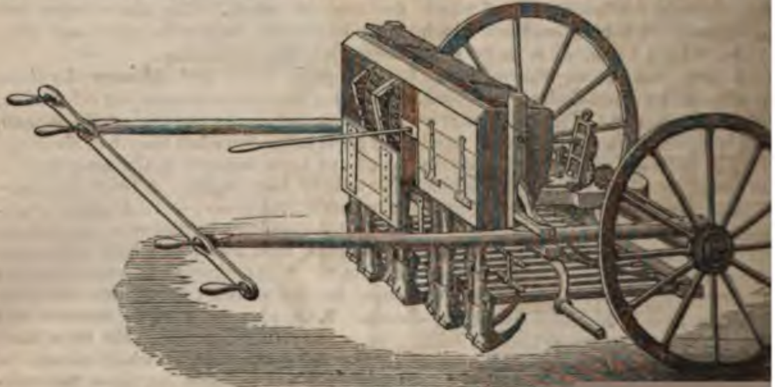
SUFFOLK CORN AND MANURE DRILL.

3. The next machine which deserves notice is the *Bedfordshire drill.* This drill was the invention of Robert Salmon of Woburn, who obtained for it the premium given by the late Duke of Bedford, at his annual sheep-shearing about thirty years ago.

It is an ingenious and a simple machine, and so contrived that the drill-man can easily direct its course while he is attending to the cups, and otherwise superintending its operation. In the arrangement for its guidance

consists its principal advantage. It
proved by two brothers, James and
Bachelor, farmers and mechanists
lington near Bedford; and afterw
the present makers, Samuel Hens
Ampthill, William Hensman of Wobu
William Smith of Kempston, wit
others in the county of Bedford. T
of the drill will be seen by the fo
engraving.

The seed-box is suspended up



BEDFORDSHIRE DRILL.

centres, one at each side; on these it swings so as to keep its level position as the drill moves up and down hill, or over ridges. Sometimes, instead of the box being made *to swing* upon centres, it is fixed so as to be

altered, as occasion may require, by
justing screw and crank placed in
venient position for the drillman to
The seed corn is taken up by iron cu
on circular plates and delivered into

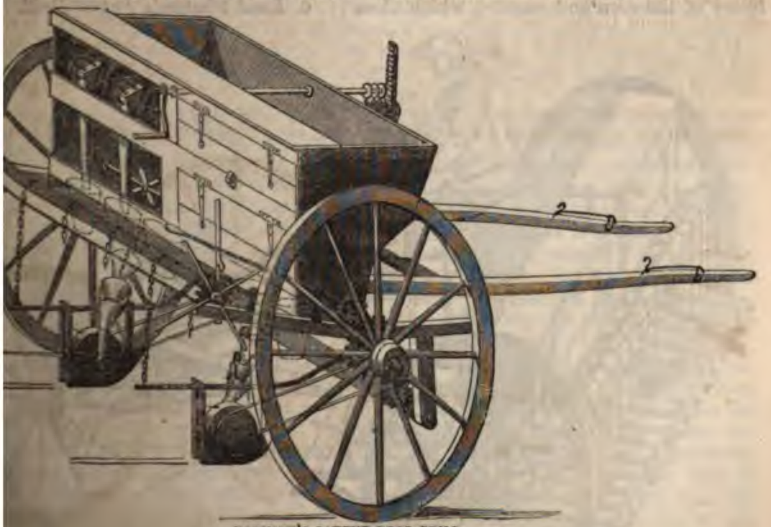
ence it descends to the ground; tes are centred upon a spindle, which by being connected with the nave the carriage wheels. The coulters d into the land by an equal pres- on each from the centre of the on which nearly the whole weight rill rests. The steerage is effected of light shafts attached to the axle, the carriage wheels run. These ave a cross bar at their ends, to nall handles are attached, so that may guide the drill to a nicety, he be at the right or left side of it. the steerage principle are made r, six, or eight coulters; the two zes are in general use in Bedford- ose with six coulters are considered for heavy or hilly land; those with lters for light and level lands

Bedfordshire drill, which has been cribed, is for sowing corn; but it ited for the combined purpose of nanure and corn at the same time, eight of both together would be at to admit of the man lifting round at the end of the field. folk corn and manure drill has, , for this purpose the advantage; drill is well suited for sowing nd manure. In such cases the corn to be exchanged for a double one, in one part of which runs a spindle with brushes, where the turnip seed is contained. There are small copper slides, with different numbers, from one to six holes pierced in them, through which the seed is delivered as required. The other part of the box contains the manure, which is thrown into the funnels, and these are so arranged that it drops into the earth just before the seed.

4. The next drill is *Hornsby's Patent Drop Drill.* This drill is, also, intended for dropping seed with manure at intervals, but the construction of it is very different from the Suffolk. In this, the manner of regulating the delivery is by having a coulter of a peculiar form inside, in which a circular box revolves on an axle which passes through one side thereof. This box is divided into compartments closed by small doors, which are kept shut by a spring to each; the compartments in the box are supplied through a series of funnels, the end of the lower one entering one side of the box below the centre.

On the machine being moved forwards, this box revolves by means of appropriate cog-wheels; and as each spring arrives at the ground, the door to which it is attached opens, and the contents of that compartment are deposited, to be again replaced, when it arrives at the part of its rotation at the end of the funnel, and so on successively.

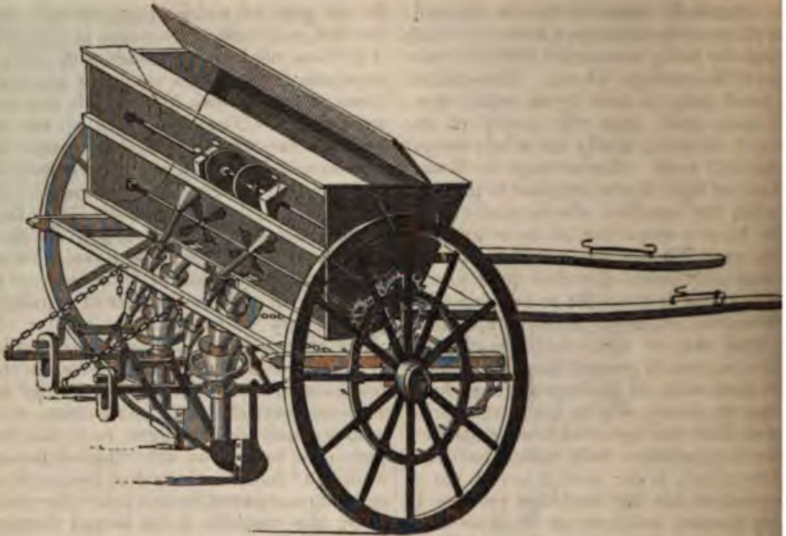
Having described the large drill, we think to pass over the numerous varieties ones, as these are adapted only to rposes; and as this essay is intended to the application of machinery to average size, we think it unneces- introduce them here.



HORNSBY'S PATENT DROP DRILL.

5. *Grounsell's Patent Drop Drill.*—This drill is for the purpose of depositing corn, grain, pulse, and manure *at intervals*, the distances of which may be regulated at pleasure.

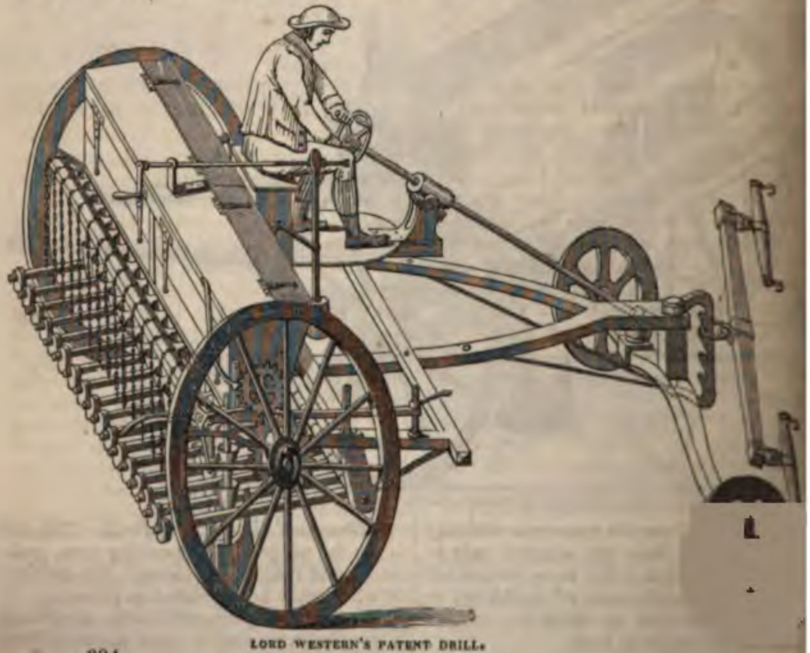
To effect the purposes above mentioned, a circular iron ring is fixed about midway



GROUNSELL'S PATENT DROP DRILL.

between the nave and rim of the drill carriage wheel. In this there is a number of holes to carry a series of studs, which may be varied according to circumstances; and as these studs come in succession, when the wheel turns they open valves for the delivery of the corn and manure, which close again immediately the stud has passed. further improvement is by the adoptio projecting arms or shovels, to draw manure and corn to the funnels, inst of taking the same up in cups in the adopted in other drills.

6. *Lord Western's Patent Drill.*



LORD WESTERN'S PATENT DRILL.

genious improvements to the drill
by this nobleman consist, 1. In
ation of improved metallic hinge
the moving levers, so as to insure
tinuing parallel with each other,
line with the course of the ma-
. By the addition of a pair of
d wheels and fore axletree to the
by which it can be guided with cer-
any direction. 3. A peculiar ap-
r steering the machine, consisting
passing through a socket, fixed in
r block to the foot-board; its outer
g attached to the fore axle by an
joint, the other end having a wheel
dles fixed thereon, by which the
is readily steered in its course.
plication of improved iron sockets
des of the levers, as a means of
the coulters, instead of weakening
by passing through them as here-

st the farmer in his researches, I
a rapid sketch of the chief modern
ents made in the drill, which have
y materially to its usefulness, with-
e same time increasing its expense.
rills usually made by the best
such as the Messrs. Garrett and
eiston Works, near Saxmundham,
k, or the Messrs. Smyths of Peasen-
Swefling, in the same county, of
luable and early improvements in
we have already spoken, are of
inds; but their description may be
mprehended under three or four

Common Lever Drill (see en-
f Common Suffolk Drill). This
e machine, which is the one in the
eral use, is adapted for drilling
either level grounds or ridges, and
scriptions of soil. These are, as
stated in our previous descrip-
ished with independent levers, by
e coulters are *each* readily and
y made to avoid any rocks or ir-
es of the ground, and a "press
," to force the coulters, in case of
to hard ground, with a varying
pressure, according to the texture
l.

coulters can now be set so as to
corn at any width, from four inches
ater distance; they, also, if re-
adily allow of the introduction of
e-hoe; and from being placed, by
excellent improvement, in double
ey admit, when at work, of large
c. passing between them, of a size
not possible under the old plan
g the coulters in one line. These
in the most complete drills, furnished with a "swing steerage," by which the drill-man keeps the rows at exact or even distances from those which have been previously drilled in the centre of the ridge, or out of the furrows, &c. The "corn barrel" of this drill is made to deliver from two pecks to six or seven bushels or strikes per acre of any kind of grain; and they have an additional barrel for drilling turnips and mangel wurzel, &c. And again, these barrels, by a peculiarly simple, yet excellent "regulator," are kept on unequal, hilly ground, on the same *level*; so that the grain is evenly delivered, in whatever situation the drill may be placed.

A "seed engine" is also sometimes added to this common corn drill, by which the grass seeds and clover are sown at the same time as the corn, and each kind of seed, if required, separately; by which plan any quantity per acre of the seeds may be much more evenly distributed, than by mixing them up together. For these seeds, being of different sizes and weights, are in the ordinary seed engines very apt to separate in the boxes; and thus the brushes too often deliver them in unequal proportions.

The weight of these drills necessarily varies with the number of coulters; they are usually from about three to ten cwts., and are drawn, according to circumstances, by either one, two, or three horses; and have, if required, slip axletrees, with which, by merely adding to the number of the coulters, &c., the drill is adapted to any breadth of land.

2. The next description of drill to which I shall allude, is *The Manure Drill*. This drill is formed very readily, by merely adding to the common corn drill, an operation which any husbandman can perform, "a manure box." It is a simple yet accurately-working apparatus for delivering the manure, which, in the best drills, it does with great evenness, and in quantities varying as "the slip" is placed, from six to eight bushels per acre. In the best drills, also, a very important improvement has been made within the last few years, which consists in the use of separate coulters for manure and seed. The manure is now deposited according to the mode preferred by the cultivator, not only from two to three inches deeper in the ground than the seed, but from ten to twelve inches in advance of it, so as to give the soil time to cover the manure before the next coulters deposit the seed;—whereas, on the old plan of depositing the seed and the fertilizer together down one pipe, an evil was liable to arise when it was used with some of the more powerful artificial manures; the seed

and the manure were too close together, and the manure was not always dropped in what is commonly its best position, *under* the seed.

3. The third variety of drill which I shall notice, is *The Northumberland Frame Manure and Turnip Ridging Drill.* This excellent drill (which was first constructed by the Messrs. Garrett of Saxmundham) is furnished with pressing rollers (one to each coulter), which form the land into ridges — and *precede* the coulters. These deliver in separate coulters, 1st, the manure; and 2dly, the seed: and the drill is provided with a second roller, which follows the coulters and closes the rows. This machine drills two rows at a time — weighs only about one cwt. — and one man and a horse can easily drill from eight to ten acres per day.

Besides these three most commonly used drills, there are several others — such as the Two Coulter Seed and Manure Lever Drill; this has a swing steerage, to which we have before alluded, and a slip axletree, to vary the distances of the ridges — (for this valuable implement a prize was awarded to Mr. Garrett at the Cambridge meeting). —To this a set of hoes is occasionally attached, furnished with independent levers, either for ridge-work or otherwise.

There are many other varieties of drills, but they involve no particularly useful principles, if we except the drop drills, the chief object of which is to save the quantity of manure. In these the seed or corn is mixed, and deposited with the manure.

From this brief enumeration the farmer will see that the modern drill-makers have not neglected their duty, in the adoption of every improvement calculated to simplify and render more serviceable the common and the manure drill; and I am highly gratified to be able to add, that there is now every prospect of their skill and enterprise being rewarded by the cultivators of our country; for I find, from an eminent maker, that the demand for manure drills has within the last two years been greater than ever was remembered before.

The chief advantages of the use of the drill, are the regular deposition of the seed at an uniform regulated depth, from which arises a considerable saving of seed (at least one third) — and the facility afforded in cleaning the land either by the hand or horse-hoe. The importance of these results is, happily for our country, rapidly becoming generally understood; and the result of experiments which I have witnessed to a considerable extent, upon some of the poorest gravelly soils of Surrey, by Mr. Hewitt Davis and others, convince me that, by the use of this machine, combined w
hoeing and weeding the crops, a
of half the usual quantity of seed
by the drill may be effected.
I cannot too often urge upon
of the upland soils, far away fro
of manure, the use of the ma
and those fertilizers expressly
for its use; since by these
manure is sufficient for three a
let the farmer remember, that it
the first cost of all manures w
them expensive, but the compara
saved in their application, which
taken into the account when the
is estimating their value. And
him remember that the best
farm compost is likely to con
fields a multitude of seeds,
whose removal too rarely form
of such comparative estimates.

The following is a list of
which have been taken out, dur
half century, for drill ploughs an
ments in sowing machines: —

March 13. 1784. J. Horn,
sowing seed.

July 30. 1784. Jervas Wrig
for sowing corn.

October 20. 1785. J. Horn,
be fixed to a plough for sowing.

December 18. 1786. Mr.
drilling seed.

March 10. 1787. Rich and
for sowing and harrowing.

July 3. 1787. J. Wright,
for sowing seed.

July 4. 1788. J. Cooke, a
drilling and ploughing.

October 29. 1788. Wm. H
chine for sowing grain.

June 20. 1789. Samuel Rid
hoe plough.

August 27. 1789. Moses Boo
for sowing grain.

August 19. 1790. Christ. P
chine for sowing grain.

April 26. 1800. James Richar
Warwickshire, machine for
depositing grain.

November 3. 1801. William
Easingwold, drill to be attached
beam.

January 21. 1813. Samuel T
ding, Hoe, Sussex, broadcast
chine.

January 21. 1816. William
Yardley, drilling machines.

December 22. 1820. W. S. To
drills to be fixed to ploughs.

November 2. 1835. Mr. Kean,
improvement in machinery
grain.

ovember 3. 1838. Lord Western, im-
ements in drills.
nuary 11. 1839. Newton, drilling and
ng machines.
pril 28. 1839. Milton, improved drilling
ines.
ne 12. 1839. Grounsell, drilling corn,
, &c.
vember 25. 1839. Hornby, machine
illing and sowing.
ober 22. 1840. Richard Edwards,
ry, improvement in machines for
ing drills, and depositing seed or
e.

LL-ROLLER. A roller so con-
as to form regular small incisions or
the ground at proper depths for the
t is merely a common cylinder roller,
y of iron, about seven feet long,
which are put cutting-wheels of cast
ch of which generally weighs about
The cutting wheels, being move-
y be fixed at any distance, by means
ers.

NKING POND. See Pond.

NKS. See Drench.

KE. A provincial word used for

PSY. In farriery, a disease incident
s, and sometimes called water-farcy.
ses and Sheep, Diseases of.

PWORT, COMMON. (*Spiræa
la.*) This wild plant seeks rocks,
laces, and open elevated pastures,
lky or gravelly soil, flowering from
July. It grows from one to two
, and its stalk is round, firm, and
d. Its dark green leaves growing
from the root, and standing upon
footstalks, are large and divided
eral firm segments. The stem-leaves
ll. Its flowers, which are small,
oloured inside and reddish on the
stand in great tufts at the top of
ches. The root is woody, composed
small tubers, attached to each other
ents, which are black externally,
te and farinaceous within. The root
wort is a good astringent. (*Engl.*
ol. ii. p. 368.)

PWORT, WATER. (*Œnanthe.*)
Eng. Flor. vol. ii. p. 68.) describes
ies. The common water-dropwort;
ley water-dropwort; sulphur-wort
ropwort; the fine-leaved water-
rt; and the hemlock water-dropwort.
e aquatic herbs, perennials, and bi-
fetid, and often poisonous; found
s, ponds, and other watery places.
t three species are not reckoned
s; but the last (*Œnanthe crocata*),
ps, in its fresh state, the most
of British plants. Brood mares, according to Sir Thos. Frankland, sometimes eat the root, and are poisoned by it. The root consists of many fleshy knobs, resembling parsnips externally, abounding with an orange-coloured, fetid, and very poisonous juice, such as exudes less plentifully from all parts of the herb when wounded. The stem is from two to five feet high, much branched, somewhat forked, and hollow. The leaves are of a dark shining green, and doubly pinnate. The flowers are white, or tinged with purple, very numerous and crowded.

DROSOMETER. (From the Greek.) An instrument constructed for measuring the quantity of dew that collects on the surface of a body exposed to the open air during the night. The first instrument for this purpose was proposed by Weidler. It consisted of a bent balance which marked in grains the preponderance which a piece of glass of certain dimensions, laid horizontally in one of the scales, had acquired from the settling and adhesion of the globules of moisture. A simpler and more convenient drosometer would be formed on the principle of the rain gauge; and in order to facilitate the descent of the dew down the sides of the funnel into the tube, a coat of deliqueate salt of tartar may be spread over the shallow surface. Dr. Wells, in making his celebrated experiments on dew, exposed a small quantity of wool to the open sky, and the difference in its weight when laid down and taken up showed the quantity of moisture it had imbibed in the interval. (*Brande's Dict. of Science.*)

DROUGHT. The effect of long-continued dry weather, or the want of rain: when applied to animals, it signifies thirst, or want of drink.

DROVER. One who drives cattle to market.

DROVER'S DOG. See Dog, Shepherd's.

DROWNING. The act of suffocating or being suffocated by a total submersion in water. The death which follows in this case depends on the non-admission of air to the lungs. One of the chief objects of breathing is to abstract the carbonic acid from the venous blood, which is returned from all parts of the body to the heart, and to imbue that which is again to be circulated with oxygen. The venous blood, therefore, gives out in the lungs carbonic acid, which is expelled by the mouth; and absorbs oxygen, by which it is reddened and converted into arterial blood. Whatever prevents these changes from taking place in the lungs destroys life: and on this account drowning is the cause of death. The length of time during which a person may remain under water without the body as quickly as possible into a warm room; this, however, should not be done on the shoulders of another person, but on a shutter or board, with the head and shoulders elevated, and the face freely exposed to the air. The wet garments should be taken off as speedily as possible, and the lungs inflated by artificial respiration without loss of time, and warmth and friction applied to the body by well drying and rubbing it with warm blankets and towels. Electricity, if it can be applied, will also be found advantageous; but all nasal stimulants should be avoided. The simplest method of effecting artificial respiration is to introduce the nozel of a pair of bellows into one nostril, shutting the other and the mouth whilst the air is blown in; and as soon as the chest seems filled, to open both mouth and nostrils, and press gently on the chest, to imitate natural breathing. (*Brande's Dict. of Science; Willich's Dom. Ency.*)

DRUDGE. An implement of the rake or harrow kind, peculiar to West Devonshire. It is a sort of long heavy wooden-toothed rake, the teeth being broad, and placed with the wide or flat side foremost. It is drawn by horses or oxen, and made use of, in paring and burning operations, to collect the broken parts or fragments of the sward which have been loosened by the operation of the plough and harrow.

DRUG. A term provincially applied to a four-wheeled timber-carriage; and to every medicinal agent.

DRYAS, WHITE, or MOUNTAIN AVENS (*Dryas octopetala*). A perennial,

tilation. In the old cathedrals
public edifices, the dry rot neve
because care was taken to ventilat
It occurs among the timbers of s
it sometimes commits the m
damage and in damp ill-ventila
Mr. Batson, in the *Trans. of*
Encour. of Arts, recommended
a preventive. Some excellent
also given on this subject in
Mr. Hart "On the Cause of Dry
Larch and other Trees" (*Trans.*
vol. iv. p. 395.). The process
been patented by Mr. Kyan, na
ing the wood for a week or two
solution of corrosive sublimate,
agulates the albumen of the woo
stroys the fungus, appears to
preventive at present known. S
net has recently invented anot
for rendering wood, cordage, a
scriptions of woollen, free from
of dry rot, which has lately been
found very efficacious by gove
understand the active matter in
Burnet's solution is sulphate
(*Brande's Dict. of Science; Wil*
Ency.)

DUB. A provincial term a
small pool, or hollow, containing

DUCK. (Dutch *ducker*, to dip;
There are many varieties of duck
by naturalists, but only two are
in our farm-yards; namely, th
duck and the Muscovy duck. T
duck is an useful and economica
quiring little care. It is perf

, which are March, April, and May.
hovel should be well secured from
rance of foxes, polecats, weasels, &c.,
should be defended from wind and
. Ducks "feed themselves" a great
the year, as they are gross eaters;
every sort of garbage, such as offal,
rms, caterpillars, sweepings of barns,
of breweries, slugs, toads, spiders,
ects. In this particular, they are
le gardeners, effecting more in one
an two gardeners could perform in
towards clearing a garden of slugs,
d caterpillars. The waters which
equent should contain no leeches.
l has any leeches in it, put in a few
ho will soon devour them. The
nbane should also be carefully
from the neighbourhood of ducks
try in general, from its poisonous
A duck lays from fifty to sixty
ween the months of March and
ch are as nourishing in their qua-
n's eggs. The duck is not natu-
ined to sit, but let her always sit
own eggs if possible. It is ob-
at they do not like sitting upon
ggs, and that they even suffer pain
et her nest be remote and quiet
ms. While the duck is sitting,
should be placed near her, and
sparingly. They sit closer if
oo profusely. The food should
noist. The young ducklings are
n a month, and then the mother
put in a coop for some time, or
arry her brood immediately to the
d tire them; besides which, many
th cold. They should be allowed
ong first. Many housewives pre-
g duck eggs under hens and hen
in order to prevent this; but if
is secured, the end is answered.
ucklings have dishes of water near
to dabble in, and feed them when
e egg-shell with bread crumbled in
a few days. Nettle-leaves boiled
d chopped very small, made into
with barley meal, is also a warm
e food. When the ducklings gain
give them plenty of raw potherbs
pped, mixed with soaked bran,
mashed potatoes, mashed acorns,
if near the coast. Ducklings in-
r the table should not be allowed
about much; it keeps them lean.
ucks are valuable. They should
ned to their hovel or to a coop
he process of fattening, and fed
one month upon oats and water in
ughs. It is of no use giving them
s: they will no more fatten upon
ts than we can thrive upon musty bread. Do not try to fatten them either upon garbage. It gives the flesh a bad taste. Boiled rice is a nice delicate variety of food. The fine white Aylesbury breed are the most profitable and the handsomest duck. They are also the earliest in laying and setting.

DUCK, THE MUSCOVY (*Anas Moschata*), a native of South America, is a gaudy-looking large bird, often introduced into our farm-yards, but not much approved; more for show than use. Their flesh is not so good to eat as that of the common duck, and the drake is very tyrannical in attacking the poultry, and causing an uproar in the peaceful homestead, besides spoiling a superior breed.

I will give a recipe for salting ducks, as they are done in Brittany: it is economical and excellent food. Two days after the well-fatted ducks are killed, cut them open at the inferior part, and draw away the thighs, wings, and flesh of the stomach and rump. Put the whole, with the neck and tip of the rump in a tub of salt, with a little nitre and a few bay leaves mixed in it, to give the flesh a fine red colour. Cover it up in the salt a fortnight; then cut the fowl in four quarters, lard it with cloves, and put it into a pot or pots, with some spice.

Duck feathers are very profitable, and, mixed with those of the goose, make good pillows, &c. The feathers should be plucked in May and September, while the duck is yet warm after death. Dry the feathers in bags in the oven after the bread has been withdrawn, and repeat the process several times. See FEATHERS.

DUCK, THE WILD (*Anas boschas*, Linn.), is rather less in size than the tame duck, but differs little in plumage; it weighs usually about 2½ lbs., but has been known to reach 3½. In-shore shooting of wild ducks is considered to be legitimate sporting about the middle of August, when the *flappers*, or young ducks, have begun to take wing. The fens of Lincoln, Cambridge, and Martin Mere, in Lancashire, are excellent localities for duck as well as every other wild-fowl shooting. The last Game Act has a clause to prevent wild-fowl being killed from the last day of March to the 1st of October, and this applies equally to shooting and taking them in decoys. The wild ducks pair in the spring, build their nest among rushes near the water, and lay from ten to sixteen eggs. (*Blaine's Rural Sports*, p. 913.; *Willich's Dom. Ency.*) See WIDGEON, and TEAL.

DUCK'S FOOT. (*Podophyllum*; abridged from *anapodophyllum*, a word signifying a duck's foot, as the leaves bear some resemblance to it.) This plant requires a moist shady situation, and to be grown in peat soil; increased by division at the root. (*Paxton's Bot. Dict.*)

DUCKWEED. (*Lemna.*) A genus of plants consisting of four species, all of which are natives of this country, and grow abundantly in ponds, ditches, and stagnant waters. They are in flower from June to August. Duckweed is a small green herb, consisting of little roundish leaf-like disks. It is not, perhaps, generally known that duckweed, if allowed to spread itself over ponds and stews, in which fish are preserved, will ultimately destroy them, by its forming a compact mat upon the surface, thereby preventing the fish, when they rise to the surface of the water for air, from breathing. It should on this account be abstracted diligently with a rake, or some such implement, and kept under before it obtains an ascendency, which it will do in a very short time if not seasonably withdrawn. The quantities of fish that perish under the influence of this weed are incalculable. Ducks feed upon the "lemna" with surprising avidity, and thence it derives its name (duck's meat or duckweed). Ducks, by dabbling and grovelling in foul pools, where it predominates, and its adhering to their feathers, are in the habit of introducing it into other waters, where it never appeared before. (*Eng. Flora*, vol. i. p. 31.; *Willich's Dom. Ency.*)

DUN. (Sax. dun.) A colour partaking of brown and black, frequent in horses.

DUNES. (Ang.-Sax. *low hills.*) Hills of moveable sand, which are met with along the sea coast in various parts of Great Britain, Ireland, and the Continent. (*Brande's Dict. of Science.*)

DUN-FLY. The class of small ephemeral flies called *duns* in the angler's vocabulary (says Blaine), are very important to his practice. From their numbers and varieties, it would be difficult in the extreme for the most attentive naturalist or angler to designate or characterize them individually. Some have very little of a dun hue about them, such as the orange and bright yellow varieties, and they pass through the gradation of all sorts of shades; thus we have the blue dun, the brown dun, the red dun, the cream-coloured dun, the claret dun, &c. They are in use from February almost through the season. (*Blaine's Rur. Sports*, pp. 1151. 1160.; *Walton's Angler.*)

DUNG and DUNGHILL. See Farm-yard Dung and Compost.

DUNLIN. (*Tringa variabilis.*) This species of bird is known all round our coast by some one or more of the following names, viz. Dunlin, Purre (Sir T. Browne writes it,
Churr), Stint, Ox-bird, Sea-snipe, &
the most common as well as the most
ous of the sand-pipers frequenting our
and may be seen there throughout th
except for a short time at their br
season, from April or May to August.
four; greenish-white spotted with da
brown; one inch four lines and a
length, and eleven lines and a
breadth; whole length about eight
beak one inch and a quarter. (Y
Brit. Birds, vol. ii. p. 658.)

DURHAM CATTLE. See Catt

DURZED-OUT. A term appl
some counties to corn beaten out of t
in the field by the wind or other acc

DUST BRAND. One of the local
for the smut in corn.

DUTCH ASHES. See Ashes.

DWALE, COMMON. (*Atropa*
donna.) The deadly nightshade. Se
ladonna and Nightshade.

DWARF BAY. See Mezereon.

DWARF BERRIES. See Nights

DWARF OAK. A shrub, some
employed for making live fences. It
very fast, and becomes thick by c
very rapidly.

DWINED. A term used to
shrivelled, or withered, as corn.

DYDLE. A term provincially a
to a kind of mud-drag.

DYER'S GREEN-WEED, or W
WAXEN. (*Genista tinctoria.*) See G
weed.

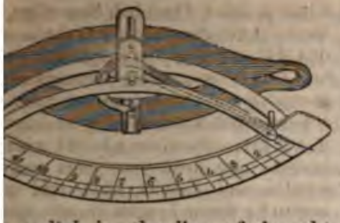
DYER'S ROCKET, or YEL
WEED. (*Reseda luteola.*) See Wo

DYER'S WOAD. (*Isatis tinctoria.*)
Woad.

DYKE. (Sax. dic; Erse *dyk.*) A
of wall or mound formed of earth or
In Scotland it is applied to any wall
a field. See Ditch.

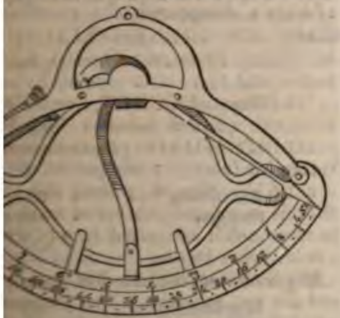
DYNAMOMETER. (Gr. δυναμις, po
and μετρον, measure.) An instrument
measuring power of any kind, as the str
of men and animals, the force of mach
&c. Some interesting results relati
the average strength of men at diff
ages, and of different weights and sizes
been produced by M. Quetelet of Br
from numerous experiments with Reg
dynamometer, one of the most conv
that is made. The following is a dr
dynamometer, constructed on Reg
principle.

It consists of two flat plates of st
a curved form, increasing in thickne
wards the ends, which unite into sol
lindrical loops; the curved sides o
plates being placed opposite to each
and the whole forming an entire el
spring. On the application of this i



a *link* in the line of draught, becomes lengthened in proportion egree of force acting on the loops ite directions, and the curved sides more nearly towards each other gly. The degree of approximation lates is shown on the scale, in di- corresponding to half and whole weights, by means of a cross rod to one plate acting on a crank to the opposite one, thus commu- its effect to the lever index, which, ver the divisions of the scale, marks ing degree of force exerted each by the draught to which the in- is subjected.

Cottam and Hallen, engineers and ral implement makers, of Winsley Oxford Street, London, have re- tented an improved dynamometer. the following figure is an illustra-



is dynamometer has been contrived intention of obviating the continual of the indicator of the dynamo- ormerly in use, which was caused ference to the plough) by the ob- s met with in the soil through which passing. These vibrations were so t, that the indicator could scarcely rved during the experiment. The ment consists in the attachment of brass pump filled with oil, the piston h has one or two small apertures. eing no outlet from the pump, it is that when any shock occurs, caused ne, root, &c. the oil having to pass e side of the piston to the other, lenness is greatly diminished by the resistance, producing a corresponding effect upon the pointer, which, as these shocks are rapid, vibrates nearer the actual draught of the machine; which is the object in view, and not the measurement of any impediment, but a mean result of the whole. Mr. Pusey, in his "Experimental Inquiry on Draught in Ploughing" (*Journ. Roy. Eng. Agr. Soc.* vol. i. p. 219.), speaks very favourably of this draught-gauge, and remarks (*Ibid.* p. 222.): "Such is the goodness of Mr. Cottam's new draught gauge, that we scarcely ever, I believe, differed by more than a quarter of a hundred weight, and often agreed to an eighth, or one stone."

DYSENTERY. (Fr. *dysenterie.*) See SHEEP, DISEASES OF.

E.

EADDISH. A provincial term for aftergrass, roughings, or grass growing among the stubble after the corn is cut.

EAGLE. (Fr. *aigle*; Lat. *aquila.*) Of the diurnal birds of prey the eagles are by far the largest in size, and of great muscular power; and although they do not possess all the characteristics which distinguish the true falcons, their flight is powerful and their habits are destructive. The golden eagle (*Aquila Chrysaëtos*), though occasionally seen in the southern counties of England, is more exclusively confined to Scotland, and its western and northern islands. These birds possess the senses of sight and smell in an uncommonly acute degree; they are also remarkable for their longevity, instances having occurred in which they have been known to survive beyond a century. Eagles are very destructive to lambs, kids, fawns, hares, and all kinds of game, especially during the breeding season, when they carry vast quantities of prey to their young. In the Orkney Islands a law is in force which entitles the person who kills an eagle to a hen out of every house in the parish where such bird was killed. The length of the golden eagle is nearly three feet, the general colour of its plumage dark brown, the legs covered with bay feathers, toes yellow, claws black, the weight about 12 lbs. The nest of the eagle is formed of large sticks on inaccessible rocks: the eggs, which are two or three in number, are three inches long by two inches and five lines broad, dirty white, mottled with pale reddish brown.

The great sea eagle (*Haliætus albicilla*), also known as the Erne or white-tailed sea eagle, and cinereous eagle, is inferior in size to the golden eagle; but it is much more common, and may frequently be seen on the high rocks and cliffs that overhang the sea, ready to seize either fowl or fish, as its appetite impels it. It has also a great partiality for fawns and venison, on which account it has been occasionally killed in deer parks and forests. It forms its nest on rocks or in lofty trees; lays two eggs, nearly the same size and colour as those last described. Plumage dusky brown, with an ashen tinge; tail wholly white; cere and feet yellowish white.

The fishing eagle, or hawk (*Pandion Haliætus*), is by many naturalists denied a place among the eagles, and classed among the bald buzzards. See Osprey. (*Yarrell's Brit. Birds*, vol. i. p. 7—19.; *Blaine's Rural Sports*, p. 653.)

EAGLE OWL. See Owl.

EAR. (Sax. eaꞃe, Lat. *auris*.) The organ of hearing in animals. In a horse, the ears should be small, narrow, straight, and the substance of them thin and delicate. They should be placed on the very top of the head; and their points, when stiled or pricked up, should be nearer together than their roots. When a horse carries his ears pointed forwards, he is said to have a bold or brisk ear. In travelling, it is considered an advantage when the horse keeps them firm. The exterior ears of the horse are merely organs for collecting sound; consequently, he has a complete power over the muscles attached to them, and can turn them in every direction. It is probable that the organ of hearing is the safeguard of the horse in his natural state. He is ill adapted for combat; his swiftness of foot and his acuteness of hearing are therefore requisites to him of the utmost importance.

EARING. A term used provincially, probably for *aring*, which signifies ploughing, tilling, or cultivating land.

EAR MARK. A mark on the ear by which shepherds know their sheep. Cattle, dogs, and other animals are sometimes marked in the same way, by notching, clipping, or slitting the ear.

EARNEST. (Sax. eoꞃneꞅꞇ; Fr. *arrhes*; Dan. *ernitz penge*.) In commercial law, the sum advanced by the buyer of goods in order to bind the seller to the terms of the agreement. As to what amounts to sufficient earnest, Blackstone lays it down, that "if any part of the price is paid down, if it is but a penny, or any portion of the goods is delivered by way of earnest, it is binding." To constitute earnest, the thing must be given as a token of ratification of the contract, and it should be expressly stated so by the giver. (*Chitty's Com. La*
p. 289.; *M'Culloch's Com. Dict.*)

EARS *of Corn*. (Sax. æhheꞃ.)
of corn, that part which contains
but the term is very generally
the heads of different grain crops.

EARTH. (Sax. eaꞃð.) This
anciently employed to signify on
four elements of which all matter
posed to be formed; namely, *air*,
and *earth*. In the present period,
in common language has two mea
implies either the globe we tenan
soil on which plants vegetate. In
it has reference to the latter. The
well as the rocks, &c. of which ou
is formed, is composed of a variety
stances, such as lime, silica, alumi
nesia, &c. to which chemists lo
gave the name of earths; and alth
the researches of Sir H. Davy an
these earths have been shown t
reality, metallic oxides — that is
united with oxygen — yet the term
so well and so extensively know
should, even if this was intended
chemical dictionary, retain it.
lowing is the composition of the fo
most commonly met with by th
in his land, or in the crops which
ports: —

Lime: a compound of a peculi
called

		Parts
Calcium	- -	71·4
Oxygen	- -	28·
		100

Alumina (clay): a compound of,

Aluminum	- -	56·
Oxygen	- -	43·1
		100

Magnesia: a compound of the m

Magnesium	- -	40
Oxygen	- -	60
		100

Silica, which is by modern
classed with the acids, is a compou
metal called

Silicon	- -	49·
Oxygen	- -	50·1
		100

In this place, however, our bu
with the earths only so far as their
vegetation are concerned.

EARTHS, *their Use to Veget*
the investigation of the use of th
to vegetation, not only as rega
position as necessary portions of

ls, but as forming the essential
s of most vegetable substances,
y important circumstances will
mselves to the notice of the cul-
he order and the regularity with
e earths are found in plants is
kable; the harmony, too, with
arious chemical ingredients are
the uniform manner in which
sorbed by the roots of the plant
ated in its juices, cannot escape
n, nor fail to excite our gratitude
nevolence and the wisdom dis-
he contrivance. Thus we shall
proceed in our researches (to
single instance), that the earth
) abounds in the *straw* of the
t, where its presence helps to
requisite degree of strength and
the stem; but scarcely a chemical
is earth is discoverable in the
e seeds of the same plant, for
resence in our food would be
useless.

however, the reader, when he
ng the discoveries of vegetable
feel surprised that more has not
plished by the chemical philo-
at important branch of science.
many reasons why the discov-
branch of chemistry have been
d only by slow degrees: he may
that the difficulties which attend
t when he is investigating the
f organic matter, are more than
nerous; for the living plant, in
nces, seems endowed with powers
r even to neutralise the effects
l attraction and repulsion: thus
nd alkalies, to give one instance
ten found in juxtaposition with
l vegetable acids. The roots of
s, also, are endowed with a re-
apacity of absorption; not only
sorb water, the gases of the at-
nd those formed by putrefaction,
ke up earths, alkalies, and saline
; and, besides doing this with a
which is almost unvaried, they
power of absorbing certain saline
n dissolved with others in water,
ing the others in solution, which
to be endowed with properties
remarkable nature. Some cu-
iments were long since made by
e on this interesting question.
rious salts were dissolved at once
e solutions," says Dr. Thomson,
s made to vegetate in them, it
that different proportions of the
absorbed. The following table
results of these trials, supposing
l weight of each salt to have
been 100. Each solution contained one hundredth part of its weight of each salt —

		Proportions absorbed.
1.	Glauber Salt -	- 11·7
	Common Salt -	- 22·0
2.	Glauber Salt -	- 6·0
	Common Salt -	- 10·0
	Acetate of Lime	- 0·0

On examining the plants the salts absorbed were found in them unaltered." (*Chemistry*, vol. iv. p. 325.) In these experiments the cultivator will observe that the plants (which were Spotted Persicaria (*Polygonum Persicaria*) and the Bur-marigold (*Bidens tripartita*), with their roots attached) absorbed the common salt with avidity, but that they rejected entirely the acetate of lime. The earths are, in all probability, always imbibed by the plant in a state of solution; we know, in fact, that both lime and silica are, to a certain extent, soluble in water, and alumina is also very probably absorbed as a component of some of the soluble salts which contain this earth.

The part which the earth fulfils in the support of plants early attracted the attention of philosophers. The earthy ashes produced by the combustion of vegetable substances must have very soon indicated to mankind the real truth of the case, that there were certain solid substances found in vegetables which they could only derive from the earth they tenanted. That the soil furnished its earthy matter to the plant was, therefore, the natural conclusion of some of the Greek philosophers; and although their observations in this way were commonly very loose, and always general, yet when they decided, which they did with all gravity, that earth, air, fire, and water composed every thing on the earth, the vegetable world was of course included in the list; they still, however, thought that the chief use of the earth to plants consisted in keeping them upright, and furnishing them with a sufficient supply of moisture.

When the ancient naturalists came to the conclusion that the whole earth was composed of four elements, they founded their decision upon certain rude observations; but they did not stop there, they proceeded to confuse themselves by various incomprehensible or delusive phrases, such as more modern observers have too often imitated. Fire they regarded as the active principle of the universe, the source of both animal and vegetable life, the cause of renovation and decay. Earth they considered as the principle of fixity, of hardness, and of solidity. These rude, though sagacious observations, the early chemists, and then the alchemists, strongly confirmed by the mode in which they analysed vegetable substances. They had only one mode of effecting this, that of subjecting them in a retort to dry or destructive distillation. By this mode the results are almost always the same; first the water of the plant comes over; then a volume of carburetted hydrogen and carbonic acid gases is driven off; and finally a quantity of earthy matters, mixed with various salts and potash, remains at the bottom of the retort. We need hardly feel surprised, therefore, that after such an analysis, the chemists of old readily agreed with the naturalists that earth, air, and water alone formed the vegetable world.

Evelyn, in 1674, wrote a work upon earth, in which he lauded its powers with much enthusiasm. "What shall I say," he exclaims, "Quid Divinum? the original of all fecundity; nor can I say less, since there was nor sacrifice nor discourse acceptable without it." And in another place he says (for Evelyn was exceedingly credulous), "Whatever then it be, which the earth contributes, or whether it contains universally a seminal virtue, so specified by the air, influences, and the genius of the climate, as to make that a cinnamon tree in Ceylon which is but a bay in England, is past my skill to determine; but it is to be observed, with no little wonder, what M. Bernier in his history of the empire of the Mogul affirms to, as of a mountain there, which being on one side of it intolerably hot produces Indian plants, and on the other as intemperately cold, European and vulgar plants." There is much valuable matter, however, in *The Terra* of Evelyn, whose modesty enhanced his great merits. Thus, in conclusion, he told the Fellows of the Royal Society, to whom his valuable essay was addressed, that it was merely "a dull discourse of earth, mould, and soil."

Fitzherbert, the earliest English writer upon agriculture (1532), did not pay any attention to earths, beyond the usual necessary routine of the farm; he confined himself entirely to practical details: not a trace of any thing like scientific inquiry is to be found in his *Boke of Husbandrye*. John Worlidge, who published his *System of Agriculture* in 1669, thought it necessary, as he professed to "unveil the mystery of agriculture," to give the cultivator an explanatory chapter on the food of plants, in what he called "a plain and familiar method," and this he did in the true jargon of the alchemists; for the age of "the transmuters" was not yet over when Worlidge wrote. He gave, therefore, the husbandmen of those days a dissertation upon "the universal spirit, or spirit of merc
universal sulphur, and the univers
but still, after all, he thought that
was the true food of plants, and th
operations of the husbandman onl
to enable the roots of the plant
up more earthy matter, and he
a chapter of his book to the "S
Manures taken from the Earth."
ideas, like those of the alchemi
usually an intimate mixture of
sense and absurdity, too closely
be always readily distinguishable
good sense of the cultivator.

Jethro Tull, who wrote betwe
and 1740, considered earth to be
food of plants. "Too much nitre,"
us (page 13. of his valuable Book
bandry), "corrodes a plant, to
water drowns it, too much air
roots of it, too much heat burns it
much earth a plant never can hav
it be therein wholly buried: too mu
or too fine can never possibly be
their roots, for they never receive
of it as to surfeit the plant." And,
tells us in another place, "That wh
rishes and augments a plant is the
of it. Every plant is earth, and th
and true increase of a plant is the
of more earth." And in his chapte
"Pasture of Plants," Tull told his
with great gravity, that "this past
the inner or internal superficies of th
or, which is the same thing, it is th
ficies of the pores, cavities, or inte
the divided parts of the earth, whic
two sorts, natural and artificial
mouths or lacteals of roots take the
lum, being fine particles of earth,
superficies of the pores or cavities,
their roots are included."

Tull wrote with all the enthu
genius, and carried his admiratio
powers of earth to support vegetati
too far; he was deceived, in fact,
effects of his finely pulverising s
tillage, and did not sufficiently a
the fact, that there are many ot
stances in the commonly cultivated
the farmer besides the earths, and th
from their being always the chief
tuents of the soil, they very often
smallest portion of even a highly pr
field.

That the four earths of which
vated soils are composed are all th
sary food or constituents of vegeta
long since Tull wrote, been decide
accurate investigations of the chem
these lime, either as a carbonat
acetate, or a sulphate, is by far
generally present in plants; indee

form or another, it is rarely absent from them. The presence of silica (flint) is almost equally general. Magnesia is less usually present, or, at least, it exists in smaller proportions; and the same remark applies to alumina (clay).

The quantity of the earths which is present in various vegetables is, therefore, a primary question for the cultivator's guidance. This will be seen from the following tables:—

			Parts.
100 parts of the	oak	contain of the earths	1·030
—	beech	—	0·453
—	fir	—	0·003
—	Turkey wheat	—	7·110
—	sunflower	—	3·720
—	vine branches	—	2·850
—	box	—	2·674
—	willow	—	2·515
—	elm	—	1·960
—	aspen	—	1·146
—	fern	—	3·221
—	wormwood	—	2·444
—	fumitory	—	14·000

The proportions of the earths contained in the commonly cultivated crops of the farmer have been ascertained by M. Schræder: this able chemist obtained from thirty-two ounces of the seeds of wheat (*Triticum hybernum*), of rye (*Secale cereale*), barley (*Hordeum vulgare*), oats (*Avena sativa*), and rye straw, the following results:—

	Wheat.	Rye.	Barley.	Oats.	Rye Straw.
Silica - -	13·2	15·6	66·7	144·02	152·0
Carbonate of Lime -	12·6	13·4	24·8	33·75	46·2
Carbonate of Magnesia	13·4	14·2	25·3	33·09	28·2
Alumina - -	0·6	1·4	4·2	4·05	3·2
Oxide of Manganese -	5·0	3·2	6·7	6·95	6·8
Oxide of Iron - -	2·5	0·9	3·8	4·05	2·4
	47·3	48·7	131·5	227·8	238·8

(*Gehlen Journ.* vol. iii. p. 525.)

The earth silica or flint abounds in almost every description of vegetable matter, especially in the grasses and *Equisetum* (horse-tail). In the Dutch rush it is so plentiful that that plant is used by the turner to polish wood, bone, and even brass. It forms so considerable a portion of the ashes of wheat straw, that when these are exposed to the action of the blowpipe, it unites with the potash found also in the straw, and forms an opaque glass. Davy found it most copiously in the epidermis or outer bark of the plants he examined.

	Parts.
100 parts of the epidermis of bonnet cane contain of silica - - -	90·0
100 parts of the epidermis of bamboo cane contain of silica - -	71·4
100 parts of the epidermis of common reed contain of silica - -	48·1
100 parts of the epidermis of stalks of wheat contain of silica - -	6·5

In the joints of the bamboo a concrete substance is found, which Fourcroy and Vauquelin examined, and ascertained that it consists of 70 parts of silica, and 30 parts of potassa. This substance, which is named *tabasher*, can only be furnished by the soil. (*Gehlen*, vol. ii. p. 112.)

This earth, according to M. Saussure, constitutes 3 per cent. of the ashes of the leaves of oak gathered in May, 14·5 per cent. of those gathered in September, and 2 per cent. of the wood. In the ashes obtained by burning the wood of the poplar, it exists in the proportion of 3·3 per cent.; of the hazel, 0·25 per cent.; of the mulberry, 0·12 per cent.; of the hornbeam, 0·12 per cent.; 0·5 per cent. in peas (*Pisum sativum*); 61·5 in the straw of wheat; 0·25 in the seeds; 57·0 per cent. in the chaff of barley; 35·5 in its seeds; and, in the oat plant, 60 per cent.

Lime is, if possible, still more generally present in all plants than silica. "The salsola soda," says Dr. Thomson, "is the only plant in which we know for certain it does not exist." (*Syst. of Chem.* vol. iv. p. 190.) It is, however, united with carbonic acid as carbonate of lime; or it exists as the base of some other salt, such as in oxalate of lime, or in sulphate of lime (gypsum). It was found in the ashes remaining after the combustion of oak wood, at the rate of 32 per cent., by M. Saussure. In that of the poplar at the rate of 27 per cent. He discovered also 8 per cent. in those from the wood of the hazel; 56 in those of the mulberry wood; 26 in the hornbeam; 14 in the ripe plant of peas; 1 per cent. in the straw of the wheat, but not any in its seeds; 12 in the chaff of barley, but none in either its flour or its bran; neither did he find any in the oat plant; but then, in the ashes of the leaves of the fir (*Pinus abies*), raised on a limestone hill, he found 43·5 per cent.

Alumina, as I have elsewhere observed, is found in most vegetables, but in much smaller proportion than either silica or carbonate of lime, and the same remark applies to magnesia. M. Schræder found, as we have before seen, in two pounds weight of the seeds of wheat only $\frac{6}{10}$ths of a grain of alumina, in rye $1\frac{4}{10}$ grains, in barley $4\frac{2}{10}$ grains, in oats $4\frac{1}{2}$ grains, and in rye straw $3\frac{2}{10}$ grains. In 12 ounces of wormwood there are about 5 grains of alumina. This earth, however, necessarily exists in all fertile soils as the food of plants; for although the proportions in which it is found are rather small, yet still there is no reason to believe that its presence is not essential to the healthy growth of the plant. M. Saussure found the ashes of the *Pinus abies*, growing on a granitic and on a calcareous soil, to contain nearly the same quantity of alumina (15 per cent. on the calcareous and 16 per cent. on the granitic), although these soils differed widely in the proportion of the alumina they contained; for 100 parts of each were composed of—

The Granitic soil.	Parts.
Silica - - -	75·25
Alumina - - -	13·25
Lime - - -	1·74
Iron and Manganese -	9·00
	99·24

The Calcareous soil.	
Carbonate of Lime - -	98·000
Alumina - - -	0·625
Oxide of Iron - -	0·625
Petroleum - - -	0·025
	99·275

(*Thomson's Chem.* vol. iv. p. 317.)

Such are the earths which constitute all cultivated soils, and such is the necessary proportion in which they form the constituted elements of some of the plants which they support. In the soils of the cultivator, however, they exist in an endless variety of proportions: thus, I found 68·5 per cent. of silica in the gravelly soils of Great Totham, in Essex, and 62 in those of Kintbury, in Berkshire. Davy discovered about 50 per cent. in the soil of the Endsleigh Pastures in Devonshire, 54 in that near Sheffield Place in Sussex, 15 in the turnip soils of Holkham in Norfolk, 32 in the finely divided matters of the wheat soils of West Drayton, and about 97 per cent. in the soil of Bagshot Heath. Mr. George Sinclair found about 66 per cent. in the grass garden of Woburn Abbey.

Of alumina, or pure earth of clay, the proportions are equally varying. I ascertained the presence of 4·5 per cent. of this earth in a gravelly soil of Thurstable in Essex, and 8·5 in one at Kintbury in Berkshire. Mr. G. Sinclair found 14 per cent. in the soil of the grass garden at Woburn Abbey. Davy detected 8·5 per cent. in that at Endsleigh, 6·25 in one at Croft Church in Lincolnshire, 7 in that in Sheffield Place, 11 in that of Holkham, 29 in a field at West Drayton, and about 1 per cent. in the soil of Bagshot Heath.

Of carbonate of lime, the presence is just as varying in amount as that of the other earths. I found 18 per cent. in a soil at
Totham, and 19 per cent. in
bury; Sinclair, 2 per cent. in
Woburn Abbey grass garde
covered 8 per cent. in that from
3 per cent. in that of Sheffield
cent. in the finely divided ma
from Holkham, and about 1
in the soil from Bagshot.

The farmer, however, must
that by merely mixing the p
lica, lime, and alumina togeth
fertile proportion, a soil can
which plants will flourish,
very erroneous conclusion.
which have been made to ma
rish in the pure earths have
when they have been water
water; yet a totally different
invariably experienced when
ployed an impure solution
nure. My trials have been
ported by those of M. Giobe
formed of the four earths, s
lime, and magnesia, a soil in
proportion, in vain essayed
plants flourish in it when wat
water only; but every diffi
moved when he moistened it
from a dunghill, for they th
luxuriantly: and M. Lampadi
demonstrated the necessity
powers of, such an addition t
he formed plots composed o
earth—namely, pure lime, p
pure silica—and planted in
vegetables, watering them
drainings from a dunghill, and
plants on all of them flour
well. The soluble matters
constitute, in fact, its most
tion; and if by any artifici
richest mould is deprived o
repeated washings in cold or
the residuum or remaining
rendered nearly sterile. This
curately demonstrated by
have since confirmed by a
periments. Neither must
imagine that these carefully c
clusions, the results of ofte
borious experiments, are erro
transparent water, *apparentl*
viewed in water glasses, or
promotes the growth of bu
since the very purest sprin
rain water, contains foreign s
when only chemically pure wat
to water plants, they cannot
flourish. I have fruitlessly
tempt in several ways. All th
of Dr. Thomson were equally
the plants vegetating only for
and never perfecting their s

ents were made by Hassenfratz,
e, and others, with the same unfa-
e result. Duhamel found that an
ich he had raised from an acorn in
water, made less and less progress
ar. The florist is well aware that
roots, such as those of hyacinths,
&c. which are made to grow in
nless they are planted in the earth
her year, at first refuse to flower,
lly they cease even to vegetate.
r, it has been unanswerably shown
y very accurate experiments, at
tition of which I have personally
that the quantity of nourishment
matters absorbed by the roots of
always in proportion to the im-
f the water with which they are
l; thus some common garden beans
de to vegetate under three dif-
cumstances; the first were grown
d water, the second were placed in
watered with rain water, the third
n in garden mould. The plants
luced, when accurately analysed,
d to yield the following proportion
-

	Parts.
ose fed by distilled water	3·9
ose fed by rain water -	7·5
ose grown in the soil -	12·0

in which the earths are absorbed
ts of the plant is, it is almost cer-
eans of their solution in water, for
nate of lime and silica are, in small
s, soluble in water; they exist to-
many springs; and they were both
the water of the Clyde by Dr.
in that of the Thames by Dr.
nd in the springs of Upsala, ce-
r their purity, by Bergman. Alu-
r as we know, is not soluble in
then it exists in very small pro-
plants; and the soluble salts of
the base may serve to yield this
egetables: the earth itself is so-
nmonia.

y in which soils are gradually
the action of the atmosphere upon
rimitive rocks has been well ex-
y Davy, and is a natural process
nnot but be interesting to the
I merely slightly alter his words
owing account of this important
enomenon. It is not difficult to
nd the manner in which this change
, and rocks converted into soils, by
to the instance of soft granite or
granite. This substance is com-
hree ingredients, quartz, felspar,
The quartz is almost pure sili-
th in a crystalline form. The
d mica are very compound substances*, both contain silica, alumina, and oxide of iron; in the felspar there is usually lime and potash; in the mica, lime and magnesia.

When a granitic rock of this kind has been long exposed to the action of the atmosphere, the lime and the potash contained in its constituent parts are acted upon by water or carbonic acid; and the iron, which is almost always in its least oxidised state, tends to combine with more oxygen; the consequence is, that the felspar decomposes, and likewise the mica, but the first the most rapidly. The felspar, which is, as it were, the cement of the stone, forms a fine clay; the mica partially decomposed, mixes with it as sand, and the undecomposed quartz appears as gravel, or sand of different degrees of fineness. As soon as the smallest layer of earth is thus formed on the surface of a rock, the seeds of lichens, mosses, and other imperfect vegetables, which are constantly floating in the atmosphere, and which have made it their resting place, begin to vegetate; their death, decomposition, and decay afford a certain quantity of organic matter, which mixes with the earthy materials of the rock. In this improved soil, more perfect plants are capable of subsisting; these in their turn absorb nourishment from water and from the atmosphere, and as these, too, decay, afford more new materials to those already provided; and the decomposition of the rock still continues. At length, by such slow and almost imperceptible processes, a soil is formed in which even forest trees can fix their roots, and which is fitted to reward the labours of the cultivator.

Where successive generations of vegetables have grown upon a soil, unless they have been carried off by man or consumed by animals, the vegetable matter increases to such an extent that the soil approaches to peat in its nature. Poor and hungry soils are commonly produced by the decomposition of the granite and sandstone rocks: such soils usually remain for ages with only

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* Common felspar is composed of—

	Parts.
Silica - - -	62·83
Alumina - - -	17·02
Lime - - -	3·00
Oxide of Iron - -	1·00
Potash - - -	13·00
Loss - - - -	3·50
	100

Common mica is composed of—

Silica - - -	47·00
Alumina - - -	20·00
Oxide of Iron - -	15·50
Oxide of Manganese - -	1·75
Potash - - -	14·50
Loss - - - -	1·25
	100

a thin covering of vegetation. The soils produced by the same gradual means on the limestones, chalks, and basalts, are often clothed by nature with the perennial grasses; and afford, when ploughed up, a rich bed of vegetation for every species of cultivated crop.

The quantity of moisture which a soil, or the earths of which it is chiefly composed, contain, influences to a very material extent its fertility. This not only differs in different seasons, but this power varies very considerably indeed in soils, according to their chemical composition. This was experimentally decided by Professor Schubler, of the University of Tubingen, in his "Agronomy, or Principles of Agricultural Chemistry," for a translation of which the English farmer is indebted to Mr. Hudson, the present excellent Secretary to the Royal Agricultural Society of England, — a translation of which I have largely availed myself in this paper. (*Journ. of Roy. Ag. Soc.* vol. i. p. 177.) M. Schubler found that a cubic foot of different soils, when thoroughly saturated with water and when completely dried, weighed as follows: —

Kind of Earth.	Specific gravity.	Weight of a cubic foot.	
		Dry.	Wet.
		lbs.	lbs.
Calcareous Sand -	2·722	113·6	141·3
Silicious Sand -	2·653	111·3	136·1
Gypsum powder -	2·331	91·9	127·6
Sandy Clay - -	2·601	97·8	129·7
Loamy Clay - -	2·581	88·5	124·1
Stiff Clay or brick earth - -	2·560	80·3	119·6
Pure grey Clay -	2·553	75·2	115·8
Pipe Clay - -	2·440	47·9	102·1
Fine Carbonate of Lime (Chalk) -	2·468	53·7	103·5
Garden Mould -	2·332	68·7	102·7
Arable soil - -	2·401	84·5	119·1
Fine slaty Marl -	2·631	112·0	140·3

The result of these trials will be useful to the farmer in explaining to him the reason why, on account of their requiring more or less moisture, certain crops flourish best on particular soils; and even in the carriage of the earths he will perceive that their weight in the wet or dry state is much greater than some persons suppose.

The next important inquiry instituted by the same excellent chemist, was the relative degree of tenacity with which different soils retain the moisture when exposed under similar circumstances to the action of the atmosphere, and he found that they parted with their moisture according to the following rate: —

Kind of Earth.	Evaporation from parts of absorbed W in Four Hours.
	Parts.
Silicious Sand - -	88·4
Calcareous Sand -	75·9
Gypsum powder -	71·7
Sandy Clay - -	52·0
Loamy Clay - -	45·7
Stiff Clay or brick earth	34·9
Pure grey Clay -	31·9
Fine Lime - -	28·0
Garden Mould - -	24·3
Arable soil - -	32·0
Slaty Marl - -	68·0

In these experiments the soils were sp out to dry very thinly over a plate of me but in the following comparative trials render the results in all respects more milar to those which the cultivator would perience), the soil was exposed to the mosphere in masses of an inch in depth

Kind of Earth.	Water evaporated Four Days.
	Grains.
Calcareous Sand -	146
Light garden Mould -	143
Gypsum powder -	136
Very light Turf soil -	132
Slaty Marl - -	131
Arable soil - -	131
Fine Magnesia - -	129
Black Turf Soil not so light - - -	128
White fine Clay -	123
Grey fine Clay - -	123

The amount of the relative contractio different soils, when they are deprived their moisture, is another equally impor question to the farmer to be ascertai — "Many of them," says M. Schub "become contracted into a narrower sp in drying, and in consequence of this cumstance cracks and fissures frequ occur in land, and have an injurious ef on the vegetation, as the finer roots, w often ramify horizontally, and not u quently supply to the plants the gr part of their means of nourishment, are such contractions, either laid bare of so torn asunder. In order to subject soi comparative experiments on this point, following plan may be adopted. We c form of the earths, in their wet state, cubic pieces of equal size, being at ten-twelfths of an inch in height, br and length, or we let such earths be and dried one after another in an accur worked cubic inch; after some time, the weight of these cubes of earth cea change by further drying, we measur

f the cube by means of a rule
tenths of lines can be distin-
may thus calculate easily the
he earth, and consequently as-
iminution in bulk which has been
the drying. The experiments
de with the following earths
this point the subjoined differ-

Earth.	1000 parts diminished in volume by
	Parts.
nd - -	no change.
earth -	no change.
- -	50
- -	60
- -	89
brick earth	114
Clay -	183
f Magnesia	154
uld - -	149
- -	120
- -	35

effect upon various soils of de-
n of their moisture. In these
estigations the farmer will see
they confirm his own observa-
eavy clay soils, he well knows,
contracted by exposure to the
mer; the sands the least affected

re important property of soils,
tion for the aqueous vapour of
ere, is next to be considered —
the importance of which to the
Sir H. Davy long since saw in its
d his observations cannot be too
d, since they well illustrate and
ongst other things, the truth of
llian system of agriculture,— of
ges of finely dividing the soil, of
plough, and of the horse-hoe
"The power of the soil to absorb
hesive attraction," said this great
epends in a great measure on the
ision of its parts; the more di-
re, the greater is their absorbent
e different constituent parts of
e appear to act, even by cohesive
with different degrees of energy:
ble substances seem to be more
han animal substances, animal
more so than compounds of alu-
ilica, and compounds of alumina
ore absorbent than carbonates
magnesia; these differences may,
ossibly depend upon the differ-
ir state of division, and upon the
osed. The power of soils to ab-
from air is much connected with
hen this power is great, the plant
with moisture in dry seasons; and the effect of evaporation in the day is counteracted by the absorption of aqueous vapour from the atmosphere by the exterior parts of the soil during the night. The stiff clays, approaching to pipe-clay in their nature, which take up the greatest quantity of water when it is poured upon them in a fluid form, are not the soils which absorb most moisture from the atmosphere in dry weather; they cake, and present only a small surface to the air, and the vegetation on them is generally burnt up almost as readily as on sands. The soils that are most efficient in supplying the plant with water by atmospheric absorption are those in which there is a due mixture of sand, finely divided clay and carbonate of lime, with some animal or vegetable matter; and which are so loose and light as to be freely permeable to the atmosphere. With respect to this quality, carbonate of lime and animal and vegetable matter are of great use in soils; they give absorbent power to the soil without giving it tenacity: sand, which also destroys tenacity, on the contrary, gives little absorbent power. I have compared the absorbent powers of many soils with respect to atmospheric moisture, and I have always found it greatest in the most fertile soils; so that it affords one method of judging of the productiveness of land. 1000 parts of a celebrated soil from Ormiston in East Lothian, which contained more than half its weight of finely divided matter, of which eleven parts were carbonate of lime, and nine parts vegetable matter, when dried at 212° gained in an hour, by exposure to air saturated with moisture at a temperature of 62°, 18 parts; 1000 parts of a very fertile soil from the banks of the river Parret, in Somersetshire, under the same circumstances, gained 16 grains; 1000 parts of a soil from Mersea, in Essex, worth forty-five shillings an acre, gained 13 grains; 1000 grains of a fine sand from Essex, worth twenty-three shillings an acre, gained 11 grains; 1000 of a coarse sand, worth fifteen shillings an acre, gained only 8 grains; 1000 of the soil of Bagshot Heath gained only 3 grains."

In my own experiments upon the absorbent powers of various earths, I extended the examination to various organic and saline fertilizers. The result of these may be seen in the following table:—

	Parts.
1000 parts of horse dung dried in a temperature of 100 degrees, absorbed, by exposure for three hours to air saturated with moisture and of the temperature of 62 degrees -	145
1000 parts of cow dung, under the same circumstances, absorbed -	130

		Parts.
1000 parts	pig dung	120
1000 —	sheep dung	81
1000 —	pigeon's dung	50
1000 —	of a rich alluvial soil, worth two guineas per acre	14

The following were dried at 212 degrees:—

1000 parts	fresh tanner's bark	115
1000 —	putrefied tanner's bark	145
1000 —	refuse marine salt sold as manure	49½
1000 —	soot	36
1000 —	burnt clay	29
1000 —	coal ashes	14
1000 —	lime	11
1000 —	sediment from saltpans	10
1000 —	crushed rock salt	10
1000 —	gypsum	9
1000 —	chalk	4

(My Work *On Fertilizers*, p. 41.)

Davy's experiments and my own are confirmed by those of M. Schubler, who varied his observations at intervals of three days; his results were as follows:—

Kind of Earth.	1000 grains on a surface of 50 square inches, absorbed in			
	12 hours.	24 hours.	48 hours.	72 hours.
	grs.	grs.	grs.	grs.
Silicious Sand	0	0	0	0
Calcareous Sand	2	3	3	3
Gypsum powder	1	1	1	1
Sandy Clay	21	26	28	28
Loamy Clay	25	30	34	35
Stiff Clay	30	36	40	41
Gray pure Clay	37	42	48	49
Fine Lime	26	31	35	35
Fine Magnesia	69	76	80	82
Garden mould	35	45	50	52
Arable soil	16	22	23	23
Slaty Marl	24	29	32	33

Another property possessed by all cultivated soils, that of absorbing the gases of the atmosphere and of putrefaction, is a power equally worthy of the consideration of the farmer. It was long since shown, in some experimental reseaches of Mr. Hill, that when oxygen gas is supplied to the roots of plants, their growth and vigour are very considerably increased. Some years since, also, Alexander Von Humboldt announced that the earths possess the property of absorbing this gas from the atmosphere (*Gilbert's An. of Phil.* vol. i. p. 512.; and although the fact was doubted at the time, yet later researches have shown that *moist* earth has the property assigned to it by Humboldt, and the amount absorbed by various earths has since been ascertained by, and will be seen in the following table of M. Schubler:—

Kind of Earth.	Absorbed in the dry state.	In the wet state absorbed in 30 days by 1000 grains of Earth from 15 cubic inches of atmospheric Air, containing 21 per cent of Oxygen.
		grains.
Silicious Sand	0	0·10
Calcareous Sand	0	0·35
Gypsum powder	0	0·17
Sandy Clay	0	0·39
Loamy Clay	0	0·70
Stiff Clay or brick earth	0	0·86
Gray pure Clay	0	0·97
Fine Lime	0	0·69
Magnesia	0	1·08
Garden Mould	0	1·10
Arable soil	0	1·03
Slaty Marl	0	0·70

This attractive power of the earths and of the plants for the aqueous vapour and the oxygen gas of the atmosphere are, as I have on more than one occasion contended, two of the most important facts to be kept in mind by the farmer, with regard to the deepening and pulverisation of his soil. The power of absorbing moisture is a power which all plants possess in a certain measure, but some in such a perfect degree as to depend entirely upon it for all the moisture they need. The aloe, the agave, and many of the native plants of the East, nearly support themselves in the same way; the lichens and some of the mosses of this country almost do the same. The quantity of water consumed by plants, when in a state of healthy vegetation, is in fact so great that, if it was not for the gentle and supply thus imperceptibly furnished to the soil by the atmosphere, vegetation would speedily cease, or only be supported by incessant rains. Thus. Dr. Hales ascertained that a cabbage transmits into the atmosphere, by insensible vapour, about half its height of water daily; and that a sunflower three feet in height, transpired in the same period nearly two pounds' weight. (*Veg. Stat.* vol. i. pp. 5—15.) Dr. Woodward found that a sprig of mint, weighing grains, in seventy-seven days emitted grains of water. A sprig of spearmint weighing 27 grains emitted in the same time 2558 grains; a sprig of common nightshade weighing 49 grains evolved 3708 grains, and a Lathyrus of 98 grains emitted 2501 grains. (*Phil. Trans.* 1699, p. 193.) "The of soils to absorb moisture," says "ought to be much greater in warm countries than in cold or moist ones, and the quantity of clay or vegetable or animal matter greater. Soils, also, on declivities

ore absorbent than in plains,
tom of valleys. Their pro-
ikewise, is influenced by the
subsoil, or the stratum on
st. When soils are immedi-
upon a bed of rock or stone,
sooner rendered dry by eva-
where the subsoil is of clay or
rime cause of the great fer-
n the moist climate of Ireland
ty of the rocky strata to the
y subsoil will sometimes be of
ntage to a sandy soil; and,
will retain moisture in such a
be capable of supplying that
rth above, in consequence of
the consumption of plants."
res, p. 186.)

shown by the experiments of
with some sprigs of pepper-
en supported by pure water
owed to vegetate for some
ght, they nearly doubled the
rbon which they originally
Recherches sur la Veg. 51.)
ld have procured only from
e; and, under these circum-
is now little doubt of the
f the conclusion of M. Ber-
lants, by means of their roots
ve the power of decomposing
well as the carbonic acid of
e, and furnishing, with these
combinations. How essen-
ss of the atmosphere is to the
ts was long since shown by
who found that oxygen gas
y the roots of plants as well
eaves, and that it is at the
with carbon, and transmitted
to be decomposed. Even the
orb oxygen; in its absence
not even expand. (*Thomson's*
p. 353.) It has been proved
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em with water impregnated
as; hence, too, the superiority
r. Some remarkable experi-
made by Mr. Hill, demonstra-
eat benefits plants derive from
being applied to their roots:
elons, Indian corn, &c. were
of the experiments. The first
improved in beauty, the second
e last in size, and all in vigour.
another use of increasing the
he soil, by deep and complete
for M. Humboldt and M.
e clearly shown that a dry soil
able of absorbing oxygen gas.
t be evident to the most list-
, that the more deeply and
is pulverised, and its earths rendered permeable, the greater will be the absorption by them of both oxygen and watery vapour from the surrounding atmosphere.

It is perhaps needless to prove that the roots of commonly cultivated plants will penetrate, under favourable circumstances, much greater depths into the soil in search of moisture than they can, from the resistance of the case-hardened subsoil, commonly attain. Thus, the roots of the wheat plant, in loose deep soils, have been found to descend to a depth of two or three feet, or even more: and it is evident that if plants are principally sustained in dry weather by the atmospheric aqueous vapour absorbed by the soil, that then that supply of water must be necessarily increased, by enabling the atmospheric vapour and gases, as well as the roots of plants, to attain to a greater depth; for the earth, &c. of the interior of a well pulverised soil, be it remembered, continues steadily to absorb this essential food of vegetables, even when the surface of the earth is drying in the sun.

By facilitating the admission of air to the soil another advantage is obtained, that of increasing its temperature. The earths are naturally bad conductors of heat, especially downwards: thus, it is a well-known fact, that at the siege of Gibraltar, the red hot balls employed by the garrison were readily carried from the furnaces to the batteries in wooden barrows, whose bottoms were merely covered with earth. Davy proved the superior rapidity with which a loose black soil was heated, compared with a chalky soil, by placing equal portions of each in the sunshine; the first was heated in an hour from 65° to 88°, while the chalk was only heated 69°. This trial, however, must not be regarded as absolutely conclusive, since the surface of the black soils naturally increases more rapidly in temperature when exposed to the direct rays of the sun than those of a lighter colour. A free access of the air to the soil also adds to their fertility, by promoting the decomposition of the excretory matters of plants and other organic substances of the soil.

In the truth of these conclusions and laborious experimental reseaches of the chemist, does not the practical testimony of the ablest cultivators of all ages and in all countries concur? Thus, in enforcing the advantages of rendering the soil more completely permeable by the atmosphere, nearly two thousand years since, Cato asked the Italian farmers, "What is good tillage?" To plough. "What is the second?" To plough. The third is to manure. Cato however, mistook the cause of the benefit, for he says, "He who stirs his olive ground oftenest and deepest will plough up the very slender roots; if he ploughs ill, the roots will become thicker, and the strength of the olive will go to the root." (*Lib.* 61.) Virgil, when giving an erroneous explanation of the advantages of paring and burning, says, "The heat opens more ways and hidden vents for the air, through which the dews penetrate to the embryo plant." (*Georg.* i. 90, 91.)

And at this very period do not the best of England's agriculturists find the greatest advantage from stirring the ground between their rows of drilled turnips, which only operates so beneficially to the plants, by promoting the access of the air to their roots; and that, too, on soils where a weed is hardly to be seen? Is not one great object of fallowing to produce by pulverising and deepening the soil the same result? Did not Jethro Tull labour long, and sometimes too sanguinely, in illustrating the same position? And does he not support almost all the observations of the chemist, as to the attraction of the earth for the gases and aqueous vapour of the atmosphere, when he says—"I have had the experience of a multitude of instances, which confirms it so far that I am in no doubt that any soil (be it rich or poor) can ever be made too fine by tillage. For it is without dispute, that one cubical foot of this minute powder may have more internal superficies than a thousand cubical feet of the same or any other earth tilled in the common manner; and I believe no two arable earths in the world do exceed one another in their natural riches twenty times; that is, one cubical foot of the richest is not able to produce an equal quantity of vegetables, *cæteris paribus*, to twenty cubical feet of the poorest; therefore, it is not strange that the poorest, when by pulverising it has obtained one hundred times the internal superficies of the rich untilled land, should exceed it in fertility; or, if a foot of the poorest was made to have twenty times the superficies of such rich land, the poorest might produce an equal quantity of vegetables with the rich. Besides, there is another extraordinary advantage when a soil has a larger internal superficies in a very little compass, for then the roots of the plants in it are better supplied with nourishment, being nearer to them — on all sides within reach — than they can be where the soil is less fine, as in common tillage, and the roots in the one must extend much farther than in the other: to reach an equal quantity of nourishment they must range, perhaps, above twenty times more space, to collect the same quantity of food. But, in this fine soil, the weak and tender roots have free passage to the utmost of their extent, and
also an easy, due, and equal pressure
where, as in water." (*Tull's New*
bandry, p. 43.) The farmer, too, is
that when the inert substratum of
cultivated soils is first brought to th
face, it is entirely barren, and that
mere exposure to the atmosphere,
comes readily productive.

The comparative rapidity with
soils absorb heat by exposure to the
the sun is also a question of much
ance. M. Schubler found that wh
temperature of the upper surface
earth was 77° in the shade, earth,
posed to the sun in vessels four
square and half an inch deep, from
till three o'clock, attained the
temperature:—

Kind of Earth.	Wet.
Silicious Sand, bright yellowish gray - -	99·1
Calcareous Sand, whitish gray	99·3
Gypsum, bright white gray	97·3
Sandy Clay, yellowish -	98·2
Loamy Clay, yellowish -	99·1
Stiff Clay or brick earth, yellowish gray - -	99·3
Fine bluish gray Clay -	99·5
Lime, white - -	96·1
Magnesia, pure white -	95·2
Garden mould, blackish gray	99·5
Arable soil, gray - -	97·7
Slaty Marl, brownish red -	101·8

As different soils absorb heat
rying rapidity, so they retain it wi
or less tenacity, as displayed in the f
table by Professor Schubler:—

Kind of Earth.	Period requi cubic inches of cool down fr to 70¼°, in a ing temperat 61¼°.	
	Hours.	M
Calcareous Sand	8	
Silicious Sand - -	3	
Gypsum powder -	2	
Sandy Clay - -	2	
Loamy Clay - -	2	
Stiff Clay or brick earth	2	
Gray pure Clay -	2	
Fine lime - -	2	
Fine magnesia - -	1	
Garden mould - -	2	
Arable soil - -	2	
Slaty Marl - -	3	

From these experiments, the far
perceive that the popular ideas,
gard to the quality of soils when
denominated hot and cold, are near

will see that sandy soils absorb the e sun faster than any others, but rate of cooling is equally great; pid in their transitions from heat n any others, the crops which they re commonly thin, and to these sitions we may assign one reason erty of the produce. The clays, ntrary, which imbibe the sun's slowly, retain their heat much

e several other properties of the which it is highly desirable that tor should be acquainted: thus, ce which soils offer to the plough e, in their wet and dry state, is n several accounts highly inter- e farmer. This property of the o been examined by Professor nd the results of his experiments d in the following table:—

Earth.	In dry state.	In wet state.	
	Firmness, that of clay being 100.	Adhesion to agricultural implements on a surface of one square foot with	
		Iron.	Wood.
		lbs.	lbs.
and -	0·0	3·8	4·3
s Sand -	0·0	4·1	4·4
e -	5·0	14·3	15·6
owder -	7·8	10·7	11·8
y -	57·3	7·9	8·9
lay -	68·8	10·6	11·4
or brick - -	83·3	17·2	18·9
e Clay -	100·0	27·0	29·2
ould -	7·6	6·4	7·5
il -	33·0	5·8	6·4
rl -	23·0	4·9	5·5

ese laborious researches of the hilosopher the intelligent farmer many new and important con- ith regard to the improved cul- the earth. They may serve to him one great reason, why fal- d pulverising the soil, either by or by the mixture of chalk or the heavier clay soils, promotes so or so permanently, their fertility. , the advocate for all old customs te modes of tillage may hence, er things, learn *why* it is that hing, either by the common or by plough, produces such beneficial w the gases and aqueous vapour are hence rendered more ser- the roots of his crops; and *how* this free passage of these elastic t caused by the action of the plough, is preserved and facilitated by that of the common or the horse-hoe. Such researches, too, into the important properties with which the Creator has endowed the soil will be serviceable to the cultivator in even an indirect manner. These investigations will, assuredly, suggest to him the very reasonable conclusion, that there may be yet other chemical properties hidden in the land, which will serve to awaken the curiosity, and reward the labours of future scientific cultivators for many succeeding generations. (*Brit. Farm. Mag.* vol. v. p. 1.) See MIXTURE OF SOILS. ANALYSIS OF SOILS, ABSORPTION, CHALK, &c.

EARTH-BOARD. That part of a plough which turns over the earth. It is generally termed the mould-board. See PLOUGH.

EARTH-BUILDINGS. Buildings formed by rammed or compressed earth or clay. This kind of building is supposed to have been known at a very early period, and is still much in use in the southern parts of France. Not only the walls of houses, but garden walls are formed in the same manner, and of the same materials in many parts of Normandy. In some instances, boards are placed between the layers of clay, and form a kind of framework, which increases the strength of the wall.

Clay cottages are not uncommon in some parts of England; but they are not constructed in the above-mentioned manner.

EARTH, EATING OF. Stall-fed cattle, who have not the opportunity of plucking up the roots of grass, evince a great partiality for earth. It is seldom that a cow will pass a newly-raised mole-hill without muzzling into it, and devouring a considerable portion of it. This is particularly the case when there is any degree of indigestion, and it probably acts as a sort of gentle purgative. It is stated by Mr. Youatt (*On Cattle*) that the celebrated Kynton ox always had a basket of earth standing near him, of which he occasionally ate a considerable quantity. When decomposition commenced, and the acescent principle began to be developed, and the animal felt uneasiness on that account, he had recourse to the mould; and the acid uniting itself to the earth, the uneasy feeling was relieved. It is also probable that a purgative neutral salt was manufactured in the paunch, but this would depend on the nature of the earth. The absorbent or alkaline earth taken up with the roots of grass by sheep also neutralises the acids of the stomach. (*Lib. of Use. Know.* "Sheep," p.3.; "Cattle," p. 104—317.) It is usual to allow sucking calves to have access to chalk. In the stomachs of almost all young animals, man not excepted, there is a tendency to form superabundant acid, which if not corrected impairs digestion, and interferes with the assimilative function, that which converts the chyle into the animal tissue or substance of the body. The importance, therefore, of correcting this, by the administration of absorbent earths, is obvious.

It might become a matter of curious inquiry, how far this desire of earth in cattle has affinity to that of the human stomach, which leads the Otomacs, a South American tribe, to eat clay. It is an unctuous clay, containing an oxide of iron; and during some months, when provisions are scarce, an Otomac devours about three quarters of a pound of clay daily, and he does not suffer nor become lean upon it. The negroes on the coast of Guinea, and the natives of Java, and some of the other islands of the Indian Archipelago, are also earth-eaters; and in this and other European countries, pregnant women, and young girls in a state of disease connected with the uterine function, also evince a strong inclination to eat earth.

Among quadrupeds, earth-eating is not confined to the ox tribe; for, when pressed for food, wolves in the north-east of Europe, reindeer and kids in Siberia, all eat clay. It is probable that the earth operates as a mechanical stimulus to the stomach, and abates the sensation of hunger, which always attends certain diseased conditions of the stomach. But, whatever may be the cause, this instinctive longing for earth in cows and oxen should not be overlooked, and the animals should be supplied with it when they are stall-fed.

EARTH-NUT. (*Bunium flexuosum.*) The common earth-nut, kipper, or pig-nut, for it is known by all these names, is a perennial plant growing in sandy or gravelly meadows, pastures, orchards, and woods; flowering in May or June. The root is eatable, nearly globular, black, internally white, aromatic, sweet, and mucilaginous, with some acrimony. The stem is a foot high or more, striated, with long, narrow, acute leaves; the radicle leaves are twice or thrice pinnatifid. The flowers are in umbels; they are pure white. The roots are at present searched for only by hogs, who devour them with avidity; but as they are little inferior to chestnuts, they might form an agreeable addition to our winter desserts, eaten either raw, boiled, or roasted. (*Willich's Dom. Encyc.*; *Eng. Flora*, vol. ii. p. 54.)

EARTH-WORMS. (*Lumbricus*, Linn.) Well-known molluscous animals, which are common in all parts of the country, at little depths beneath the surface of the earth. White, in his *Nat. Hist. of Selborne*,
speaking of their effects on the soil i
moting vegetation, says, "The mos
nificant insects and reptiles are of
more consequence, and have much m
fluence in the economy of nature, th
incurious are aware of; and are mig
their effect from their minuteness,
renders them less an object of att
and from their numbers and fecu
earth-worms, though in appearance
and despicable link in the chain of
yet, if lost, would make a lamentable
For, to say nothing of half the bir
some quadrupeds which are entirely
ported by them, worms seem to be
promoters of vegetation, which woul
ceed but lamely without them, by
perforating, and loosening the soil, a
dering it pervious to rain and the fi
plants, by drawing straws and st
leaves and twigs into it; and most
by throwing up such infinite num
lumps of earth, called worm-casts,
being their excrement, is a fine man
grain and grass. Worms probably
new soil for hills and slopes, where
washes the earth away, and they
slopes probably to avoid being
Gardeners and farmers express their
tation of worms: the former, becau
render their walks unsightly, and
them much work; and the latter, bec
they think, worms eat their green co
they would find that the earth
worms would soon become cold,
bound, and void of fermentation, a
sequently sterile; and besides, in f
worms, it should be hinted that gr
plants, and flowers are not so much
by them as by many species of Co
(*scarabs*) and *Tipulæ* (*long-legs*)
larva or grub state, and by un
myriads of small shell-less snails,
slugs, which silently and imperceptib
amazing havoc in the field and
Worms work most in the spring,
out every mild night in the winter
are very prolific." (*Quart. Journ.*
vol. ii. p 145.) Worms are readily de
by the application of common salt
broadcast at the rate of five or six
per acre; or on grass plats, by the
tion of lime-water, or rather milk
which is readily made by stirring
minutes a pound of hot lime in four
pailsfull of water. But, for the reasons
given, they should not be destroyed.
worms are viviparous, their eggs are
in the body, and the young are
alive. They generally come out of th
during the night in June to copulat

EARTHY MANURES. These
most universal of all fertilisers, althou

r is limited to three, viz. Chalk and
Clay or alumina, Sand or silex: and
hese may be classed the coal, or
shes produced by the combustion of
rf, and other vegetable substances,
position of which is usually similar
of the soils on which the combustible
s produced. Ashes from chalk soils
abound in carbonate of lime and
which is produced in the chalk by
ical decomposition of the iron py-
ch most chalk contains; while those
y lands as generally abound with
and sand. Those which are
from the seashore almost always
a considerable quantity of soda,
common salt. There are no re-
more likely to amply repay the
than the investigation of the
on of his soils. All the difference
a fertile soil and the poorest cul-
nd consists in the presence of the
ble constituents of a soil in pro-
hat are more or less profitable.
tion of the desired substance,
rganic or inorganic, constitutes the
ingredient. Davy long since re-
hat "Fertility, seems to depend
state of division and mixture of
y materials and the vegetable
In ascertaining the composition
soils, with a view to their im-
, any particular ingredient which
use of their unproductiveness
particularly attended to; if possi-
ould be compared with fertile soils
e neighbourhood, and in similar
as the difference of composition
any cases, indicate the most pro-
ds of improvement." (*Agricultural*
, p. 203.) Thus, either peat, or
lay is an excellent permanent ad-
andy soils. Chalk and sand im-
texture and productiveness of
o peat the earths are all more or
nent fertilisers; lime removes the
sulphate of iron (green vitriol);
qually efficacious in what the far-
acid or sour soils. This class of ma-
ers from the organic and saline, in
important yet seldom sufficiently
ed quality, that as they are more
y employed in larger quantities
r of the other two, so their bene-
ence on the soil far exceeds in du-
others.

WIG. (*Forficula auricularis*,
A well-known insect, which is
n damp places, and often found
rs under stones, and beneath the
rees. They do much damage in
by preying upon the fruit. The
mmon name, and also the French *pierce-oreille*, relate to a habit absurdly attributed to these insects of penetrating the ears. (*Brande's Dict. of Art.*)

It is a curious fact that the earwig sits upon her eggs like a hen; and when the young are hatched, they creep under the mother, like a brood of chickens under a hen. De Geer, who has observed the habits of this insect, says, the parent will sit over them for hours. She usually carries them about on her back, until they are able to provide for themselves. One of the species of Forficula, namely *F. minor*, has wings, and flies in groups.

EATING-OFF. A term employed by farmers to signify the feeding-off of different green crops; for example, turnips by sheep.

EAVES-GUTTERS. Small troughs for preventing the rain-water from falling from the eaves or roofs of buildings, and to enable it to be collected for domestic use.

EDDER. A small straight shoot of ash, hazle, oak, or any other kind of flexible wood, used for binding the tops of hedges.

EDDISH. The same with eaddish, or after-grass. See EADDISH.

EDGE. The extremity or border of any thing. From whence we have,—*edge-grown*, that is, grain which has come up uneven, and does not ripen with the general crop. *Edge-hoeing*, the operation of hoeing the sides of the rows of any sort of crops, &c.

EEL. (*Anguilla vulgaris.*) A fish, the appearance of which is too well-known to require any description. It is a native of almost all the waters of Europe, frequenting rivers as well as stagnant pools. Several ponds are appropriated in England to the rearing of eels, and considerable numbers are taken in the Thames and other rivers. They attain sometimes to a large size, weighing fifteen or twenty pounds; but are in general not more than a foot and a half or two feet in length. The periodical emigration of eels is a most singular but well-attested fact. The eel is viviparous and extremely tenacious of life. Bobbing, spearing, sniggling, and angling, are each occasionally resorted to, but not with much relish by the more experienced angler, who aims at higher game. (*M'Culloch's Com. Dict.*; *Blaine's Rur. Sports*; *Willich's Dom. Encyc.*)

EFT, NEWT, or EVET. (*Salamandra.*) A small kind of lizard, that chiefly lives in the water. As the newt is an amphibious animal, it requires to ascend frequently to the surface of the water, to take fresh air into its lungs.

EGGS. (Fr. *œufs*; Germ. *ei*; Lat. *ova.*) The ova of birds and oviparous animals.

The shell of the egg is lined throughout with a thin but tough membrane, called *pellicula ovi;* which, dividing at or near the obtuse end, forms a small bag — the air *follicule*. This membrane weighs about 2·35 grains in an egg of 1000 grains in weight. It contains what is called the *albumen* or white, and the *vitellus* or yellow. The *white* consists of two distinct parts, one of which is a delicate membrane forming a series of cells, which inclose the other, or fluid part. It has the well-known property of being coagulated by heat. It consists of 12 parts of albumen, 2·7 of mucus, 0·3 of salts, and 85 of water, in a hundred parts. The yolk consists of oil, suspended in water by means of albumen, and held in a membranous sac — the yolk-bag, each end of which is twisted, to form what is called the *chalazæ*, intended to preserve the yolk in such a position that the *cicatricula*, or rudimental embryo, shall always be uppermost. The yolk consists of 28·75 of yellow oil and crystallisable fat, with traces of sulphur; 17·47 of albumen, containing phosphorus, and 53·8 of water. The relative weights of these parts, in an egg weighing 1000 grains, are, 106·9 shell and membrane, 604·2 albumen, and 288·9 yolk. The egg loses two or three per cent of its weight when boiled in water. The white is more easily digested than the yolk; and both are more digestible in the soft than in the hard state. The changes which the hen's egg undergoes during incubation have been described by Sir E. Home (*Phil. Trans.* 1822, p. 339.), and illustrated by a beautiful series of plates, after drawings by Bauer. The same volume also contains a valuable paper, by Dr. Prout, on this subject, but chiefly treating of the chemical changes of the egg during that process. The egg does not receive its outer coat, or *pellicule*, until it arrives at that part of the oviduct which is called the uterus; and not its shell until it has passed through one half of the uterus. Eggs are sometimes expelled without shells, and are called *oon-eggs*. The specific gravity of new-laid eggs at first rather exceeds that of water, varying from 1·08 to 1·09; but they soon become lighter, and swim on water, in consequence of evaporation through the pores of the shell. The mean weight of a hen's egg is about 875 grains.

Hen's eggs are decidedly wholesome; and, when new laid, are an agreeable and nourishing food. Vast quantities of eggs are brought from the country to London, and other great towns. It is stated in the *Quart. Journ. of Agr.* vol. iii. p. 1077, that, about fifteen years ago, the number of eggs exported from Berwick-upon-Tweed to London amounted to 30,000*l.* worth a-year.

The trade in eggs is of gre
importance. It appears from
ments, that the eggs imported
amounted to 60,000,000 a-ye
suming them to cost, on an av
dozen, it follows that we pa
above 83,000*l.* a-year for eg
posing that the freight, impor
tailer's profit, duty (10*d.* p
raise their price to the consum
dozen, their total cost will
The number of eggs impor
country from various parts of t
for the year ending January
83,745,723; and the gross am
received for the same was
Netherlands and the Channel
nish a large quantity of the e
in this country. (*M'Culloch'*
Quart. Journ. of Agr. vol. ii
Dict. of Science; Willich's D

EGG-PLANT. (*Solanum*
This is a tender or green-ho
native of Africa. It loves a l
and blows violet flowers in J
which are succeeded by fruit, s
loured like an egg. The plant
by seed. In French and Itali
is used in soups, and for the s
as the love-apple. (*Loudon*
Gard.)

EGLANTINE. (*Rosa ru*
eglantin.) The old English
sweetbriar rose. The odour,
agreeable, is exhaled from r
glands, which cover the und
the leaflets. This odour en
readily recognised from all o
roses, except the small-flower
(*Rosa micrantha*), which some
only a variety of *R. rubiginos*
eglantine is improperly appli
to the honeysuckle.

EGRET, THE LITTLE.
zetta.) This small heron was
common in Britain, but it is
met with. It breeds in mars
duces four or five eggs. The
plumage is of a pure and d
legs and claws black; toes, b
The whole length of the bird i
inches. (*Yarrell's Brit. Birds,*

EGYPTIAN VULTURE
TURE.

EIDER-DUCK. (*Somater*
The common eider frequents
bers the Orkneys, the Hebr
Shetland Islands. It is defe
cold of these dreary northern
development of an unusual q
finest down, beneath the d
plumage, which is equally w
form an impenetrable barrie

own. She then begins to lay
envelopes her eggs with another
wn; and if this be removed, the
d to contribute his own down,
male can afford no more. Lastly,
rood of ducklings is hatched, the
n visited, and the down removed.
nsiderable quantity of the valu-
al furnished by the eider-duck is
ndependently of that which is
m the slaughtered birds. Be-
wn and eggs, the islanders turn
nd flesh of the eiders to profit,
birds cost them no expense, as
ntirely on sea-weed, and other
luctions of the ocean. (*Brande's*
t. and Science.) The value of
as an article of clothing, or for
body warm, depends on its small
power. With the exception of
t is the worst known conductor
order to determine its compara-
ing power, Count Rumford made
ent to ascertain the number of
ch elapsed during the passage of
y in the thermometer through
s, in the cooling of different
e found their non-conducting
be the following:— lint, 1032;
1046; sheep's wool, 1118; raw
beaver's fur, 1296; eider-down,
's fur 1315. From this it is
under garments made of either
or hare's fur, are admirably
defend the body from severe
ld; or, in other words, to pre-
pid radiation of the natural heat
e body.

S. A term applied to the shoul-
of cattle.

A provincial term signifying

insects which thrive on blighted or delicate plants, nor do many of this tribe, in the caterpillar state, feed upon them. Cattle scarcely touch them, and the mole is driven away by their scent; but sheep eat the leaves greedily, and it is said to be a cure for the rot. The Rev. Mr. Farquharson, in an able paper in the *Trans. High. Soc.* vol. iv. p. 336., advocates the cultivation of the elder for hedges, from its rapidity of growth, hardihood, and cheapness. The only objection appears to be, that it does not thicken and close up its branches, so as to form an impervious fence, like the whitethorn. M. Wehrle of Vienna has found, by a series of experiments, that the berries of the elder tree produce a much greater quantity of spirit than the best wheat. The spirit is obtained by pressing the berries, the juice of which is treated in the same way as the must of the grape, and afterwards distilled. If the results obtained by M. Wehrle are confirmed, it will be an additional motive for cultivating a plant which possesses many other useful qualities. (*Quart. Journ. Agr.* vol. iii. p. 183.) An odorous water is prepared by distilling the flowers: it is used as a perfume. The inspissated juice of the berries is laxative and diuretic; and, mixed with water, forms a cooling beverage in fevers. The inner bark is purgative and emetic.

ELDER, THE WATER. (*Viburnum opulus.*) See GUELDER ROSE.

ELECTRICITY. The application of this science to the cultivation of the earth has hitherto not been very practically useful. Its operations — the very nature of electricity — are as yet much too little understood for the cultivator to derive instruction from its study. "Electrical

trical powers; and it is probable, that the various electrical phenomena occurring in our system must influence both the germination of seeds and the growth of plants. I found that corn sprouted much more rapidly in water positively electrified by the voltaic instrument, than in water negatively electrified; and experiments made upon the atmosphere shew that clouds are usually negative; and as when a cloud is in one state of electricity, the surface of the earth beneath is brought into the opposite state, it is probable that, in common cases, the surface of the earth is positive. Different opinions are entertained amongst scientific men respecting the nature of electricity: by some, the phenomena are conceived to depend upon a single subtile fluid, in excess in the bodies said to be positively electrified, in deficiency in the bodies said to be negatively electrified: a second class suppose the effects to be produced by two different fluids, called by them *vitreous* and *resinous;* and a third set regard them as affections, or motions of matter, and merely an exhibition of attractive powers, similar to those which produce chemical combination and decomposition, but usually exerting their action on masses."

ELLIS, WILLIAM, was a farmer of Little Gaddesden, near Hemel Hempstead, in Hertfordshire, and evidently a man of intelligence. He travelled much, both in this country and on the continent, and wrote the following works: —

1. The Timber Tree improved; or the best Practical Methods of improving different Lands with proper Timber. London. 1738. 8vo. 2. Complete Modern Husbandry, containing the Practice of Farming; Chiltern and Vale Farming; Improvements on Fruit and Timber Trees, &c. 1744. 8 vols. 8vo. Again in 1750 and 1752. He also edited "The Farmer's Instructor, or the Husbandman's and Gardener's useful and necessary Companion," which was originally written by Samuel Trowell, Gent. This was published in 1747. 8vo. He also mentions another work he was about publishing, entitled, "Ellis's Country Housewife." Mr. Trowell, says Ellis, was a very ingenious gentleman, and celebrated garden artist, and he mentions his "writings on Gardening," which I have never seen. He was steward of the estates belonging to the benchers of the Inner Temple. He was dead in 1747. He published a new Treatise of Husbandry and Gardening. London. 8vo. 1739, which was translated into German in 1750. (*G. W. Johnson's Hist. of Gardening.*)

ELLMAN, JOHN, a celebrated breeder and improver of South Down sheep, was born at Hartfield, a small village near East Grinstead in Sussex, on the 17th Oct. 1753, and succeeded his father, Richard Ellman, on his farm at Glynde, near Lewes in the same county, in 1780. Although labouring under the disadvantages of a very limited education, the subject of this memoir, by his practical experience as a farmer and breeder for more than half a century in the improvement of cattle, the advancement of agricultural knowledge, and the reward of labouring industry, made for himself a name and a reputation which will
Mr. Ellman was much conne
thur Young and his publicati
of Agriculture, and with all th
culturists of the day. He w
originators of the Smithfield
1798, and also the founder of
sex Agricultural Society.
breed of sheep carried off
miums at the shows of stock
several valuable pieces of pl
in testimony of the services
his native county and the king
Mr. Ellman died on the 22d
(*Baxter's Lib. of Agriculture.*

ELM. (*Ulmus.*) A ge
trees, common in Great Brit
there are several varieties.
of the genus are, *flowers*, bi
bell-shaped, four to five toot
persistent; *stamens*, three to
two; *fruit*, sub-globular,
membranous margin. Sir J
(*Eng. Flor.* vol. ii. p. 19.)
species of native elm: — viz.
small-leaved elm (*U. campest*
found chiefly in the southern pa
The wood is hard and tough
durable in wet situations, and
ferred in Norfolk (where it
common species) to any other
nearly double the price, servi
cially for the naves of whee
parts of England and parti
London, the wood of the comm
for coffins. 2. The *common co*
(*U. suberosa*), which is tall
spreading than the foregoing
when a year old is covered
dense cork in deep fissures;
name. It is far inferior to
value. There are various cu
eties raised from seed. 3. The
barked elm (*U. major*); a do
The branches spread widely i
manner, and the bark is r
more corky than even the fore
ler says this elm was brought
in King William's reign, and
mended for its quick growth,
able tree for hedges in garde
wards fell into disuse. He ad
wood is good for nothing, so its
banished in this country." 4.
leaved Scotch elm, or *wych ha*
tana). It is sometimes called
shire elm, being very frequent
in that county. The large
is abundant, and very conspi
or June; and the seeds appe
ally perfected. This is one
general species of elm throug
It is a large spreading tree,

says Brande) is valued for the
s growth, its hardness, and its
thriving in poor soil unfit for
lgold (*Princip. of Carp.*), how-
e elm is of slow growth. The
nd are scarcely less remarked for
lk, and beauty than the British
olour of the heart-wood of elm
larker than that of oak, and of
wn. The sap wood is of a yel-
ownish white, with pores in-
. It has a peculiar odour, is
ous and cross-grained—some-
grained, and has no large septa.
l warps much in drying, and
onsiderably both in length and
is difficult to work, but not
, and bears the driving of bolts
ter than any other timber. In
irs and other articles of house-
e are frequently made of elm
a England, where the wood is
des the purposes already spe-
iefly in demand for the manu-
sks, mill-wheels, pumps, water
ees, &c. It is appropriated to
s because of its great durability
ich also occasions its extensive
d planking for wet foundations.
te charcoal is made from this
ils and gates of elm, thin sawed,
us in his *Sylva*, are not so apt
. Elm is said to bear trans-
ter than any other large tree.
ted by seed, layers, or suckers,
fting and budding. Suckers,
nerally disfigure those trees
ayers or suckers. As the value
r consists more in the length
the shaft than in the irregular

grass (*E. geniculatus*). 3. Wood lyme grass (*E. europæus*). The last is found in woods, thickets, and hedges on a chalky soil; herbage of a grassy green; stem erect, two feet high, and striated. As Sinclair has treated copiously of the proportional value of the different native and foreign species of *Elymus*, I shall follow his classification.

Elymus arenarius. (Germ. *Sand-haargras.*) Upright sea lyme grass, starr, or bent, named from its upright close spike. Its stalk is not winged, and the leaves are spinous, pointed. The calyx is lanceolate, the length of the spikelets. The nutritive matter afforded by this lyme grass is remarkable for the large quantity of saccharine matter which it contains, amounting to more than one-third of its weight; this grass may, therefore, be considered as the sugar-cane of Britain. The saccharine matter must render the hay made from this grass very nutritious, particularly when cut into chaff, and mixed with corn or common hay. Its natural soil (if soil it can be called) is the sands of the sea-coast. This grass, when combined with the *Arundo arenaria*, seems admirably adapted by nature for the purpose of forming a barrier to the encroachment of the sea. The culms are very deficient, both on its natural soil, and when cultivated. A greater proportion of saccharine matter is afforded by the culms of this grass than by the leaves. It flowers about the third week in July.

Elymus geniculatus. Knee-jointed, or pendulous lyme grass. The stem is winged, and the spikes bent directly downwards. At the time of flowering the produce from a sandy loam is 20,418 lbs. per acre. The foliage is tough and coarse, and the sufficient to recommend it for cultivation; for even though both were early in the produce of fine foliage, and grew rapidly after being cut, their strong creeping roots, which exhaust the soil very much, would preclude their introduction on the farm. This species flowers in the second week in July, and the seed is perfected in about three weeks.

Elymus hystrix. Rough lyme grass. At the time of flowering, the produce from a rich silicious sandy loam was 27,225 lbs., of which half the weight is lost in drying. The nutritive matter afforded by the produce of an acre is only 1063 lbs. The harsh, broad, thin, light-green leaves of this species, and of those of the *E. striatus* and *E. sibiricus*, indicate that they are naturally inhabitants of woods, or wet shady places. Grasses of this description are generally (indeed in every instance that has come under my observation) deficient in nutritive matter, and contain an excess of bitter extractive. Cattle appear to dislike these grasses. Oxen eat the Philadelphian lyme grass when it is offered to them, but they refuse the striated, Siberian, and rough lyme grasses. From the above details there is no authority for recommending the rough lyme grass to the notice of the agriculturist. It flowers in the second week in July, and ripens the seed in about a month.

Elymus Philadelphicus. Philadelphian lyme grass. At the time of flowering, the green produce per acre from a clayey loam and retentive subsoil is 30,628 lbs.; dry produce, 15,314 lbs.; nutritive matter, 2033 lbs.; so that it is a very productive grass, and contains a considerable quantity of nutritive matter. With respect to foliage, it is rather early in the spring. From the large size it attains, the produce is rank and proportionably coarse, and is unfit for pasture. It appears that for soiling, or hay to be used in the form of chaff, this and some other of the gigantic grasses would be profitable plants on soils unfit for the production of the superior pasture grasses, or of corn. A comparison of the quantity of nutritive matter contained in hay of the best quality with that made from this grass, will show nearly their comparative value. One pound of hay composed of the best natural grasses contains of nutritive matter 57 drs.; one pound of hay of the *E. Philadelphicus*, 34 drs. With regard to nutritive powers, therefore, five tons of the hay of this grass are scarcely equal to three tons of that of the superior grasses. But the soil that will produce this grass, and others of the same class, at the rate of six tons per acre, would not produce one fifth the quantity of the superior grasses; consequently, the adoption of the tall fescue and Philadelphian lyme grasses on soils of thi
tion for the uses now described,
found a profitable measure.
flowers in the first and second week
and successively till the end of
The seed ripens in about three
the time of flowering.

Elymus sibericus. Siberian l
At the time of flowering, the pr
acre from a rich sandy soil is 16
dry produce, 5,717 lbs.; nutritiv
574 lbs. The produce of this gr
coarse, and the weight of the c
fore, though considerable, is com
of no value. It is a native of Si
withstands the effects of the sev
tinued frost, but not sudden cha
frost to fine weather. It requires
every year, and treated as an a
comes into flower the second seas
the second or third week in June,
tinues to emit flowering culms till
A light rich silicious soil appears
adapted to its growth.

Elymus striatus. Striated lyme
the time of flowering, the green pr
acre of this grass from a clayey
20,418 lbs.; dry produce, 8,933 l
tive matter, 1276 lbs. From thes
therefore, this species is inferior in
powers to the Philadelphian lym
the proportion of 17 to 16. It is
later in the production of folia
spring, and does not come into
after that species has nearly per
seed. It cannot, therefore, be reco
for the purposes of the agriculturist
about the latter end of July, and
seed in August. (*Hort. Gram. W*
—371.)

EMBANKMENT. A large
bank of earth, thrown up for the
protecting or reclaiming lands f
injured or inundated by the wa
sea, rivers, or lakes. Mr. P. Ho
rates, in the *Communications to th*
Agriculture, vol. vi. p. 148., the
use for embankments abroad.

In Yorkshire, Lincolnshire, C
shire, and other places, many hun
sands of acres have been taken in b
ing. In Holland the whole coun
a great measure been gained in
Near Chester, the River Dee Com
also reclaimed some thousands
from the sea, which are now di
several beautiful farms. Mr.
docks of Carnarvon inclosed 1080
the sea, by an embankment of
in extent. (*Ibid.* vol. vi. p. 15
Boringdon also reclaimed a lar
land from the sea by embank
p. 252.) Mr. D. Sheriff, of Inver

ise describes (*Ibid.* vol. vii. p. 59.) lan he pursued in taking in from the 08 acres of valuable carse land. In *ib. of Useful Knowledge*, "Brit. Husb." . p. 447—449., will be found some lent observations on the embankment of s, and the cost of an operation of the In the *Quart. Journ. of Agr.*, vol. viii. 7., will also be found some interesting s on the same subject.

ere are many other parts of the United dom in which capital might be ad- geously employed for the same pur- It is a question of even national im- nce, and, as in the proposed embankment Wash, may be carried in some districts uch greater extent than is commonly sed. It is an improvement which must much varied, according to the situation ich the farmer is placed, that it would possible, in this work, to go into en- ring details; for, as Mr. Blakie remarks *r. of High. Soc.* vol. ii. p. 75.), "It be an Herculean task to attempt to wn rules, or give directions for raising equisite structures in every situation. any local impediments occur, so many ked-for obstacles must be surmounted, here are always so many circumstances attended to and provided for, that must ever depend on the ingenuity bility of the director." See also Rev. amilton, Mr. Sidney, and Mr. Mac- (*Ibid.* p. 97—103.); Johnstone on *ing and Embanking*, and Stephens on *tion.*

IBROCATION. (Gr. ενϐρέχω). In far- is a liquid application, usually pre- of volatile and spirituous ingredients, y used by friction to relieve pains, ness, &c.

IOLLIENTS. (Lat. *emolliens.*) In ry, such remedies as relax and diminish rdness and rigidity of the parts to they are applied.

CHANTER'S NIGHTSHADE. *ea.*) Of this perennial herbaceous of plants there are two indigenous s, the common enchanter's nightshade *tetiana*), and the mountain enchanter's shade (*C. alpina*). The former grows ist shady places, hedge-bottoms, church- , orchards, &c.: the root is tenaciously ing; the stem 18 or 20 inches high; d and branching: the leaves, of a sh dull green, waved, with short , one rib, and many veins; the flowers n clusters, many, small and scentless, or reddish, with a brownish green ; the fruit is a bur, clothed with ed bristles. (*Eng. Flor.* vol. i. p. 15.)

CLOSURE, or INCLOSURE. (Old ch, *enclosure.*) The enclosure of waste land is one of the preliminary steps to agricultural improvement, which has been evidently carrying on in every quarter of the globe in all ages; for as soon as mankind began to increase in numbers, and any thing like laws were established, it became especially necessary to distinguish one man's grounds from another, to guard against the inroads of wild animals, and to keep out the cattle of strangers. These would be the causes of the first origin of mounds, fences, ditches, and other landmarks, which, in the early days of the cultivation of the earth, would be rude and ill-constructed. The value of the land was then too trifling for any one to stop to inquire by what right the holder enclosed his lands: he would have perfect freedom of choice; locate himself where he pleased; choose naturally the best soils; and when these, by the increase of population, were exhausted, lands of inferior quality would be tilled, and only those neglected which were of the poorest description: hence these neglected portions being free to every one, common to all, at least of the tenants of the manor, they acquired the name of commons, or moors. The increase, however, in the value of land, which is a natural result of increasing population, as a certain consequence led the landowner to see the possibility of bringing still poorer lands profitably into a state of cultivation. Hence came the local enclosure acts of the present and last century in England, and then, to assist these, and to avoid a constant repetition of the same regulations and enactments, was passed the General Inclosure Act of the 41 Geo. 3. c. 109. And, finally, by the last General Inclosure Act of the 6 & 7 W. 4. c. 115., a local act is no longer rendered necessary for the enclosure of lands.

It is usual in an enclosure to allot a twentieth part of all waste to the lord, in lieu of his manorial rights, over and above his share of the land in right of his demesne (*Arundel* v. *Falmouth*, 2 M. & S. 440.); two fifteenths or two sixteenths are then usually allotted to the clergyman of the parish, and the remainder is allotted to those proprietors who possess rights of common. In case no especial clause is introduced into the act, the enclosed land is freehold (*Revel* v. *Joddrel*, 2 T. R. 415.); but a provision is almost always introduced, that the allotments shall follow the nature of the title of the land, in regard to which the allotment is made. And this is directed to be the case in all enclosures made under the General Inclosure Act of the 6 & 7 W. 4. c. 115. And the owner of a tenement may have two separate rights from which he is entitled to an allotment; viz. a right of common for his cattle levant (or to pass over), and couchant (to remain as in a common field). (*Hollingshed* v. *Walker*, 7 East, 485.)

By the statute 6 & 7 W. 4. c. 115., entitled "An act for facilitating the inclosure of open and arable fields in England and Wales," it is provided that two thirds in number and value of the persons interested or in possession of any open or common arable fields, or in any open and common meadow or pasture, may agree at a public meeting to inclose by an agreement or consent in writing; and, to effect this, are empowered to choose two commissioners and an umpire; and these are empowered to make a conclusive decision, subject, however, to an appeal to the quarter sessions.

And by section 40. it is provided, that if seven eighths of the persons interested in number and value shall agree, they may, by following the directions of the act, enclose such lands without the intervention of commissioners; a proviso which, especially in the case of small open fields, is a very valuable facility.

ENDIVE. (*Cichorium endivia.*) This plant is too well known to require description. There are three varieties. The green-curled is the only one cultivated for the main crops. When the larger seedlings have been transplanted, the smaller ones which remain may be cleared of weeds, and have a gentle watering; by which treatment, in twelve or fourteen days they will have attained a sufficient size to afford a second successional crop; and by a repetition of this management, in general, a third. The plants are generally fit for transplanting when of a month's growth in the seed bed; but a more certain criterion is, that when five or six inches high, they are of the most favourable size. They must be set in rows twelve or fifteen inches apart each way; the Batavian requires the greatest space. Some gardeners recommend them to be set in trenches or drills, three or four inches deep; this mode is not detrimental in summer and dry weather; but in winter, when every precaution is to be adopted for the prevention of decay, it is always injurious. Water must be given moderately every evening, until the plants are established, after which it is not at all requisite, except in excessive and protracted drought. If the plants are of a larger growth than is specified above, it is an advantageous practice to cut off the tips of the leaves before planting, as this checks them, and prevents, in a great measure, their premature advance to seed. Those which are left in the seed-bed, if the soil is at all favourable, in general attain a finer growth than those that
have been moved. In No
plants that have attained ne
size may be removed to the
sloping bank of dry light ear
or two feet behind, to be
frames, mats, or thick cover
during severe and very wet
to be carefully uncovered du
days. The plants, in this ins
required to be farther apar
eight inches. This plan ma
in open days during Decer
nuary, by which means a c
may be obtained. Instead of
in the above manner on a
sometimes the practice to t
on a dry day, and, the lea
together, to lay them horiz
earth, down to the tip of th
accelerates the blanching, b
far more subject to failure.
months elapse between the
and the fitness of the plants
This operation, if conducted
be completed in from ten to
in summer, or in three or
winter. In hot weather, th
completed in half the time t
if the season is cold. To bla
it is the most common prac
leaves together; to place til
board upon them; or to co
garden pots; whilst some r
leaves to be tied together,
covered up to their tips with
it rise to an apex, so as to
cessive rains. All these me
in dry seasons, but in wet o
treated according to any of
very apt to decay. The one
best in all seasons, is to f
round the heart as much as p
natural position, and being
with a shred of bass mat, c
tirely with coal ashes in the
the surface being rendered fi
with the trowel. Sand will
are equally unretentive of n
they are much superior in a
which is so beneficial in th
the process. If the simple m
the leaves together is adopte
etiolation, they must be tied
in a week after the first t
ligature must be passed rou
of the plant, to prevent th
bursting out. A dry aftern
plants are entirely free
should be selected, which
adopted for this concluding
the production of seed, the fin
est plants should be select
plantation, and which most

aracteristics of the respective varieties.
r a small family, three or four plants of
ch variety will produce sufficient. These
ould be taken in March, and planted be-
ath a south fence, about a foot from it,
d eighteen inches apart. As the flower
ms advance, they should be fastened to
kes; or if they are placed beneath
lings, the supporting string can be nailed
them. They must be kept clear of weeds.
July the seed will begin to ripen; and
re it must be observed, that each lateral
anch is to be gathered as the seed upon
ripens; for if none are gathered until the
ole plant is changing colour, the first
ned and best seed will have scattered
l be lost, so wide is the difference of
e between the several branches of the
e plant ripening their seed. Each branch
t be laid, as it is cut, upon a cloth in
sun, and when perfectly dry, the seed
n out, cleansed, and stored. Endive
will vegetate after being kept five or
ears. (*Quintin's Comp. Gard.* vol. ii.
; *Trans. Hort. Soc.* vol. iii. p. 138.;
Johnson's Kitch. Gard.) See Chic-

GRAFTING. See Grafting.
TRY TO FARMS. See Customs
ENTIES.
CRIS, SNOWY. (*Epacris nivalis.*)
ornamental evergreen, native of
Holland, blowing abundance of white
in July. It should be housed in
and may be propagated by cut-

DEMIC. (Gr. ἐπὶ, and δῆμος; Fr.
ique.) In farriery, a term applied to
vers, or other distempers of cattle,
k great numbers at certain seasons,
time, if many suffer in the same
. The term is frequently confounded
fectious, which is perfectly distinct,
plies a disease communicated from
dividual to another. Horses are
to epidemic fevers, and to several
pers of that kind, such as the epide-
catarrh, or influenza, strangles, stag-
e.
DERMIS. (Gr. ἐπὶ, and δέρμα, the
in.) In botany the exterior cellular
of the bark, leaf, or stem of plants
es. It is composed of cells compacted
r into a stratum, varying in thick-
different species, and is often readily
le by gentle violence. It is believed
tended by nature as a protection of
jacent parts from the drying effects
atmosphere. (*Brande's Dict. of*
.)
LEPSY. (Gr. ἐπίληψις.) A disease
occurs in various animals. See
Diseases of.

ERGOT. (*Spermœdia clavus.*) A parasitic fungus, which most frequently appears upon the ears of rye, but sometimes upon other plants of the gramineous order. It most commonly appears in hot, damp summers. It is known to be present by the change which the affected grains assume; but these seldom exceed five or six in an ear. The grain or pickle lengthens to more than double its natural size, becomes angled, of a deep purplish brown colour, and curved at its apex, where the ergot is seated. The surface, when viewed through a magnifying glass, appears studded with transparent, shining, white, angular dots; and when sliced and viewed in water under the microscope, it is seen to consist of white, flocculent threads, bearing globular sporules. The ergotted grains have a heavy, unpleasant odour, and an acrid, nauseous taste, leaving a slight sensation of heat in the palate. Ergotted rye is poisonous both to man and other animals. When in bad seasons, it has prevailed, and has been ground into flour with the rye, and baked in bread, it has caused many fatal, depopulating epidemics in the north of Europe. On quadrupeds its use is followed by emaciation, palsy of the hind legs, and extreme debility; mules in South America lose their hoofs and hair when fed on ergotted maize; and hens who have ergotted rye mixed with their food lay eggs without shells, owing to its excitement of the oviduct. It is employed as a medicine in difficult parturition, but it ought not to be administered without the greatest caution and discretion. (*Edin. Med. and Surg. Journ.* vol. liii.)

ERICA VULGARIS. The common heath, ling, or heather. See Heath.

ERIOPHORUM. The genus of cotton grasses, which see.

ERNE. One of the names of the white-tailed eagle. See Eagle.

ERSH, EARSH, ERRISH, or ETCH. (Sax. eꝺıꞅc.) Provincially land in the state of stubble after the corn has been cut. Thus we have pea, bean, and different sorts of grain-ershes, &c. Hence ersh-crop is a crop which has been grown after the stubble was turned down. See Eddish.

ERYNGO. (*Eryngium.*) A genus of plants consisting of eleven species, two of which are perennials, natives of this country, viz. 1. The sea holly, or sea eryngo (*E. maritimum*), which grows on the sandy sea-shore, strikes its long creeping roots eighteen or twenty feet deep into the soil; the radical leaves are more or less sheathing, stiff, spinous, three lobed; it blows a bright blue flower in July or August. Stem a foot high; root whitish, of a pungent aromatic flavour, with a mixture of mucilage; herb smooth, glaucous, with an elegant blue tint. The roots, reckoned stimulating and restorative, are either sold candied or administered in decoctions variously prepared.

2. The field eryngo (*E. campestre*) grows on waste ground chiefly near the sea, and is not so common as the last. It is more bushy and slender, and of a paler glaucous green than the foregoing; radical leaves larger; flowers white or purplish. The leaves of both are somewhat sweet, and of a pungent flavour. (*Eng. Flor.* vol. ii. p. 34.)

ESCALLION. See SCALLION.

ESCALOT, or ESCHALOT. See SHALOT.

ESCULENT. (Lat. *esculentus.*) A term applied to edible roots and plants, as carrots, turnips, cabbages, &c.

ESH. A provincial name for the ash tree.

ESPALIERS (Fr. *espalier*), in horticulture, are trees trained by lattice-work or other supports on the borders of beds, or as hedges to enclose plots of ground. They may serve to defend in a great measure many tender plants from the inclemencies of wind and weather. The trees chiefly planted for espaliers are apples, pears, and plums. The principal objects aimed at, however, in espaliers, are to expose the foliage and fruit of the plants or trees more perfectly to the light and sun, to prevent the branches from being blown about by the winds, and to economise space by confining them within definite limits. (*Loudon's Sub. Gard.* p. 232.)

ESPARCET. A local name for Sainfoin, which see.

ESSE. The provincial name in some places for ashes.

ESTATE. (Fr. *estat.*) In common parlance is applied to the landed property held by individuals; and a man is said to be of good or of small estate, according to the magnitude of his landed property. Estates vary exceedingly in size and value, in most parts of England. The largest estate in the kingdom may be worth 100,000*l.* or upwards, a year; and there are estates of most inferior degrees of magnitude, down to the annual value of 40*s.* In some counties property is more, and in others it is less subdivided. In Cheshire, the East Riding of Yorkshire, and one or two other counties, there are, comparatively, few small proprietors; but the latter predominate in most parts of the west of England, in the north, and generally throughout the country. Dr. Beeke, whose authority as to such matters is deservedly high, estimated the total number of proprietors in England and Wales at 200,000; and supposing the gross rental of the kingdom to be
year, the average annual inco
his capacity of landlord, will
and seeing that a few have
follows that many must hav
less. (*Brande's Dict of Lit.*;
Statistics, vol. ii.)

ETCH. A synonymous t
and eddish, which see. Grou
a crop has been taken.

EVELYN, JOHN. This
individual was born at Wott
the mansion of Richard Ev
father, on the 31st of O
He was one of the first F
Council of the Royal Society
lishment in 1662. He was
one of the Commissioners
St. Paul's cathedral; had a
Board of Trade; and was on
cil for the management of
tions. After the accession
he became one of the Com
executing the office of Lor
and in 1695 treasurer of Gr
pital.

Evelyn died at Wotton, F
1705–6, and was interred in th
there, after a life of unwearie
cerely regretted by every pat
of science. His writings and
of the greatest service in
arts of cultivation. (*Diary an*
of J. Evelyn.)

His family delighted in the
as he did himself. "There
raeli, "what may be termed a
in the home of a man of geni
an electrical atmosphere, his
nence strikes out talents in
in his beautiful retreat at Say
inspired his family with that v
which he himself was spreadi
the nation. His son transl
Gardens, which poem the
preserved in his *Sylva*; his lad
in his study, excelled in the
band loved, and designed th
to his *Lucretius*; she was also
of their celebrated garden, wl
an example of his great w
Trees. It was in consequen
mendation of Evelyn's in his
that fragrant plants should
nurseries, &c. in the low
London, that the lime trees w
St. James's Park. His hortic
are as follows: —

1. The French Gardener; instructin
all sorts of Fruit Trees and Herbs fo
gether with directions to dry and cons
natural state. By Philocepos. Londo
and 1691. 12mo. This translation h
many editions, to most of which are
English Vineyard," by John Rose.

nicaces of the Air and Smoke of London
London, 1661, 4to. 3. "Sylva," or a Discourse
Trees, and the Propagation of Timber in his
Dominions. To which is annexed "Pomona,"
endix concerning Fruit Trees; in relation to
making, and several ways of ordering it.
664, 1669, 1679; with great additions and im-
s in 1705 and 1729; all in folio. Dr. Hunter
dited an elegant edition, with copious notes
ful engravings, in 1776. 2 vols. 4to. A second
which the "Terra" is added, appeared in
as passed through two other editions. The
2, in 2 vols. 4to., received Dr. Hunter's last
. Evelyn published his "Sylva" and "Po-
the request of the Royal Society. 4. Kalen-
tense, or the Gardener's Almanack, directing
to do monthly throughout the year, and what
Flowers are in their prime. London, 1664.
work was afterwards printed in folio, with
" and "Pomona;" and the same, including
." London, 1676 and 1691, both in 8vo. It
ed, with the addition of his Discourse on
706, 8vo., previous to which there had been
. 5. "Terra," a Philosophical Discourse of
ing to the culture and improvement of it for
and the propagation of plants, as it was pre-
e Royal Society, April 29. 1675. London,
The same, including his "Pomona" and
London, 1676 and 1678, 12mo., and 1706,
mona, &c., was published separately. Lon-
lio. 7. M. de la Quintinye's Treatise of
s, with the raising of Melons, omitted in
ditions, made into English by J. E.; London,
with engravings. 8. Acetaria, or a Dis-
allets. London, 1699, 12mo. 9. Letter
he Damage done to his Gardens in the
inter. This is in the Philosophical Trans-
iii. p. 28. 1684. He also published several
scientific works. In 1660 appeared "The
of ordering Fruit Trees, &c." Translated
nch of Le Gendre. London, 8vo. This
been ascribed to Evelyn. If there is some
, there is still more respecting the real
endre being only an assumed name. The
opinion seems to be that it was written
naud d'Andilly, a clergyman born at Paris
who died in 1674. The original was pub-
in 1652, entitled "De la Manière de Cul-
s Fruitiers." Evelyn contributed largely
ton's "Husbandry and Trade improved."
the "Plan of a Royal Garden," and an
of the Horticulture of the Georgics," never
, W. *Johnson's Hist. of Gard.*)

NG PRIMROSE. (*Œnothera*
This pretty flower is common in
d often escapes from them into
ground. But on the dreary
ur Lancashire coast it is truly
planted there by the hand of
ough perhaps transported by na-
s from the other side of the
It expands, of an evening, its
large and handsome, but short-
t yellow, white, or purple flowers,
delicately fragrant: stem two or
high, leafy, angular, hairy; leaves
eolate, acute, grass green. Most
ies are natives of America or the
ood Hope. (*Eng. Flor.* vol. ii.

REENS, in gardening, are pe-
nts which continue their ver-
s, &c. throughout the year, such
llies, pines, firs, cedars, &c.

LASTING-PEA, BROAD-
. (*Lathyrus latifolius.*) A pe-
nt of the vetch kind, which grows
in some places; is easily culti-
annually yields a great burden
t provender, and might be cultivated to advantage as a green food for cattle, on any of the more strong sorts of soil. See Vetch and Vetchling.

EVERLASTING, PEARLY. (*Emaphalium margaritaceum.*) One of the names of the American cudweed. See Cudweed.

EVERY-YEAR'S-LAND. Such lands as have been cropped with a brown and white crop, or pulse and corn in alternation, for a length of time, without any intervening fallow. There are extensive common fields in Gloucestershire and other parts of our island, which have been conducted under this management for perhaps centuries past.

EVERS. A country name for stiles that open, in which case the top rail has a bolt of iron driven through it at one end, the other end falling into a notch in the opposite post by which arrangement an opening is readily made.

EWE. (Sax. eope.) See Sheep.

EWER, or YEWER. A provincial name for the udder of animals.

EXCRETION. (Lat. *excretio;* old Fr. *excretion.*) In animal and vegetable economy, is the discharge of excrementitious organic remains.

EXECUTION. (Old Fr.) See Distress.

EXOTICS. (Gr. ἐξωτικὸς, foreign.) In gardening, a name given to plants which are not natives of Britain, but have been introduced from some other country. The generality of exotic plants do not thrive in this country, without particular care and culture. They require the warmth of their own climates; hence, hot-beds, green-houses, and conservatories (see these articles) are essential to their existence and growth. During summer, &c. some exotics, from the arctic circle, suffer from the warmth of this climate, in the same manner as the Esquimaux dogs.

EXPERIMENTAL FARMS. See Farms.

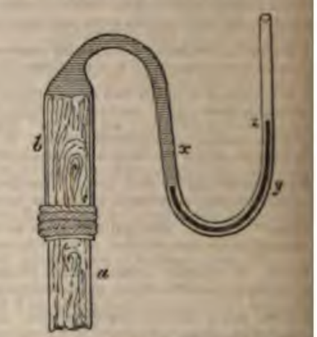
EXTERNAL INJURIES, in farriery, are such as happen to cattle of different denominations, as cuts, wounds, bruises, &c. A writer in the *Veterinarian* speaks very confidently of the beneficial effects of chloride of lime and chloride of soda, when applied to wounds and external diseases of the animal system, as having the property of arresting or destroying the progress of putrefaction. (*Quart. Journ. of Agr.* vol. ii. p. 149.)

EXTRAVASATED SAP. Under this general name I purpose to include the consideration of gumming, bleeding, and some other diseases from which plants occasionally suffer on account of their juices escaping from the containing vessels.

The extravasation proceeds from the alburnum or inner bark, and may arise from one or other of the following causes: — 1. The acrid or alkaline state of the sap, which has been considered already when treating of the canker. 2. From plethora or excessive abundance of the sap. 3. From the unnatural contraction of the ascending vessels. 4. From wounds. 5. Heat and dryness.

1. With regard to the *alkaline state of the sap*, it may be observed, that the excessive alkaline quality of the sap may exist in plants in which, during their healthy state, an alkaline principle is either absent in the sap, or exists in small quantity; hence this excess imparts to it the power of destroying the fibre of its containing vessels. This opinion is based on chemical experiments. A weak alkaline solution dissolves woody fibre without alteration; and it may be thrown down again by means of an acid. By this property we are enabled to separate wood from most of the other vegetable principles, as few of them are soluble in weak alkaline leys. (*Thomson's Syst. of Chem.*, vol. iv. p. 180. Ed. 6th.) It is true that the vital principle may counteract powerfully this chemical action; but it will not control the corrosive effect of an active agent in excess, if repeated for any length of time. The blood of the human system contains, when in a healthy state, a portion of common salt, yet if this saline constituent is in excess, it induces inflammation and organic derangement. On the same principle the alkaline state of the sap, by weakening the coats of the vessels, may permit its exudation. It must, however, in candour be admitted that no means have hitherto demonstrated that the sap actually ascends in the alburnum or sap-wood through tubes or membranous vessels; but this does not weaken the argument which is here attempted to be advanced. Although these exudations from the sap-wood can only be fluid sap, not gum or any proper juice, which comes solely from the bark, yet, by weakening the assimilative process, it causes diseased action sufficient to produce exudation, from the descending vessels being in a weakening condition.

2. *Plethora* is that state of a plant in which the sap is formed more rapidly than the vessels or conducting tissue can convey it; and when this occurs, rupture must take place. The force with which the sap is propelled during its ascent, and consequently the force acting to burst the vessels during any check, is very much greater than could have been expected before Dr. Hales demonstrated it by experiment. This distinguished vegetable physiologist found,
that in the vine this force was able to
19 lbs. weight. In order to prove
fact, he fixed to the stem of a vine (*a*)



off about two feet and a half from the gro
a mercurial gauge, (b, y), and luted
the sides of the stem with mastic.
gauge (b, y) was in the form of a syp
so contrived that the mercury might
made to rise in y in proportion to the
sure of the ascending sap above x. In
instance, in two hours, it raised the mer
to a height of 15 inches higher in leg y
in leg x; and, ultimately, after tw
days, to 32½ inches. (*Hales's Veget.*
vol. i. p. 107.) The branch of an
tree was separated from the parent
and placed in water. When the
were upon it, the force with which it
pelled its sap raised the mercury a qua
of an inch. The pear, quince,
walnut, peach, gooseberry, and sycam
had a power equal to elevating the mer
varying from three to six inches. The
the oak, the chestnut, hazel, sallow, and
elevated it variously from one to two in
The laurustinus, the laurel, and other
greens, scarcely raised the mercury
(*Ibid.* p. 114. &c.) The experiments
with a separated branch do not give the
amount of the parent tree's power, bec
the exhaustion incident to amputation
cessarily diminishes the vigour, and
minute the power in the branch bec
less as it approaches so much the near
death. Now we know that a much less
sure than any of those above mentioned
be capable of bursting the delicate
branes of any of the exterior ascending
vessels; and by weakening the coats of
descending vessels, they pour out their
tents, if they be excessive in quantity.
is in these outer ducts that the injury
first occur. When one exterior ves
ruptured, that next beneath it, having
supporting pressure removed, is enabl
follow to the same course, at the sam
cality; and in proportion to the length

escending sap continues in ex-
lepth to which the mischief ex-
he quantity of sap extravasated.
avasation proceeds from this
is but one mode of treatment
d, namely, to cut off one of the
to afford the tree immediate re-
en to reduce the staple of the
ving some of it, and admixing
earthy components, as sand or
must be done gradually, for
oots that are suited for the col-
itriment from a fertile soil are
for the absorption that forms a
it pasturage. Care must be
o apply the above remedies
clearly ascertained that the
an unnatural contraction of the
because, in such case, the treat-
be injurious rather than salu-
always found it arising from
production of sap, if the tree,
d by extravasation, produces at
e very luxuriant shoots.

contraction of the descending
the extravasation arises from
ere is usually swelling of the
ately above the place of dis-
ave a cherry tree in my garden
which the stock has grown very
reely than the graft. Conse-
t above the place of union, a
mbling a wen extends round
th of the tree, from which swell-
ontinually exuding; evidently
obstruction in the descending
at part in the stem below it.
e as this, the cultivator's only
reduce cautiously the amount
if the bleeding threatens to
y extensive; otherwise it is of
nsequence, acting, like tempo-
ges of blood from the human
elief to the system.

xtravasation of proper Juice
nd.—This is usually the most
se of extravasation; it amounts
and therefore it is the most
and as the wound, whether
cut, is liable to be a lodgment
d other foreign bodies, which
healing of the injured part, the
often protracted. This is espe-
se if the wound is made in
efore the leaves are developed,
ning the winter pruning of the
an is proper. In such case, the
true sap, and comes from the
the wound; thence the vine is
ened, and in some instances it
stroyed. The quantity of sap
e made to flow from some trees,
ns are made at this season, is astonishing, especially in tropical climates. Thus, from a cocoa-nut palm, from three to five pints will flow during every day, for four or five successive weeks; but this is proper juice; and in this climate, when an incision is made in a tree in summer or in autumn, the discharge is from the upper lip of the wound, and the exuded matter is proper juice. The best modes of checking such exudations, arising from wounds or injuries, is by placing a piece of sponge, dipped in a solution of sulphate of iron, upon the discharging place, covering the sponge with a piece of sheet-lead, and binding it on firmly. The sulphate of iron acts as a styptic, promoting the contraction of the mouths of the vessels. The sponge encourages cicatrization; and the lead excludes moisture and the formation of spongy deposits.

5. *Heat attended by dryness of the soil,* such as occurs during the drought of summer, is very liable to produce an unnatural exudation, such as furnishes the Gum Arabic from the bark of a species of Acacia, abounding in Morocco, and the Tragacanth, from a species of Astragalus in Arabia. It is somewhat analogous to that outburst of blood which in such seasons is apt to occur in man, and arises from the increased action of the secreting and circulating systems, to which it affords relief. There is this great and essential difference, that in the case of the plants, the extravasation is upon the surface of the stem, sometimes on that of the leaves, and consequently is in proportion to the abundance of the proper juice; their respiration and digestion is impaired, and disease set up in their system. The honey-dew, an exudation on the leaves, was noticed by the ancients, and is mentioned by Pliny (*Hist. Natur.* xi. 12.), by the fanciful designations of "the sweats of the heavens," and "the saliva of the stars," though he questioned whether it was not a deposition from the air purging this from some contracted impurity. More modern philosophers have been quite as erroneous and discordant in their opinions relative to its nature. Some, with the most unmitigable asperity, declare that it is the excrement of aphides; others as exclusively maintain that it is an atmospheric deposit; and a third party consider that it arises from bleeding, consequent to the wounds of insects. That there may be a glutinous saccharine liquid found upon the leaves of plants, arising from the first and third named causes, is probable; but it is by no means conclusive that there is not a similar liquid extravasated upon the surface of the leaves, owing to some unhealthy action of their vessels. It is with this description of honey-dew that we

are here concerned. The error into which writers on this subject appear to have fallen, consists in their having endeavoured to assign the origin of every kind of honey-dew to the same cause. Thus, the Rev. Gilbert White (*Naturalist's Calendar*, p. 144.), seems to have had a fanciful and comprehensive mode of accounting for the origin of honey-dew. Thus he informs us, on June 4. 1783, "there is vast honey-dew this week." The reason of this seems to be, that, in hot days, the effluvia of flowers are drawn up by a brisk evaporation, and then in the night fall down with the dew with which they are entangled. The objection urged to this theory by Curtis (*Trans. Linn. Soc.* vi. 82.), is conclusive. If it falls from the atmosphere, it would cover every thing on which it falls indiscriminately; whereas, we never find it but on certain living plants and trees. We find it, also, on plants, in stoves and greenhouses covered with glass. Curtis had convinced himself that the honey-dew was merely the excrement of aphides; and he supported this theory with his usual ability, although he justly deemed it a little extraordinary, that any insect should secrete, as excrementitious, saccharine matter. He even thought it possible, if the ants, wasps, and flies could be prevented from devouring the honey-dew "almost as fast as it was deposited," to collect it in considerable quantities, and convert it into the "choicest sugar and sugarcandy." The bees, however, he found totally disregarded the honey-dew which came under his observation. With these conclusions of Curtis's I do not agree; and they are also opposed to those of the Abbé Boission de Sauvages, who, in a memoir read before the Society of Sciences at Montpellier, gives an account of "a shower of honey-dew," which he witnessed under a lime-tree, in the king's garden at Paris. M. Decandolle regards the honey-dew as the result of temporary checked transpiration, on the surface of the leaves, affording an opportunity for the proper juice to be transpired with the sap, when the course which occasioned the check is removed. "The powerful and sudden operation of the sunbeams," he remarks, "after a drizzling rain, favours not unfrequently the perspiration of oxidized slime, and of sweet drops, which are known by the name of honey-dew." (*Elements of the Phil. of Plants*, § 321.)

The various successful applications of liquids to plants, in order to prevent the occurrence of the honey-dew and similar diseases, would seem to indicate that a morbid state of the sap is the chief cause of honey-dew; for, otherwise, it would be difficult to explain the reason why the use of
a solution of common salt in wa
to the soil in which a plant is gro
prevent the appearance of the d
it caused by insects. Besides, i
that the irregular action of the
cause of the disorder, then we
stand that a portion of salt
into the juices of the plant w
rally have a tendency to corre
any morbid action, correcting th
secretion of sap, and promoting
formation. In making this
am perfectly aware that whateve
the tone of the plant checks t
tions of parasites; but it does n
with the ravages of the aphis.
treatment the honey-dew may
prevented. I have often witne
sult in my own garden when ex
with totally different objects.
have seen plants of various kind
been treated with a weak solution
salt and water, totally escape
dew; whilst others of the same
ing in the same plot of gro
treated, have been materially in
ravages. I think, however, that
which has been sometimes emplo
purpose is much too strong f
plants. I have always preferr
liquid, and am of opinion that o
sea salt (chloride of sodium) to
water is quite powerful enough
tended purpose. I am in doub
correctness of Knight's opinion
the influence of the water alone
position of such a remedy, since
ticed that standard fruit trees, ar
at a distance of six or eight fe
stem, I had deposited, at a dept
inches, a quantity of salt to p
general health and fruitfulness
according to the manner forme
to some extent in the cider cou
apple orchards; — that those tr
the honey-dew which infeste
trees: and this, just as well as
had been watered with salt and
with much diffidence that I do
rectness of any of the opinion
man as the late lamented presi
Horticultural Society; for to hi
physiology is deeply indebted
highly scientific, accurate, and
researches. He seemed, too, o
sions, to introduce into his exp
elegance of research and ingenio
ment worthy of the great class o
substances to which he devoted
life. I may be excused for
something should be done towa
the gratitude of his contempor
nook should be found in Westmi

tablet. Hill, who was a practical
r, and published his work upon
es in 1755, after describing the
ew and his ideas of its effect on fruit
ys, "If the season be wet, spread
salt over the border, about eight
each tree, for the more salt the
tains the thicker it is, and the
and more compact are their leaves,
eby, the less subject are they to
ation of the honey-dew than when
composed of juice more watery."
ht's experiments were made with
of preventing the blue mildew,
h peas and some other crops are
noyed, especially the early and
; and by keeping the rows well
e perfectly succeeded, employing
water alone, and, on other occa-
er in which a small portion of
lt was dissolved. "By this pro-
e constantly succeeded," he re-
n preserving the health of my
ops of peas" (*Banks on Blight*,
d although the applications were
provide against the injuries of
sease, yet still, in some degree,
nly support the conclusion drawn
nd myself as to the preventive
sessed by a weak saline solution
ey-dew. It is more than probable
of the diseases of plants arise in
r other from the irregular action
and the proper juice, caused very
dden transitions in the temper-
he atmosphere. The cultivator
y convince himself of the power
salt in preventing these injuries;
ly strew it at the rate of about
shels per acre, over a portion of
bbages or brocoli, &c., and when
ets in he will soon perceive how
e stoutly the salted plants with-
effects of the frost than those
e not been thus assisted. This
oduced, very likely, by the salt
g absorbed by the roots of the
bling the vitality of the plant to
more effectually the congealing
low temperature, since the more
fluids contain the lower is the
re required to render them solid.
also, most probably, other ways
the salt operates on vegetation,
which we are but imperfectly
l. One of these is, undoubtedly,
r vigour communicated by the
and tonic influence of the salt,
n into their systems; for plants,
ls, are capable of maintaining
ral temperature or innate heat in
f their vigour and tone. (*G. W.*
Quart. Journ. Agr. vol. ix. p. 496.)

EXUVIÆ. (Lat.) The cast-off parts or covering of animals, and also the shells and other marine productions met with in the bowels of the earth, having been deposited there for a vast length of time. The lobster casts his shell, the toad and snake shed their skin periodically, leeches and fishes seem to cast off exuvial layers of mucus only; but in most reptiles the epidermis is periodically moulted, either entire or in large coherent masses. The periodically moulted feathers of birds, and hairs of various species of mammalia, may also be regarded as exuviæ. Substances of these kinds, where they can be procured in sufficient quantities, are highly valuable as manures, and capable of extensive application, especially on all the clay soils.

EYE. (Sax. eaȝ; Ice. *eiza*.) In the management of fruit-trees, implies the germ, small bud, or shoot inserted into a tree.

EYEABLE. A provincial expression used to signify the fine appearance of collections of sheep or cattle.

EYE-BRIGHT. (*Euphrasia officinalis*.) An elegant indigenous plant, very common in mountainous pastures and dry heaths, varying in height from one to six inches. It flowers from July to September; its stalk is square and hard; the leaves of a bright green, flat, broad, and indented at the edges. The flowers are small and white, streaked and spotted with dark colours. On the mountains of Scotland there is a more slender variety, with smaller but more richly tinted blossoms; on the Alps a dwarf, large-flowered, more purpled variety is common. It must be gathered about September, when it has done flowering. The distilled water is spoken of by the old herbalists as a fine eye-water to strengthen and improve the sight. This reputation gave it the name of *eye-bright*, but, like many other ancient opinions respecting the virtues of plants, the value of the reputation is worn out. The eye-bright will not grow in gardens; it loves to hide itself in grass or heath, and will not thrive unless it be surrounded by plants that are taller than itself. It is eaten by cattle and sheep, but refused by hogs. (*English Flora*, vol. iii. p. 122.)

EYE OF THE HORSE. The eye of the horse appears to be naturally more disposed to disease than that of any other animal. The diseases of the eye, although few in number, are frequent in their appearance, obstinate, and generally baffle all the skill of the veterinarian. The following are the principal: common inflammation, specific ophthalmia or moon blindness, cataract, and *gutta serena* or glass eye. For the two last there is no cure.— Moon blindness, as it is termed, is brought on in a great measure by close confinement in dark, heated, and poisonous stables. No specific remedies can be given for these diseases. (*The Horse*, p. 113. *Lib. Use. Know.*) See BLINDNESS and CATARACT.

F.

FACTOR. (Lat. *factor*; Fr. *facteur*.) In mercantile law, an agent who is entrusted with the property of others, which he is commissioned to dispose of. In Scotland the word factor is used synonymously with steward in England, signifying one who has the overlooking or management of an estate or a farm for another person.

FAGGOT. (Welsh *fagod*; Fr. *fagot*.) A bundle of small cut wood tied together closely for fuel or other purposes. They are made up from the cuttings or thinnings of coppices or hedges; and, in many districts, are sold to the bakers.

FAIR. (Old Fr. *fiere*; Lat. *feriæ* or *forum*.) A public place where merchants, traders, and other persons assemble from remote parts on some fixed day in the year to buy and sell commodities, and to partake of the diversions usually to be met with on such occasions. (See MARKET.) Fairs and markets are very closely allied. A fair, as the term is now generally understood, is only a greater species of market recurring at more distant intervals. Both are appropriated to the sale of one or more kinds of goods, the hiring of servants or labourers, &c.; but fairs are in most cases attended by a greater concourse of people, for whose amusement various exhibitions are got up.

Fairs originated in England in monkish days, when proud bishops and mitred abbots were not unwilling to increase their revenues by the tolls which they were empowered by royal charter to levy on the crowds who commonly attended the festivals of their patron saints. In law, whoever will have a stall in a market must have a license from the owner of the soil (*Northampton* v. *Ward*, 1 Wils. 107.), otherwise trespass lies (*Norwich* v. *Swan*, W. Black. 1116.); after twenty years' use, a fair or market is not a nuisance (*Rex* v. *Smith*, 4 Esp. 111.). The owner of the soil may recover for stallage without an express agreement (*Newport* v. *Saunders*, 3 B. & A. 411.) Spreading rumours with an intent to increase the price at fairs or markets is an offence at common law (*Rex* v. *Waddington*, 1 East, 143.).

Various statutes have been passed to regulate fairs.—By the 2 & 3 P. and M. c. 7. the owner or keeper of every fair must appoint a certain open place for the sale of
horses, and must, under a pen
shillings, appoint some one to atte
toll, from 10 A. M. till sunset; m
book, and enter therein the ma
colour, &c., seller's and buyer's
residence, or forfeit 40 shilling
31 Eliz. c. 12., if the parties are
to the book-keeper, they must
person to vouch for them; h
entering in the book, where there
is one penny, for giving a certi
pence. In the *Quart. Journ. of*
pp. 277. 366., vol. vi. p. 427., a
p. 526., will be found a very
scription of all the principal fai
land.

A list of the fairs and mark
United Kingdom will be found
almanacs, particularly that en
Farmer's Almanac, by Johnson
(*M'Culloch's Com. Dict.*; *Chi*
Law, vol. ii. c. 9.; *Willich's Dom*

FAIR MAID OF FRANCE.
culus aconitifolius.) A hardy
blowing a white flower in May
native of the Alps. It loves sh
open situation. Multiply by
roots in spring.

FAIRCHILD, THOMAS,
the few gardeners of his time wh
love of science with the practice
He is mentioned throughout
works, as a man of general infor
fond of scientific research, and i
given many of his experiments
one of the latest English culti
vineyard, having had one at Ho
as 1722. He died in 1729, lea
for insuring the delivery of a
nually in the church of St.
Shoreditch, on Whit-Tuesday,
wonderful works of God in the
or On the certainty of the res
the dead, proved by the certain
the animal and vegetable parts
tion." Besides several letters p
Bradley's works, and a paper "
ferent and sometimes contrary
the sap in plants," in the *P*
Transactions for 1724 (vol. xxxi
he published,

The City Gardener; containing the mo
method of cultivating and ordering suc
Fruit Trees, Flowering Shrubs, Flowers,
&c., as will be ornamental, and thrive be
don Gardens. London, 1722. A small o
1724. A Treatise on the manner of fall
raising of Grass Seeds, and training 1
Anonymous. 12mo. (*G. W. Johnson's H*

FAIRY RINGS. Whoever
over our down lands in search o
table treasures of creation, or i
the rational enjoyments of a
cannot fail to have noticed, says
Smith, the circles of verdant gra

ircles of fungi, most abundant
ills, and known under the name
. The various superstitions and
ies connected with these pheno-
ot be detailed. These circles
counted for by various theories,
ne, however, is alone sufficient
ll the facts. The recent dis-
habitual rejection by the roots
nce injurious to the growth of
as made it evident in what
ce of plants may occupy one
ey can no longer exist on it,
ce of the excretions their roots
d, rendering the land altogether
o them; while, on the other
ange thus effected in the soil
t more nutritious and desirable
r race of plants, than before any
had taken place. This theory,
a series of familiar facts, ex-
cessity for a rotation of crops.
is ascertained, soon render the
h they grow unfit to support
ut they enrich the soil for other
ally for the grasses, which grow
xuriance in the space left bare
ction of the fungi. The cir-
the plants taking a circular
rhaps arise from a single fun-
wing its seed all around it, and
op of fungi is sufficient to ex-
l, the grass springs up in the
ccupied, and the second year's
appears in a small ring round
centre. The rings go on ex-
ircumference year after year,
ng occurs in the soil or its pro-
k their progress, or the species
becomes dormant for a season.
ode of growth takes place in
rustaceous lichens. The rings
served to be frequent on hill-
n almost always with the lower
circle open. They sometimes
ll circle within the larger one,
ys in the centre. Within such
erbage is very luxuriant and
ing of the *Anthoxanthum odo-*
he common daisy; without the
s not any very apparent change
tion; but on the circumference,
yllum, T. monotropa, Carex re-
Hieracium pilosella, have all
d. (The *Wild Garland,* by S.

. (Fr. *faulcon;* It. *falconne;*
A formidable bird of prey, of
are several species.
yr-falcon, or ger-falcon (*F.*
s the largest in size, and one of
ical in form, which the British
lace. It builds in the rocky

coasts of Norway, Iceland, and Zetland. The eggs are mottled with pale reddish brown, on a dull white ground, and two inches and three-eighths long by one inch and seven-eighths broad. Next to the eagle it is the most intrepid and voracious of the feathered tribe, and likewise the most valuable species for the purposes of falconry. The stork, the crane, the heron, and the wild goose fall easy victims to its bold attacks. It is remarkable that in the falcons, as in all other birds of prey, the females are much larger and stronger than the males.

2. The peregrine falcon (*F. peregrinus*), being more common, is one of the most important agents in the falconry of the present day. It builds on high rocks on various parts of the coast. The eggs are two to four, about two inches long by one inch and eight lines in breadth; the colour is the same as that of the last species. The whole length of the peregrine falcon is from fifteen to eighteen inches, depending on the sex and age of the bird. Back and upper surface of body bluish slate, or ash colour; breast rufous white, with dark brown transverse bars.

3. The hobby (*F. subbuteo*), a true falcon, though of small size, may be considered a peregrine falcon in miniature. It is a summer visitor to this country, appearing in April and leaving generally in October for warmer regions. It builds its nest on a high tree; its eggs are three to four, like those of all the true falcons in shape and colour; length one inch eight lines, breadth one inch four lines. Specimens of the hobby measure from twelve to fourteen inches, depending on age and sex. Food, small birds, and large coleopterous insects. Plumage, back greyish black; breast, belly, and thighs, yellowish white; legs and toes yellow; claws black.

4. The red-footed falcon (*F. rufipes*), is a species of small size, much resembling the last described. It goes through several interesting changes of plumage. The whole length of the bird is eleven inches. The general colour of the plumage a uniform dark lead colour. Legs and toes reddish flesh colour; claws yellowish white.

The merlin, kestril, gos-hawk, &c. will be noticed under the head HAWKS. (*Yarrell's Brit. Birds,* vol. i. p. 26—48.; *Blaine's Encyc. of Rural Sports.*)

FALCONER, WILLIAM, M.D., F.R.S., was physician to the Bath General Hospital. He was the author of the three following works: —

1. An historical View of the Taste for Gardening and laying out Grounds among the Nations of Antiquity. 1783, 8vo. This appeared, for the most part, originally in the Literary and Philosophical Memoirs of the Manchester Society. 2. An Essay on the Preservation of the Health of Persons employed in Agriculture; and on the

Cure of Diseases incident to that Way of Life. London, 1789, 8vo. 3. Miscellaneous Tracts and Collections relating to Natural History; selected from the principal Writers of Antiquity on that Subject. London, 1793, 4to.

FALLOW. Such land as has been repeatedly ploughed over, and exposed to the influence of the atmosphere, for the purpose of rendering it friable, clearing it from weeds; leaving it to rest after the tillage before it is again sown.

Fallows have different names given to them, and are of different kinds, according to the purposes for which they are intended, and the manner in which they are made. Thus, a *naked fallow* is that in which the ground is ploughed and harrowed at suitable intervals for several successive times, according to the kind of crop that is ultimately to be grown, but without being sown till it has remained in fallow for some length of time. A *green* fallow is that where the land has been rendered mellow and clear from weeds by means of some kind of green crop, such as turnips, peas, tares, potatoes, &c. In this mode of fallowing, no time is lost by the land being left idle, or in an unproductive state. Fallows are also sometimes distinguished by the season of the year in which the business is chiefly or wholly performed, hence we have *summer* and *winter* fallows; and likewise, from their being in some cases only done in a partial manner, we have *bastard* fallows. Fallows are also named after particular crops, as wheat, turnip, and potato fallows.

"The chemical theory of fallowing," observes Sir H. Davy (*Elem. of Agr. Chem.* p. 23.), "is very simple; fallowing affords no new source of riches to the soil, it merely tends to produce an accumulation of decomposing matter, which, in the common course of crops, would be employed as it is formed; and it is scarcely possible to imagine a single instance of a cultivated soil, which can be supposed to remain fallow for a year with advantage to the farmer; the only case where this practice is beneficial seems to be in the destruction of weeds, and for cleansing foul soils." It has been indeed recently contended by Liebig in his Organic Chemistry, that during a fallow, a quantity of ammonia is collected from the atmosphere, potash disengaged from its combinations, and other chemical effects produced, which it is hardly necessary to examine at much length. He says (*Organic Chem.* p. 156.), "The fallow time is that period of culture, during which land is exposed to a progressive disintegration by means of the influence of the atmosphere, for the purpose of rendering a certain quantity of alkalies capable of being appropriated by plants. Now it is evident, that the careful tilling of fallow land must increase and accelerate this disintegration. For the purpose of agriculture,
indifferent whether the land is co
weeds, or with a plant which do
stract the potash inclosed in it.
plants of the family of the *Legu*
remarkable, on account of the sma
of alkalies or salts in general
contain; the *Vicia faba*, for exa
tains no free alkalies, and not on
of the phosphates of lime and
The bean of the *Phaseolus vulgar*
only traces of salts. The stem
dicago sativa contains only 0·83
that of the *Ervam lens* only 0·57
of phosphate of lime, with albume
wheat dried in the sun yields
per cent. of ashes, of which 0·09
soluble salts. These plants belon
which are termed fallow crops
cause why they do not exercise an
influence on corn which is cultiva
diately after them is, that they
tract the alkalies of the soil, and
small quantity of phosphates."

FALL. A measure of land,
perch.

FANNER. See Winnowing

FANTOME-CORN. A nam
to thin or light corn, which has
bulk or solidity.

FAR. (Sax. feop.) In hors
a term used to denote a horse's
thus the *far* foot, *far* shoulder,
right foot, right shoulder, &c.

FARCY. In farriery, a dise
absorbents affecting the skin and
vessels, by which, when inveter
coats inflame and are so thick
they become like so many cords.
intimately connected with glan
they will frequently run into c
The treatment varies with the f
sumes. In the button, or bud
which indolent boils appear, a mil
physic should be first administer
buds should then be carefully
and, if any of them have br
budding iron, of a dull red heat,
applied to them, and the buds
as soon as they appear to contai
and afterwards washed with a lo
posed of a drachm of corrosive
dissolved in an ounce of rectifi
Daily exercise and green food
essential to the animal's recovery.
Far. p. 79.; *Blaine's Vet. Outline*
The Horse, p. 128–31.)

FARCY, WATER. See Dro

FARDING-BAG. The first
of a cow, or any other ruminan
It is a mere receptacle for rece
retaining the green food, until t
has time to repose and chew the

ARE OF PIGS. A provincial mode
xpressing the number of pigs which a
brings forth at once. See FARROW.
ARINA. (Lat. *far*, corn, of which it
ade.) Meal or flour obtained by grind-
and sifting wheat and other seeds, or
ulverising and preparing edible roots,
hence the term farinaceous food.
ARM. A portion of ground cultivated
he purpose of profit. There are dif-
t kinds of farms. Where the princi-
part of the land is under the plough,
are termed arable farms; but where
fattening of cattle or other live-stock
ore immediately the object, they are
nguished by the title of grazing farms;
e the chief intention is the obtaining
rent animal products, such as milk,
er, and cheese, they are denominated
farms; and where the two systems
rable and grass management can be
bined, they are called convertible
s. As manure must be had in order to
er farms of any kind productive, the
may probably, in general, be considered
he most advantageous. Besides these,
stricts where hay is the principal pro-
, there are hay or grass farms, and
re are also what are denominated breed-
or cattle farms.
The old writers on husbandry, who lived
arm countries, where the heat and
ure of the air had sensible and fre-
ntly very dangerous effects on the health
he inhabitants, were very particular in
ir directions for the choice of farms or
tes, and of the spots whereon houses
ld be built, so as to avoid the inconve-
es arising from the climate, or from
quality or situation of the ground. The
ans had generally pleasure as well as
t in view, when they bought and
led a farm; and therefore they laid it
n as a rule, that no degree of fertility
d tempt a man to purchase in an un-
lthy country, nor the pleasantest situa-
in a barren one. "Buy not too
ly," said Cato, "but view again and
n the purchase you intend to make;
if it be a good one, the oftener you see
e better it will please you. Examine
the neighbouring inhabitants fare. Let
country it lies in be a good one; the
s to and from it good; and the air tem-
te. Let your land, if you can choose
situation, be at the foot of a hill,
g the south, in a healthy place, where
ciency of labourers, of cattle, and of
r may be had. Let it be near a
ishing town, the sea, or a navigable
; or bordering upon a good and well-
uented road. Let the buildings upon
ground be strong and substantial. Do not rashly condemn the methods of others. It is best to purchase from a good husbandman, and a good improver."

Besides the healthfulness of the situation, three other things should be particularly attended to in the choice of a farm or estate; these are, the air, the water and the soil. The air should be pure and temperate, the water wholesome and easily come at, and the soil fertile; and the farm should be at a reasonable distance from good markets, both for the sale of the produce and the purchase of manure. See FARM BUILDINGS.

The ancients were particularly attentive to the quality of their water, and to the ease of coming at it. They advised bringing into the farm-houses the water of such springs as never dried up; or, if there was no such spring within the farm, to bring running water as near to it as possible; or to dig for well-water, not of a bitter or brackish taste. If neither of these was to be found, they directed large cisterns to be provided for men, and ponds for collecting and retaining rain-water for cattle. They esteemed that running water to be best for drinking which had its source in a hill; spring or well-water from a rising ground was deemed the next best; well-water in the bottom of a valley was held to be suspicious; and marshy or fenny water, which creeps slowly on, was by them rightly regarded as the worst of all.

The nature of the soil of a farm may be ascertained either by analysis (see ANALYSIS), by observation of the weeds which flourish upon it (see BOTANY and WEEDS), and of the trees growing in the hedge rows (see PLANTATIONS). The elm and the oak are commonly tenants of good soils; the birch, the holly, and the ash indicate those which are poor. And again, the productiveness of a soil may be estimated from the degree of its attraction for the insensible moisture of the atmosphere; by the substratum on which it rests (see GEOLOGY); and by its inclination. There are many other circumstances, also, which the farmer in search of a farm should regard, most of which he will find treated of in this work under the heads APPRAISEMENT, AGREEMENT, CUSTOMS OF COUNTIES, CAPITAL required, RAIN, LEASE, &c. Let him also closely examine the state of the buildings, the mode in which the farm has been cultivated, and the course of cropping which the out-going tenant has followed. This last inquiry is one very material point to be carefully and accurately ascertained.

The number of farms in the United Kingdom is estimated to be about 2,000,000, and the property annually derived from agriculture at 215,817,624*l.*

There are in —

	Cultivated Acres.	Uncultivated Wastes cap ble of Improvement.	Barren and Unprofitable.	Total.
England -	25,632,000	3,454,000	3,256,400	32,342,400
Wales -	3,117,000	530,000	1,105,000	4,752,000
Scotland -	5,265,000	5,950,000	8,523,930	19,441,944
British Isles -	383,690	166,000	569,469	1,119,159
Total -	46,922,970	14.600,000	15,871,463	77.394,433

In England and Wales it is calculated that there are

3,250,000	acres employed in the cultivation of	wheat.
1,250,000	.. ..	barley and rye.
3,200,000	.. ..	oats, beans, and peas.
1,200,000	.. ..	clover, rye, grass, &c.
1,200,000	.. ..	roots and cabbages by the plough.
2,100,000	.. ..	fallows.
47,000	.. ..	hop grounds.
18,000	.. ..	pleasure grounds.
17,300,000	.. ..	depastured by cattle.
1,200,000	.. ..	hedge rows, copses, and woods.
1,300 000	.. ..	ways and water courses.
5,029,000	.. ..	common and waste lands.

FARM ACCOUNTS. The necessity and utility of correct and detailed particulars of all matters concerning the farm, have already been spoken of under the head BOOK-KEEPING. Let any farmer make the experiment, and he will find it both interesting and useful, to know from year to year the actual products of his farm. Let every thing, therefore, which can be measured and weighed, be so tested; and let that which cannot be brought to an exact standard be estimated, as if he himself were about to sell or to purchase it. Let him likewise, as near as possible, measure the ground which he plants, the quantity of seed which he uses, and the manure which he applies. The labour of doing this is nothing compared with the satisfaction of having done it, and the benefits which must arise from it. Conjecture, in these cases, is perfectly wild and uncertain — varying often, with different individuals, almost 100 per cent. Exactness enables a man to form conclusions which may most essentially, and in innumerable ways, avail to his advantage. It is that alone which can give any value to his experience; it is that which will make his experience the sure basis of improvement; it will put it in his power to give safe counsel to his friends; and it is the only ground on which he can securely place confidence in himself.

FARM BUILDINGS. In the construction of farm buildings, the first thing to be regarded is the convenience of their situation; and to this end must be considered the best shelter, feeding, and watering of live stock; the carriage of the crop, and of manure, and the preservation of the produce. To combine all these a
together is rarely attainable; t
with the practical farmer is to
many of them as possible. The
economical construction of farm
some years since, engaged the at
the Highland Society of Scotland,
their report (*Trans.* vol. ii. p. 36
in this article derive material
The reader who wishes for work
will derive every information from
committee say, very justly, "one o
common errors in these desig
crowding the buildings together,
idea of giving them greater co
and the not sufficiently exte
shelter sheds for the feeding of cat
is a fault so universal that it is o
larger class of breeding and fee
in the border counties of Eng
Scotland that experience has taug
fully to avoid it. In giving desi
outhouses of a farm, little mo
done than to give general useful
Although a certain similarity mu
the form and arrangement of th
all such buildings, yet these
modified according to the circum
the farm itself, the nature of th
situation with regard to market
particular kind of management
sued. No one rule that can be
general application, and the ju
the architect must be shown, i
the size, form, and arrangeme
buildings to the nature of the far
wants of the occupier. While eve
accommodation should be affor
tenant, it is the province of the
take care that the heavy co
buildings be not unnecessarily
either by erecting buildings that
or by giving unnecessary dim
such as are requisite. It may
larly remarked that the giving u
breadth to the buildings adds m
the expense by increasing the di
the timbers, and adding to the
roofs. At the same time car
taken that in the cow-houses
the animals shall not be cramp
want of necessary room. In
may be said that the most con
rangement of the outhouses of
the form of a rectangle, the side
being open, and the farm-house b
at some convenient distance in
And again, the most approve
keeping and feeding the large
kinds of cattle is in small shed
yards attached, each capable of
animals. It is recommended tha
course from the stables, cow-

ds should be carried off by causewayed n channels to a pond or tank near to the dings. This mode of conveying away receiving the urine is conceived to be r in ordinary cases than sewers below nd, which, even when executed in the manner, will be subject to be choked rom want of necessary attention to ing; and such sewers become nur- for rats, notwithstanding every pre- on that can be taken. Should the situ- of the buildings incline to the north, uits can be made through the north t below the floors, at proper places, for rging the liquids.

or watering cattle, if a stream cannot tained, there are few situations where r cannot be got by sinking a well; the way is to raise it into a cistern, which be placed in any of the shelter yards, from this be conveyed by pipes to the ent yards, furnished with proper cis- and ball-cocks. The passages and nces to the buildings should be wide; gates hung on wooden posts or hewn pillars. A house for an overseer, or especially on considerable farms, is ble; carpenters' and smiths' shops very desirable.

In making a calculation of the expense of buildings, the corners, ribbets, arches, ews are supposed to be of hewn the wood Memel, the roofs of slate, idges and flanks covered with lead, and ost and workmanship of all the ma- are included, except the prime cost es."

ASON'S WORK. The foundations to be with flat bedded stones, laid in regular es; the whole area of the dressing and low granary floors should be laid with small broken stones, forming the ness of 9 inches; the sleepers to be on the inside scarcements, and the remaining space of 14 inches to be up with solid brick or stone work, rly packed with lime. To have a of plaster ¾ of an inch thick on the he surface of the plaster being kept an inch below the top of the sleepers, are to be taken that the sleepers are g on flat stones at short distances; ne which is applied next to the walls and to be mixed up with a portion of n glass. This, if carefully done, will the barn floor free from vermin, and revent it from sinking. The straw to be done in the same way, only the e building above the small stones is to ly 12 inches deep, and to have a com- on floor laid above of 3 inches thick, broad, and where the straw falls from kes to be laid with large flags. The door soles of the barns to be laid 6 inches, and those of the cow-houses and stables 3 inches above the causeway on the outside.

Walls. The thickness of the barn walls above the door sole to be 2 feet 3 inches; above the second floor to be 2 feet and beam filled at the top; for low buildings above the door sole to be 2 feet, and likewise beam filled at the top. Division walls to be 18 inches thick, and carried to the top; the walls of courts or yards to be at least 1 foot below the general surface.

Conduits. If water be carried away by under-drains, the great common sewer or discharging conduit to begin in a central part of the office, to be 27 inches wide, and 42 inches high, to allow of a person going in to cleanse it.

Causewaying. The stables, cow-houses, calf-houses, piggeries, &c. to be laid with limestone causeway or bricks set in sharp sand. The settles for carrying off the urine to have 2, or at least 1½ inch fall to 10 feet. The run channels for stables to be 10 feet from the wall, and the rise from the channel to the rack to be 5 inches. The channels for cow-houses to be 9 feet from the wall, the rise from the channel to the sole tree to be 4 inches. The area round the yard to be causewayed, and to have proper channels with two inches declivity to the 10 feet, made so as to carry to the settling pits.

CARPENTERS' WORK. *Roofing.* The couple sides for houses of 15 or 16 feet wide to be 6½ inches at bottom, 5½ inches at top, and 2½ inches thick, with a balk 6 by 2½ inches, fixed as near the middle of each couple as possible, with double garron nails, and properly riveted.

Joisting and flooring. The sleepers in the dressing barn and the low granary floor to be 6 by 2½ inches, built in as described for the mason's work. The joisting in the loft for unthrashed corn and granaries to be 10 inches deep by 2½ thick, with 1 foot of wall-hold. Joistings and sleepers laid at 20 inches from centres, all covered with drain timber battens; under floors to be plain jointed, and douled with iron douls. The upper floor to be tongued and feathered on the joints, and fixed down with good flooring sprigs. The cart-sheds to have a joist built into the wall at each pillar, 8 inches by 2½, and the wall plate nailed down on the top of it. Those that have metal pillars should have lintling-beams 9 inches by 12 broad, and the end of the joist tenanted 2 inches into the lintel, to have an iron strap, split on the end, and put on the top with screw bolts to fix the joist and the lintel together.

Doors. The doors of deals — not more

than 6½ inches broad, 1¼ thick, beaded on the edges, and grooved and tongued on the joints, with 3 cross bars to each, 9 inches broad, 1½ thick. Those of the stable, cow-house, and barn doors to be 3 feet 6 inches wide, and hung in two leaves where necessary.

Windows. The frames of the lower windows of barns, stables, cow-houses, &c. to be 2 inches thick, with boards below, 16 or 18 inches high, hung on the frames with cross-tailed bands, and glazed above with second crown glass. For those where glass is unnecessary, weather-boards, 6 inches broad, 1 inch thick. The lower windows of the barn to be secured by iron bars 1 inch square, and not more than 5 inches apart. The dressing barn and granaries to have skirting boards 8 inches broad, by 1 thick, nailed on bond timber built in the walls.

Trevises, Racks, and *Mangers.* The hind posts of the trevises to be 8 feet 6 inches long, 6½ inches square, made in the octagon form, above the level of the pavement; to be sunk 3½ feet below the level of the pavement, and to be solidly built round, 3 feet in diameter, with stone and lime mortar. The posts to be charred at their ends as far as they are beneath the ground; their tops to stand 6½ inches above the trevise boards, and to be rounded. The height of the fore-posts to be 9 inches above the top of the racks, 4½ by 2 inches, and their foot set in stones, one on each side of the boards.

Racks, to be 2 feet 10 inches broad; the sides to be 4 by 2½ inches, and the spars to be 2¼ inches by 1¼ inches, sunk ⅝ inch into the sides at the distance of 3¼ inches apart.

Mangers, to be 20 inches at the top, by 16 at the bottom, and 10 deep. The wood to be 1½ thick at the bottom, and 1¼ at the sides.

Plaster work. The stables for saddle horses to have one coat of plaster on the walls, and the ceilings to be all lathed and plastered with two coats of plaster.

Slate work. The whole of the roofs to be covered with slates. The slates to have 2 inches of cover over the nail at bottom, and diminishing gradually to 1½ inch at the top, put on with nails of 12 lbs. to the 1000 boiled in linseed oil; ridges and flanks covered with milled lead, 12 inches broad, 6 lbs. to the square foot.

Court or yard gates. Gates to be sunk 3 feet into the ground, and charred as far as they extend into the ground. The posts to be 9 inches square, champered on the corners, and set 3 inches clear of the pillars — to stand 9 inches above the gate, and built in the ground with stone and lime, 4 feet in diameter.

Painting. The whole of the outside doors, windows, and gates to get th
paint: the windows to get
being glazed.

Wood, to be of Memel timb
and granary floors may be l
batens.

GENERAL ESTIMATE. *For t*
ings of a farm of 1000 acres
tion of crops and pasture,
partly in breeding, and par
stock, the expense is in the
committee of the Highland
whence this paper is chi
according to a plan there gi
a good and substantial man
the prime cost and workm
materials, but exclusive of
of carriage, and the prime
and also of servants' hous
shop and smithy, to be abo
if the roof is covered with
There is another plan and esti
ing, to 1600*l.* with slate roof,
tiles.

For the farm buildings of
acres kept in a rotation of cro
there are two plans, the estim
are, exclusive of the cost of
the prime cost of stones, abo
slates, and 1020*l.* with tiles:
plan, about 1190*l.* with slates,
tiles.

For the buildings for a far
kept in a rotation of crops,
plans, which, with the bef
exceptions, are, 1st. plan,
covered with slates, and 47
and the 2nd., about 550*l.* cove
and 465*l.* if with tiles.

For a clay land arable far
not producing turnips, and
wholly, in tillage, 1260*l.* cove
and 1020*l.* with tiles.

For a dairy farm of 500 a
rotation of crops and grass,
supposed to be hay or past
with tiles, 1000*l.*

For a farm of 200 acres
town employed wholly in til
stock is kept but horses an
and where the whole produc
or 470*l.*

For a mixed stock farm in
employing a pair of horses,
322*l.*

For a cottage farm of 25 a
slates, or 150*l.* with tiles, an
amounting to 164*l.* and 130
volume of *Brit. Husb.* (*Lib*
there are some admirable
buildings on various scales.
Soc. vol. ii. p. 365.; *Low's P*

FARMER. (Sax. feopme

person whose business or employment is e cultivation of land, the breeding, rearing, d feeding of different sorts of live-stock, d the management of the various products hich are afforded by them: hence those gaged in this way may be further distin- ished into arable, grazing, dairy, hay, and her kinds of farmers, according to the odes in which their farms are cultivated employed. "The British farmer," says writer in the *Lib. of Use. Know.* (*Flem. ub.* p. 3.) "is generally a man of superior ucation to the Flemish peasantry;" and, might have added, to those of all other tions.

The farmers of Great Britain may be ar- ged into the following classes: 1. The at proprietors and country gentlemen. Yeomen and farmers, properly so called. Possessors of small farms. 4. Cottagers, uding different descriptions of people, o cultivate small farms, and a few acres oining to towns and villages.

A considerable portion of the cultivated d in Britain is possessed by the propri- s, and such as generally reside on their tes, who may therefore very properly be minated country gentlemen. Exclu- e of the domains or lands around their er-houses, these proprietors commonly d farms, which are kept under regular es of cultivation. Many of these merit commendation for their steady and aried attention to that great source of onal wealth, the introduction of better ems of husbandry; while others have farther, and not only endeavoured, by precept and example, to induce tenants to adopt such systems as they experience had found beneficial, but granted leases of such duration, and on so liberal, as induced men possessing ledge, enterprise, and capital to apply elves to the art of husbandry.

regard to the second class, or the en and farmers, properly so denomi- , they may be considered the strength e state. The yeoman and the farmer alluded to, differ only in one particular; ands which the former cultivates are in part or in whole his own property, the latter rents his farm from another. egard to industry, perseverance, and tion to business, there is no difference. y in their situation, removed on the and from the vanities and superfluities gh life, and, on the other, by their t industry, from the fear of poverty, mprovement of their farms constituting chief study and delight, they spend days in independence, enjoying health ll the rational comforts of life.

s remarked, concerning the third class, that in all the best cultivated parts of Great Britain, as well as where improvements have not become general, there are many small farms. These, though not as yet in every case managed in such a manner as to produce the greatest crops which the soil is capable of yielding, are, however, much better cultivated than they were thirty or forty years ago; and the spirit for improvements among tenants of this description appears to be more general than at any former period; although, from the want of capital, and the little attention generally paid to them by their landlords, added to their own attachment to ancient prejudices, they are yet very far from having attained that degree of usefulness, in an agricultural view, to which, by adopting proper means, they may be advanced. The possessors of small farms are, however, very useful and valuable members of the community; honest, peaceable, and industrious, they breed up their children in the same principles, and to these is our island most indebted for a never-failing supply of virtuous and useful citizens.

The fourth class, or cottagers, are those who either reside in the neighbourhood of large farms adjoining to moors or commons, or in small hamlets. They generally possess a few acres of tillage-land, from the cultivation of which, together with what they receive for labour performed for the farmers, or from carrying on the occupations to which they had been bred, they are enabled to maintain their families, and to be of great service in the business of cultivation. For the most part industrious, and inured to labour, they bring up their children not only without becoming burdens on the public, but in such a manner as to render them extremely useful as members of society. These hamlets and cottages are also nurseries whence the British farmer draws his constant supply of labourers.

Those who cultivate small farms adjoining to towns or villages may be described under two characters: — The first are such as reside in towns, and are engaged in commerce and manufactures; but who, for their amusement, or the convenience of their families, possess small farms in the neighbourhood. These may be denominated good farmers, only in a national point of view. Their farms are indeed well cultivated, the crops luxuriant, and a full proportion, corresponding to the extent of the farms, comes to market; but owing to their time and attention being occupied with other matters, in the success of which they are more immediately interested, few of them derive much benefit from their farming operations. The reason is obvious;

there is no business requires more unremitting care than that of husbandry: and, though people so employed may have it in their power to pay attention to the great leading points, as that of seed-time and harvest, it is not to be supposed they can spare time to superintend the execution of many of those more minute operations, on the proper attention to which the profits of a farm, particularly one so situated, principally depend. The second are those who reside in or immediately adjoining to towns, and farm so as to enable them to keep milch cows, or two or three horses to hire, either for the saddle or the cart. It is only necessary to say, that as, on account of local situation, they commonly pay very high rents for their lands, they therefore find it to their interest to cultivate them in the best manner, so as to insure the greatest possible crops. The uses to which these crops are applied, it will be readily admitted, tend in a material degree to the convenience and accommodation of the inhabitants; and therefore this description of cultivators are to the inhabitants of these towns and villages what the British farmers are to the nation at large, namely, the means by which they are furnished with many of the necessaries and comforts of life.

FARM GATE. See GATES.

FARM HOUSE. The dwelling occupied by a farmer. The principal objects to be attended to in erecting a farm-house are, convenience, and a salubrious situation. Besides the general salubrity of the spot where dwellings are to be erected, the air, water, and soil also require to be particularly attended to: the first should be pure and temperate; the second wholesome, and easily obtained. The most healthy and convenient site on the farm ought to be selected for building the house; easy access and central situation being taken into consideration. An abundant supply of water for domestic purposes, and for live stock, is indispensable. The water, however, should not be stagnant. Ponds in the immediate vicinity of a house are not essentially injurious, unless they become dry in summer, or towards autumn: for at the period between the drying up and the complete dryness of ponds, or stagnant pools, the decomposition of animal and vegetable matter which is then proceeding evolves miasmata that generate disease. A dry gravelly soil, through which the rain can freely percolate, is to be preferred. The degree of dampness of a locality may be always pretty correctly estimated by observing the quantity of moss and lichens upon the trees; and the weeds being those that grow in marshy situations.

FARMING. The business
ment of a farm, comprehendin
circumstances and conduct of i
It is a practice that demar
care and attention, as well as m
and judgment, to conduct it in
advantageous manner. It req
timate and practical knowledg
arts of cultivation and managen
as of the nature and value of e
live stock; and still further, a
quaintance with the various mod
and selling, and the constant
ferent markets and fairs. In
all these, there are several othe
much consequence to the suc
farmer, which will be treated of
respective heads.

Farming, once regarded as
easy to be understood and
followed only by the empiric, ha
been viewed in a different,
manner. It has been justly s
pursuit requires more talent,
verance, and more careful obser
the cultivation of the earth;
from its being an empirical
is, in fact, one that several ot
illustrate and assist — one, whos
cannot too often examine the
other cultivators; and hence,
been found that the labours of
the botanist, the mechanist, a
logist, are all available in the se
farmer, it has followed as a na
quence, that the farmers of o
become a more scientific, mor
and a far more enlightened clas
of any previous generations.

FARM-SERVANTS. Suc
servants and out-door labou
requisite for performing the
the farm. These are either
in the farmer's house, with
terly wages, or accommodate
tages, and the grass of a cow
allowances, and certain money
each day's labour. The syste
ploughmen and carters to d
farmer's table was very comm
times; but now that separate
separate rooms are kept, excep
classes of small holders, it is m
employ married labourers and t
who live in their own cottage
perhaps one or two young me
constantly to cattle and tho
necessary at extra hours. Som
statements regarding the pra
farmer, as it affects the condi
English and Scotch labourers,
the first volume of *Brit. Hus*
Doyle's Prac. Husb.)

I YARD. The area or court in
e farm buildings are situated, and
enerally adjoins the farm-house.
place where cattle are foddered,
pared, and several other necessary
s belonging to the farm performed.
I-YARD MANURE. Of all fer-
e most universal and most valuable
ltivator, and yet the most gene-
managed, is farm-yard manure,
been often well described as the
heet anchor. From this fertiliser,
have derived some benefits, even
was compelled, by the increase of
, to cultivate and manure his land.
arliest mentioned of all manures;
at first, the only notice we meet
ng and dunghills, describes them
ed in Palestine for fuel; and, to
the barren deserts of the East,
camel, after being dried in the
e only combustible article the
sess. (*Ezekiel*, iv. 12. 15.; *Nie-*
age, i. 121.) This manure is
the earliest agricultural writers.
tells us, in his fourth chapter,
to have a large dunghill; keep
ost carefully; when you carry it
it and pulverise it: carry it out
mn. Lay dung round the roots
es in autumn." And in his 29th
ivide your manure; carry half of
d where you sow your provender:
e are olive trees, put some dung
ots." And in c. 37., he advises
f pigeons' dung for gardens,
nd corn land, as well as *amurca*,
e dregs of oil; and recommends
to preserve carefully the dung
iptions of animals. These direc-
given 150 years B.C.; after a lapse
000 years, the direction to the
t still be the same; little can be
he advice of Cato, when he said,
have a large dunghill." Virgil
re particular; in his description
rs, he mentions with common
hes (*Georg*. l. i. v. 80.) *Pumice-*
hells (l. ii. v. 346—350., and 350
arro (c. 38. l. i.) mentions many
imal manure, and is particularly
his enumeration of the dung of
includes even that of blackbirds
es kept in aviaries. Columella
advises the cultivator not to
to the field more dung than
ers can cover with the soil the
as the exposure to the sun does
able injury; and he enumerates
) as well-known fertilisers, night-
xcrements of birds and sheep,
cially for apple trees and vines),
il, the excrements of cattle, of
the ass, the goat, of pigs; ashes, chopped stalks of the lupine leaves, of trees, brambles, &c., and mud from sewers or ditches.

Of the early inhabitants of Britain, Pliny tells us (b. xvii. c. 6, 7, 8.) that they highly valued the use of marl for particular soils, but on other lands they never employed it. We are told that they grew corn, and lived in houses thatched with straw, which would necessarily require an attention to fertilisers. They had also, according to Strabo (*Geography*, p. 306.), gardens, which could not have been cultivated, neither could their apple orchards have flourished, without manure. The Roman invasion taught the original inhabitants better modes of using fertilising materials; but their Saxon successors, in all probability, knew less of agriculture than the natives. War and fighting was *their* profession; they held the husbandman in much contempt. The confusion attendant upon British, Saxon, and Danish inroads, still farther retarded, in England, the progress of agriculture, which never prospers in a poor disturbed country. The very laws made in those days for its encouragement show to what a low ebb the art of cultivating the land was then reduced. Thus it was provided, that if any one laid dung upon a field, the law allowed him, if the owner of it consented, to use it for one year; and if the quantity of manure conveyed was in considerable quantities, so as to render it necessary to employ a cart, he was then entitled to use the land for three years; and if any person, with the consent of the owner of the soil, folded his cattle on it for the space of a year, he was then entitled to cultivate it for four years for his own benefit. (*Leges Walliæ*, p. 298.) All these laws were evidently for the purpose of encouraging the better manuring of the land; but the necessity of such an inducement betrays the poverty of the farmers of those days, and the insufficiency of their live stock. In the middle ages little was done for agriculture. The monks, after the introduction of Christianity, were the most learned and skilful in the best modes of applying manures. They early excelled in their gardens. The population of England in those days, however, was too limited to require the cultivation of inferior soils.

In 1570, Conrad Heresbach, a learned German, published his four books of husbandry, which were translated by Googe: he there mentions the several descriptions of manure employed in his days. His book is a strange mixture of good sense and superstition. He speaks of the dung of poultry and pigeons with much approbation; but reprobates the use of that of geese and ducks. Human fæces, he says, when mixed with rubbish, is good; but, by itself, is too hot. Urine he commends highly for apple trees and vines. Of the dung of animals, he mentions that of the ass as first in order for fertilising effects; then that of sheep, goats, oxen, horses; lastly, swine, "very hurtful to corne, but used in some places for gardens." Green manure was used in his days. "Where they have no store of cattle, they use to mend their ground with straw, fern, and the stalks of lupines, and the branches, laid together in some ditch. Hereunto you may cast ashes, the filth of sinks and privies, &c." And again he says, "The weeds growing about willow trees and fern, &c. you may gather and lay under your sheep." He speaks of the practice of placing turfs and heath clods in heaps, with dung; much in the same way as Lord Meadowbank has advised with peat. He also advises the placing of the same turf parings in sheep-folds. "This is also to be noted," says our author, "that the doung that hath lyen a yeere is best for corne, for it both is of sufficient strength and breedeth less weedes; but, upon meadowe and pasture you must laye the newest, because it brings most grasse, in Februarie, the moone increasing, for that is the best time to cause increase of grasse." When, however, the manure is applied for corn lands, "looke that the winde be westerly, and the moone in the wane."

The manure commonly furnished by the farm-yard is compounded of a mixture of animal and vegetable substances, of the putrefying straw of various descriptions of grain, mixed with the excrements and urine of cattle, horses, and swine. The mixture forms no new substance, neither does the putrefaction which ensues add to the bulk of the dung; on the contrary, it causes a considerable loss of weight. Neither is the manure produced equal to the amount of food the stock consume. "If," says Dr. Sprengel "we weigh the dry food given the cattle to eat, and also dry and weigh the resulting excrements, we shall find the weight of the latter considerably less than that of the former. Block, who has lately made a great number of experiments on this circumstance, found that 100 lbs. of rye straw yielded only 43 lbs. of dried excrement (liquid and solid), while 100 lbs. of hay gave 44 lbs. Food which contains many watery parts furnished, as may be naturally supposed, a still smaller proportion. Thus, for instance, 100 lbs. of potatoes gave only 14 lbs.; 100 lbs. of mangol-wurzel 6 lbs., and 100 lbs. of green clover, 9¼ lbs. of excrement." (*Transl. by Mr. Hudson, Jour. R. Ag. Soc.* vol. vi. p. 460.)

It will assist us very materially in our examinations of various modes of prepa and applying manure, if we first exa its chemical composition; and for that pose I will give the analysis of straw the fæces and urine of animals.

1000 parts of dry wheat straw being b yielded M. Saussure 48 parts of ashes same quantity of the dry straw of b yielded 42 parts of ashes. The portion sipated by the fire would be princi carbon (charcoal), carburetted hydr gas, and water: 100 parts of these are composed of—

Various soluble salts, principally carbonate and sulphate of potash	
Phosphate of lime (earthy salt of bones)	
Chalk (carbonate of lime)	
Silica (flint)	
Metallic oxide (principally iron)	
Loss	

The straw of barley contains the ingredients, only in rather different pr tions.

The fresh urine of the cow has analysed by Mr. Brande; he found in parts the following ingredients :—

Water	
Phosphate of lime	
Muriate of potash, muriate of magnesia	
Sulphate of potash	
Carbonate of potash, carbonate of ammon	
Urea	
Loss	

The urine of cattle, after it had putrefying for a month, was analys Dr. Sprengel, and found to contain the lowing ingredients :—

		Parts by w
Water		
Urea, and resinous matter		
Mucus		
Benzoic acid	Combined with potash, soda, and ammonia, forming salts	
Lactic acid		
Acetic acid		
Carbonic acid		
Ammonia partly uncombined		
Potash		
Soda		
Sulphuric acid		
Phosphoric acid		
Chlorine		
Lime		
Magnesia		
Sulphuretted hydrogen		
Silica		
Oxide of iron		
Sediment (phosphate and carbonate of lime, and magnesia, alumina, &c.)		
(*Jour. Roy. Agr. Soc.* vol. vi. p. 467.)		10

ding to Block, 100 lbs. of chopped
aw, given as fodder to horses,
lbs.; 100 lbs. of hay, 45 lbs.;
of oats, 51 lbs.; 100 lbs. of rye,
dried excrements (fluid and solid).
excrements of horses fed on hay,
straw, contain, according to the
of M. Zierl, in 1000 parts —

	Parts.
	698
and salts	20
nd extractive matter	17
atter, albumen, mucus, &c.	63
e fibre, and remains of food	202
	1000

, when burnt, yielded to the same
60 parts by weight of ashes, which
nposed of —

	Parts.
e, sulphate, and muriate of soda	5
e and phosphate of lime	9
	46
oy. *Agr. Soc.* vol. i. p. 489.)	60

parts of the urine of the horse con-
cording to the analysis of MM.
y and Vauquelin (*Thomson's Chem.*
p. 348.) —

	Parts.
te of lime (chalk)	11
te of soda	9
of soda	24
of potash	9
	7
d mucilage	940
	1000

fæces of cattle fed principally on
have been analysed by M. Einhof.
ts evaporated to dryness yielded
ts of solid matter; the 71⅞ parts
drying would consist principally of
d some ammoniacal salts. In half
, or 3840 grains, he found 45 grains
; and by diffusing it through water
ined about 600 grains of a yellow
matter, resembling that of plants,
with a very considerable quantity of
atter. By evaporating the fæces to
, and then burning them, he obtained
which contained, besides the sand,
wing substances: —

	Parts.
	12
te of lime	12·5
a	2
	5
, with some manganese	14
	52
and sulphate of potash	1·2

The ingredients of which the urine and fæces of cattle are composed will, of course, differ slightly in different animals of the same kind, and according to the different food upon which they are fed; but this difference will not in any case be found very material.

The excrements of the sheep have been examined by Block: according to him, every 100 lbs. of rye-straw given as fodder to sheep yield 40 lbs. of excrements (fluid and solid); from 100 lbs. of hay, 42 lbs.; from 100 lbs. of potatoes, 13 lbs.; from 100 lbs. of green clover, 8½ lbs.; and from 100 lbs. of oats, 49 lbs. of dry excrement. The solid excrements of sheep fed on hay were examined by Zierl: 1000 parts by weight, being burnt, yielded 96 parts of ashes, which were found to consist of —

	Parts.
Carbonate, sulphate, and muriate of soda	16
Carbonate and phosphate of lime	20
Silica	60
	96

100 parts of the urine of sheep kept at grass contained —

	Parts.
Water	96·
Urea, albumen, &c.	2·8
Salts of potash, soda, lime, and magnesia, &c.	1·2
(*Journ. Roy. Agr. Soc.* vol. i. p. 482.)	100·0

The urine of the pig has been examined by Dr. Sprengel (*ibid.* p. 492.): he found in 100 parts of that of the animal fed on corn offal —

	Parts.
Water	92·6
Urea, mucus, albumen, &c.	5·64
Common salt, muriate of potash, gypsum, chalk, and glauber salt	1·76
	100.00.

Such are the principal constituents of the manure from a farm-yard; but of these, most of the soluble salts are usually washed away by the rain, or are suffered to drain away into ditches, while a considerable quantity of the salts of ammonia and some of the carbon are commonly lost by being either over-heated, or by being allowed to remain too long in a putrefying state.

Farm-yard manure has a very considerable attraction for the moisture of the atmosphere: some experiments to ascertain its extent I have given under the head MANURE.

There have been many arguments and much difference of opinion among cultivators, with regard to the advantages of employing dung in a fresh or in a putrid state; and, as is too often the case, both parties have run into extremes, the one side contending for the propriety of employing it quite fresh from the farm-yard, the other contending that it cannot well be too rotten. The mode employed by Lord Leicester is the medium between these equally erroneous extremes. He found that the employment of the fresh dung certainly made the dung go much farther; but then a multitude of the seeds of various weeds were carried on to the land along with the manure. He has, therefore, since used his compost when only in a half putrefied state (called short dung by farmers); and hence the seeds are destroyed by the effects of the putrefaction, and the dung still extends much farther than if suffered to remain until quite putrefied.

Putrefaction cannot go on without the presence of moisture. Where water is entirely absent there can be no putrefaction; and hence many farmers have adopted the practice of pumping the drainage of their farm-yards over their dung heaps; others invariably place them in low damp situations. This liquid portion cannot be too highly valued by the cultivator. The soil where a dunghill has lain in a field is always distinguished by a rank luxuriance in the succeeding crop, even if the earth beneath, to the depth of six inches, is removed and spread with the dunghill.

The controversy, too, which once so keenly existed, as to the *state of fermentation* in which dung should be used on the land, has now pretty well subsided. There is no doubt but that it cannot be applied more advantageously than in as fresh a state as possible, consistent with the attainment of a tolerably clean husbandry, and the destruction of the seeds of weeds, grubs, &c., which are always more or less present in farm-yard dung. These are the only evils to be apprehended from the desirable employment of this manure in the freshest state; for otherwise the loss of its most valuable constituents commences as soon as ever fermentation begins. This was long since demonstrated by Davy, whose experiments I have often seen repeated and varied. He says, "I filled a large retort, capable of containing three pints of water, with some hot fermenting manure, consisting principally of the litter and dung of cattle; I adapted a small receiver to the retort, and connected the whole with a mercurial pneumatic apparatus, so as to collect the condensible and elastic fluids which might arise from the dung. The receiver soon became lined with dew, and drops began, in a few hours, to trickle down the sides of it. Elastic fluid likewise was generated; i
thirty-five cubical inches had
which, when analysed, were fou
twenty-one cubical inches of c
the remainder was hydrocarb
with some azote, probably no m
isted in the common air in the r
fluid matter collected in the re
same time amounted to nearly h
It had a saline taste, and a
smell, and contained some ace
bonate of ammonia. Finding s
given off from fermenting litter,
the beak of another retort, fille
dung very hot at the time, in the
the roots of some grass in the bo
den; in less than a week a very
effect was produced on the gra
spot exposed to the influence o
disengaged in fermentation i
much more luxuriance than th
other part of the garden." (*Lec*

Nothing, indeed, appears at
simple as the manufacture and
farm-yard dung; and yet ther
sources of error into which the
sure to fall, if he is not ever vig
management. The late Mr. F
in his valuable tract upon the
of farm-yard manure, dwells u
these; he particularly condemn
"of keeping the dung arising f
descriptions of animals in sepa
departments, and applying the
without intermixture. It is c
adds, "to keep the fattening
yards by themselves; and the
produced is of good quality,
excrement of such cattle is ric
of lean ones. Fattening cattle
oil-cake, corn, Swedish turn
other rich food; and the refuse
such food thrown about the y
the value of the manure: it als
pigs to the yard. These rout
dung about, in search of grain
of Swedish turnips, and other fo
means the manure in the yard b
intimately mixed, and is p
increased in value. The feedin
cribs in the yard should, for ob
be shifted frequently."

"The horse dung," continu
usually thrown out at the stab
there accumulates in large h
sometimes spread a little abo
generally not at all, unless wh
for the convenience of ingres
or perhaps to allow the water
from the stable door. Horse d
such heaps, very soon ferment
to an excess; the centre of
charred or burned to a dry wh

ermed *fire-fanged*. Dung in
s from 50 to 75 per cent. of its
diligent and attentive farmer
ainst such profligate waste of
never allowing the dung to
any considerable quantity at
rs. The dung from the feeding
ld also be carted and spread
re cattle yard, in the same
e horse dung. (*Blakie on*
ng, p. 6.) There is no doubt
r fertilising effects of horse-
experiment with beans, in
s were manured with horse-
with that from a cow-yard,
l more beans than the nine.
Essex, vol. ii. p. 280.) The
on was made in Lincolnshire.
r., p. 214.) The heat pro-
fermentation of the dung of
ls has been made the subject
xperiment. When the tem-
air was 40°, that of

n-yard dung was - 70°
lime, dung, and earth - 55°
swine and fowls' dung 85°
Magazine, vol. x. iv. p 160.)

or will readily allow the ad-
e plan thus recommended by
ad the student must see from
xperiments, that the dung of
ls differs very much in their
ers.

ed table contains the results
ments made with three dif-
s on the growth of potatoes,
of Mid Lothian; the cow and
re recently made; the potatoes
scription called Pinkeyes, and
about eighteen cwt. per acre
d of each manure. (*Ency.*
i. p. 61.)

Produce per Acre				Value per Boll.	Value per Acre.			Cost of production.			Price of Manure per Cart.	
B.	F.	P.	L.		l.	s.	d.				s.	d.
42	0	0	0	8	16	16	0	25	8	6	4	0
47	0	0	0	8	18	17	6	23	8	0	3	0
42	0	0	0	8	16	16	0	24	8	0	3	6
60	0	0	0	8	24	0	0	24	8	0	4	0
51	2	8	0	8	23	0	0	22	8	0	3	0
45	0	0	0	8	18	0	0	23	8	0	3	6
60	1	0	0	8	24	2	0	22	0	0	3	0
61	0	3	0	8	24	9	6	24	0	0	4	0
39	0	0	0	8	15	12	0	23	0	0	3	6
65	2	2	0	8	26	13	0	23	13	0	4	0
66	2	2	0	8	26	13	6	21	13	0	3	0
46	3	2	0	8	18	15	0	22	13	0	3	6
63	0	3	0	8	25	5	6	23	10	0	4	0
67	2	2	1	8	27	0	7¼	21	10	0	3	0
47	0	0	0	8	18	16	0	22	10	0	3	6

Com. of Mod. Husb. vol. ii.
so *Brit. Husb.* vol. i. p. 260.)
stimate of the number of cubic
of farm-yard compost neces-
us soils per acre, which is as

On strong Land.		Loams.	Gravels.	Chalks.	Sands.
For Wheat	30	20 to 25	25	20	20
Barley	25	20	22	16	18
Turnips	30	20	25	20	20
Clover	15 to 20	15	20	16	16
Sainfoin	—	—	—	20	—
Pasture	15 to 20	15	16	16	16

Some experiments of Mr. Wright, made upon plots of ground of equal size, indicate the number of stems of barley produced by various fertilisers: each plot was dibbled with 60 corns of barley. (*Agr. Mag.* vol. i. p. 328.)

No.					No. of Items.
1.	No manure	-	-	-	159
2.	Manured with	5 tons of	Cow dung	per acre	167
3.	—	—	Horse do.	—	226
4.	—	—	Pig do.	—	233
5.	—	—	Sheep do.	—	244
6.	—	80 bush.	Coal ashes	—	233
7.	—	—	Wood do.	—	211
8.	—	—	Goose dung	—	185
9.	—	—	Hen do.	—	303
10.	—	—	Duck do.	—	282

With regard to the form of dung yards, there is some little difference of opinion. "Some theorists," says Blakie, "recommend the yards to be made so concave, as almost to amount to a *well*-shape, giving as a reason, in support of their opinion, that the virtues of dung can only be preserved by being saturated in urine, or some other moisture. Others again assert that dung yards should be formed convex, and assign as their reason, that farm-yard dung should be kept dry. Practical experience points out that a medium between those two extremes is the best; and a yard a little hollowed is the most common shape. (*On Farm-yard Manure*, p. 7.)

I will here introduce the description recommended by Mr. Blakie, of the best mode of forming dung heaps or pies in turnip fields, so as to prevent, as much as possible, the waste of gaseous matters, during the fermentation of the manure. "When," said this intelligent agriculturist, "it is found necessary to empty the dung yards early in the season, I recommend that preparation should be made in the usual way, for the reception of the dung heaps in the intended turnip fields, by collecting large heaps of clay marl, or such other materials. The bottoms for the heaps should not, however, be laid above six or eight inches thick of the earthy material, and a good quantity of it should be placed in rows on each side of the bottoms marked out; the dung should then be drawn out of the yards, and placed upon the bottoms, but not in the usual way of throwing it up loosely, to cause fermentation; on the contrary, by drawing the carts, with their loads upon the heaps, for the purpose of compressing the dung, and thereby retarding fermentation.

[illegible] should remain constantly at [illegible] while the teams are at work, on [illegible] spread and level the dung regularly, so as to render the ascent easy for the succeeding teams, as they come with their loads. If the dung has not been previously mixed in the yards, it should be so in leading to the heaps, by taking up a few loads from one yard, and then a few from another, alternately; and even from the same yard, the loads of dung should be taken from different parts alternately; for the dung is not of equal quality, nor made with the same regularity, in all parts of the yard.

"The coal ashes, road scrapings, and all other collections of manure about the farm-house, should also be carried to these dung heaps; and when the heaps are raised as high as convenient for the horses to draw up, several loads should be shot up at the ends of the heaps, for the purpose of making them up to the square of the centre; the whole heaps should then be completely covered with the marl and clay, or soil previously collected in rows by the sides of the heaps, so as effectually to enclose the dung heaps in crusts, and they are thenceforth denominated *pies*. In these, the dung will be preserved in a very perfect state, with little or no fermentation, and without loss by exhalation or evaporation. The pies, within ten days or a fortnight of the time the compost is wanted for the turnip ground, should be turned carefully over, and the crust, top, bottom, and sides, intimately mixed up with the dung. When the turning is completed, with the natural soil around the heaps, again coat the heaps all over; the pies will then undergo a gentle fermentation; the earth, intermixed with and covering the dung, will absorb the juices and gaseous matters produced, and the compost come out in a fine state of preparation for using on the turnip lands. When the dung is taken out of the yards late in the spring, or only a short time before it is required for the turnip ground, the preparation should be somewhat different, because of the compost heaps having less time to incorporate. Thus the dung should not be carted upon the heaps to compress them, and prevent fermentation, as in winter. On the contrary, the dung should be thrown up lightly with the fork upon the bottoms, and the side heaps of earth mixed intimately along with the dung. Turf turned up for a year preceding on wastes by the sides of roads makes excellent pie meat."

The temperature of the dung heap is a pretty sure criterion of the state of its fermentation; if a thermometer, plunged into it, does not rise above 100°, there is little danger of too much gaseous matter lost. If the temperature is higher, should be taken to check the fermen and the same overheating may be r as going on, if, when a piece o moistened with muriatic acid is hel dunghill, dense fumes appear, f ammonia is disengaging. (*Davy*, p. With skilful management, and under ordinary circumstances, one ton of dry straw is found to produce three tons of manure; so that, as the common weight of straw per acre is about one ton and a half, the straw grown upon that extent of land should yield about four tons and a half of compost. The quantity of manure produced by stock necessarily varies with the quantity and quality of the food upon which the animals are fed. In an experiment made at the Cavalry Depôt, at Maidstone, a horse consumed in a week —

	Lbs.
Oats - - -	70
Hay - - -	84
Straw - - -	56
	210

He drank, within this time, 27 gallons of water. The weight of the dung and litter produced was 327½ lbs.

In another experiment, on a large-sized Yorkshire milch cow, she consumed in 24 hours —

	Lbs.
Brewers' grains - -	81
Raw potatoes - -	30
Meadow hay - -	15
	126

And during this period she drank two pailfuls of water. The urine was allowed to escape. She had no litter of any kind. The weight of the solid dung she produced was 45 lbs. When fed, on another day, with

	Lbs.
Raw potatoes - -	170
Hay - - -	28
	198

she produced, under the same circumstances, 73 lbs. of solid manure. (*British Husbandry*, vol. i. p. 255.) Taking, therefore, the average produce to be equal to 60 lbs. per day, it follows that a cow will make about 9 tons of solid dung in the course of the year.

The quality of farm-yard compost naturally varies with the food of the animals of which it is made: that from the cattle of the straw-yard is decidedly the poorest; that from those fed on oil-cake, corn,

Spring Park, near Croydon, an
cientific practical farmer, had oc-
tice this in an experiment which
in 1834. In that year, on half
f turnips fed off with sheep he
il-cake; on the other half they
the turnips. The succeeding
all distinguished by their su-
the half of the field where the
il-cake; and in 1838, when the
ain a crop of turnips, the half of
n which four years previously
ere fed with oil-cake, had by far
p of turnips than that which had
ed in common with the rest of
l fed off in the ordinary manner.
food consumed so materially
he quality of the manure, it fol-
natural consequence, that that
mmer by the clover, grass, and
ck is much superior to that pro-
ng the winter months by the
ttle of the straw-yard, which is
further impoverished by the
nows. Hence, too, the superior
the manure of fatting swine to
s in a lean state, and the far su-
gth of night soil to any manure
om merely vegetable food. Che-
inations are hardly necessary to
facts. Every farmer who has
l cattle will testify to their truth
tivator will readily acknowledge
rity of "town-made," that is,
ced stable-dung, to that from
nly on hay and straw, and that
far superior in "strength" to
e relative quantities employed
ivator betray the same fact; for
where he applies twenty loads

and the latter agriculturist often makes his excellent compost-heaps of merely peat and urine. The liquid or soluble portion of farm-yard manure constitutes, in fact, its richest portion. Of the powerful effect produced by the urine of cattle and other liquid fertilisers, I shall have hereafter occasion to speak, when treating on liquid manure.

It is usual for the farmer, although not so common a practice as is desirable, to increase the bulk, if not the quality, of his dung-heaps, by adding to them various other substances: thus, as to enlarging them, by adding to that of the farm-yard, peat-moss, the late Lord Meadowbank made many experiments with success; and his directions are of a very simple and easily followed description. "Let the peat-moss," he says, "be thrown out of the pit for some weeks or months, in order to lose its redundant moisture. By this means it is rendered the lighter to carry, and less compact and heavy, when made up with fresh dung for fermentation; and accordingly less dung is required for this purpose than if the preparation is made with peat taken recently from the pit; the peat taken from near the surface or at a considerable depth answers equally well. Take the peat-moss to a dry spot convenient for constructing a dunghill, to serve the field to be manured; lay the cart-loads of it in two rows, and of the dung in a row between them. The dung thus lies nearly on an area of the future compost dunghill, and the rows of peat should be near enough each other, that workmen, in making up the compost, may be able to throw them together by the spade. In making up, let the workmen begin at one was begun, and at the two sides. The compost should not be raised above four feet or four feet and a half high, otherwise it is apt to press too heavily on the under parts, and check the fermentation; when a beginning is thus made, the workmen will proceed working backwards, and adding to the column of compost, as they are furnished with the three rows of materials directed to be laid down for them. They must take care not to tread on the compost, or render it too compact; and, of consequence, in proportion as the peat is wet it should be made up in lumps, and not much broken. In mild weather, seven cart-loads of common farm dung, tolerably fresh made, is sufficient for twenty-one cart-loads of peat-moss; but, in cold weather, a larger proportion of dung is desirable. To every twenty-eight cart-loads of the compost when made up, it is of use to throw on above it a cart-load of ashes, either made from coal, peat, or wood; or, if these cannot be had, half the quantity of slacked lime may be used, the more finely powdered the better: but these additions are nowise essential to the general success of the compost. The dung to be used should either have been recently made or kept fresh by compression, as by the treading of cattle or swine, or by carts passing over it; and if there is little or no litter in it, a smaller quantity will serve, provided any spongy vegetable matter is added, at making up the compost, as fresh weeds, the rubbish of a stackyard, potato-shaves, sawings of timber, &c.; and as some sorts of dung, even when fresh, are much more advanced in decomposition than others, it is material to attend to this; for a much less proportion of such dung as is less advanced will serve for the compost, provided care is taken to keep the mass sufficiently open, either by a mixture of the above-mentioned substances, or, if these are wanting, by adding the peat piecemeal; that is, first making it up in the usual proportion of three to one of dung, and then adding, after a time, an equal quantity more or less of moss. The dung of this quality of greatest quantity is shamble-dung, with which, under the above precautions, six times the quantity of peat, or more, may be prepared. The same holds as to pigeons' dung and other fowl dung, and to a certain extent, also, as to that which is collected from towns, and made by animals that feed on grains, refuse of distilleries, &c.

"The compost, after it is made up, gets into a general heat, sooner or later, according to the weather and the condition of the dung: in summer, in ten days or sooner; in winter, not perhaps for many weeks if the cold is severe. It always, howeve been found to come on at last; an summer it sometimes rises so high as mischievous, by consuming the mat (*Fire-Fanging*). In that season a should be kept in it in different pa pull out, and feel now and then; for approaches to blood heat, it should be watered or turned over, and, on s occasion, advantage may be taken to with a little fresh moss. The heat sub after a time, and with great variety, cording to the weather, the dung, and perfection of the making up of the comp which then should be allowed to rem untouched till within three weeks of us when it should be turned over upside do and outside in, and all lumps broken; th it comes into a second heat, but soon coo and should be taken out for use. In th state the whole, except bits of the old d cayed wood, appears a black free mass, a spreads like garden mould. Use it wei for weight as farm-yard dung, and it w be found in a course of cropping fully stand the comparison." After a long-co tinued observation and successful use peat, Mr. H. Davis is of opinion that pe in common with most organic manures, h a strong tendency to rise to the surface all cultivated soils, thus following a r directly opposite to those of earthy fer isers, which certainly descend into the la (*Young's Annals*, vol. xli. p. 247.)

Compost, if made up before January, hitherto been in good order for the spr crops; but this may not happen in a h frost. In summer, it is ready in eigh ten weeks; and, if there is an anxiety have it soon prepared, the addition of a or of a little lime rubbish of old buildi or of lime slackened with foul water, plied to the dung used in making up, quicken the process considerably. "P prepared with lime alone has not been fo to answer as good manure; in one instan viz. on a bit of fallow sown with wheat, was manifestly pernicious." (*Edinb Encyc.* vol. i. p. 279.) The opinion of L Meadowbank in favour of the use of p or saw-dust as a mixture with farm-y compost, has been recently confirmed Mr. Dixon, of Hathershaw, in Lancash who, in his Prize Essay, thus describes result of his long experience (*Journal of English Agric. Society*, vol. i. p. 135.):—

"My farm is a strong retentive soil, substratum of ferruginous clay. My ob was to improve its texture at the least For this purpose we carted great quant of fine sawdust and peat-earth, or bog; had so far to go for the latter, that horses would fetch little more than t tons in one day; one horse would fetch three cart-loads of sawdust in the same time. Having brought great quantities of both peat and sawdust into my farm-yard, I laid out, for the bottom of a compost heap, a space of considerable dimensions, and about three feet in depth; three-fourths of this bottom was peat, the rest sawdust; on this we conveyed, *daily*, the dung from the cattle-sheds; the urine, also, is conducted through channels to wells for its reception (one on each side of the compost heap); common water is entirely prevented from mixing with it. Every second day the urine so collected is thrown over the whole mass with a scoop, and at the same time we regulate the accumulated dung. This being continued for a week, another layer, nine inches or a foot thick, of peat and sawdust (and frequently peat without sawdust) is wheeled on the accumulated heap. These matters are continuously added to each other during winter; and in addition, once in every week, never less than 25 cwt., more frequently 50 cwt., of night soil and urine: the latter are always laid next above the peat or bog-earth, as we think it accelerates their decomposition. It is, perhaps, proper here to state, that the peat is dug and exposed to the alternations of the weather for several months before it is brought to the heap for admixture: by this it loses much of its moisture. Some years' experience has convinced me of the impropriety of using recently dug peat: and in the manner I recommend, it is superior and more convenient on every account; very much lighter to cart to the farm-yard, or any other situation where it is wanted; and so convinced am I of its utility in composts for every description of soil, except that of its own character, that wherever it can be laid down on a farm at less than four shillings per ton, I should recommend every agriculturist and horticulturist that can command it, even at the cost here stated, to give it a fair trial. So attractive and retentive of moisture is peat, that if liberally applied to an arid, sandy soil, that soil does not burn in a dry season, and it so much improves the texture and increases the produce of an obdurate clay soil, if in other respects rightly cultivated, that actual experience alone can fairly determine its value.

"For the conveyance of night soil and urine, we have the largest and strongest casks, such as oils are imported in; the top of which is provided with a funnel to put the matters through, and the casks are fixed on wheels like those of a common dung-cart. For the convenience of emptying the carriage, the compost heaps are always lower at one end; the highest is where we discharge the contents, in order that they may, in some degree, spread themselves over the whole accumulation. The situation on which the wheels of these carriages stand, while being discharged, is raised considerably; this we find convenient, as the compost heap may be sloped six or seven feet high: low compost heaps, in my opinion, should be avoided. The plan here recommended I have carried on for some time. I find no difficulty in manuring my farm over once in two years; by this repetition I keep up the fertility of my land, and it never requires more than a moderate application of manure.

"I am fully aware that there are many localities where neither peat nor night soil can be readily obtained; but it is worth a farmer's while to go even more than twenty miles for the latter substance, provided he can have it without deterioration: the original cost is often trifling. On a farm where turnips or mangel are cultivated to some extent, the system here recommended will be almost incalculably advantageous. A single horse is sufficient for one carriage; mine hold upwards of a ton each; six tons of this manure in compost with peat, or, if that is not convenient, any other matters, such as ditch scourings, or high headlands which have been properly prepared and laid dry in a heap for some time, would be amply sufficient for an acre of turnips or mangel. This manure is by far the most invigorating of any I have ever yet tried; bones in any state will bear no comparison to it for any crop; but it must be remembered that I write on the supposition that it has not been reduced in strength before it is fetched.

"Convenience frequently suggests that compost heaps should be raised on different parts of a farm; but, unless in particular instances, it is well to have them in the yard. In the farm-yard, all the urine from the cattle-stalls may be employed with the greatest economy; and, be it remarked, that the urine from animals, in given weights, is more powerful than their solid excrements. How important, then, must it not be to the farmer to make the most extensive and the most careful use of this liquid! It is sometimes carted on the land; but that practice will not bear a comparison with making it into composts in the manner here recommended. Great waste is often made in putrescent manures after they are carted on the land; instead of being immediately covered or incorporated with the soil, we not unfrequently see them exposed for days together in the hot rays of a scorching sun, or to the injurious influences of a dry wind.

I have before stated that compost heaps should, on many considerations, be raised in the farm-yard; still, circumstances are frequently such, that it is more proper to make them at some distance in the fields. If a headland becomes too high by frequent ploughings or working of the land, in that case it should be ploughed at the time when clover or mixed grass seeds are sown with a white crop; for instance, barley or oats, and clover for the year following: a headland might then be ploughed, and a number of cart-loads of some manure heaped from one end to the other. Immediately after this it should be trenched with the spade (or what is sometimes called digging), and ridged high, in order that an action may take place between the soil and manure; by this means the mass would soon be in a condition for turning over, and any ditch scourings, or other matters which had not in the first instance been used, might now be added to the mixture. The heap should then be allowed to remain closed for a few weeks, then turned over again; at this turning, in all probability, the mass would be much reduced; and if so, raise the ridge of compost well on both sides; but, instead of its top being pointed, make a trench or cavity on the top from one end of the heap to the other. This cavity should be made tolerably retentive of moisture, which may be effected by treading with the feet; carriages of night soil, or urine from the cattle-stalls, may then be emptied into the trench, and the bulk of the heap would determine how many were required. This being done, a little earth should be thrown into the trench, and the heap allowed to remain in that state until the middle or latter end of autumn; it will then be ready for another turning; but at this time care must be taken to have the heap well made up at the sides, and pointed at the top: in this situation rain will be thrown off, and the compost preserved dry until winter presents some favourable opportunity for laying it on the young clover, wheat, or any other crop which may require it.

"In the year 1826," adds Mr. Dixon, "my attention was first directed to raising compost heaps from urine. This I now do frequently, without the help of any dung from the cattle-stalls. The same occasion called my mind to another matter, well worthy every farmer's attention. I allude to the great superiority of the manure raised in summer soiling, to that produced in the stalls during winter."

"The strength and consequent value of all cattle-dung," says Mr. Burke, in a note upon this paper, "will of course depend
upon the nature of their food; i
during the summer, upon clover
sainfoin, &c., there can be no d
the manure will have a propor
greater effect upon the land, th
beasts be kept in the straw-yard
stall-fed, either in winter or in sum
the purpose of fatting, it will be st
Thus, it was found, on comparing t
of dung voided by animals fed
oil-cake with that of store-stoc
loads of the former exceeded in
of product twenty-four of the latt
The Complete Grazier, 6th edit.

I verily believe the difference
cent., unless stock are fed in a
sure, during winter, with artif
In an arrangement for makin
heaps from urine, I would rec
receptacle to be made at the b
cattle-stalls, just outside the buil
should hold about twenty ca
mould, or any other matters t
ployed; if its situation were a l
than the cattle-sheds, all the u
pass into it, and remain there unt
is completely saturated, which w
ficient; when the earthy matters
over, the compost may then be t
and the proceeding again renewe
to show part of the benefits of th
I beg here to observe, that the m
weedy mould may be used; the a
urine, if not reduced by water, is
ful, that wire-worms, the black
other destroying insects, and all
weeds, &c., when in contact with
for a time, are killed. The si
raising this compost should be
from the weather by a covering,
a cart-shed; indeed, the deterio
fluences of rain, sun, and arid wi
putrescent manures or compost,
rious, that, in my humble jud
would be worth while to have pla
cover where these are usually
The ordinary method of conveyin
on land, admits of much improve

On the black hungry gravels
Park, near Croydon in Surrey,
been long and skilfully applied,
best success, by Mr. Hewitt D
peat on his farm is found restin
siderable masses on a silicious
he uses it both mixed with his
compost, and also with lime; i
case, he has the peat previously
the latter, the operation of the
sorbing the moisture of the peat
renders drying unnecessary; he
lime and peat an admirable top d
young clover. To the compost of
yard he adds about an equal bul

lso burns a considerable quantity of
, and with the ashes top-dresses his
ps with decided advantage; it not
promotes the growth of the crop, but
inks that the smell of the ashes is very
ous to the turnip fly. There is no
t but that peat, when saturated with
, and in a state of gradual decomposi-
is nourishing to plants. Mr. Davis has
ed that when the land is manured with
eat and farm-yard compost, the roots of
rnips and tares will encircle the lumps
t, just as is the case when crushed bones
mployed. I am not aware of any farm
ilar extent (500 acres), where peat has
more skilfully and successfully applied
at Spring Park, under the manage-
of this able agriculturist. Peat, which
has been so successfully employed as
nure in compost, is composed princi-
of the inert, long accumulating ve-
le remains of either wood, moss, or
; it abounds also with earthy and sa-
atters; those of Berkshire and Wilt-
contain from one fourth to one third
eir weight of gypsum; their earthy
rs are always analogous to the stratum
rth on which it reposes; where that is
, the peat abounds with calcareous
and gypsum, and but little alumina
lica. "Different specimens of peat,
I have burnt," says Davy, "from the
tic and schistose soils of different parts
ese islands, have always given ashes
pally silicious and aluminous; and a
men of peat from the county of Antrim
shes which afforded very nearly the
constituents as the great basaltic stra-
of the county." (*Chemistry*, p. 192.)
ose instances, where the farmer finds
excellent results from dressing young
with a mixture of peat and compost,
ticed by Mr. Dixon, with the Lanca-
peat, it may be reasonably concluded
ntain gypsum; (*Journ. Eng. Agr. Soc.*
. p. 138.) and, if it requires the ad-
n of a portion of lime, before it is found
romote very decidedly the growth of
r, it then is very likely to be saturated
sulphate of iron.

he too general neglect of peat as a mix-
with farm-yard dung is not owing to
eing a very modern discovery, for it
publicly recommended in this country
rly half a century since. "In Sweden,
n other countries," says the Baron de
alz, when writing to Sir John Sinclair
796, "farmers have endeavoured to in-
e the quantity of manure by mixtures
l kinds of vegetables and soils, and by
cting urine in cow-houses well adapted
hat purpose; they likewise, in some
of the country, lay below their cattle soil from the shores of the lakes, leaves, moss, saw-dust, chopped alder, and pitch fir, brushwood, reeds, and straw. They often now place their dunghills on a slope instead of the former hollow, and by means of pumps, water them with urine and dung-water. Many farmers, however, still prefer the fresh dung to that which is fermented, and which they suppose has lost in the process a great part of its vegetating power." (*Com. Board of Agr.* b. 1. p. 326.)

On the sea-shore, it is usual for the farmers to mix sea-weed with their dung; in Essex they mix it with chalk; in Suffolk, with a peculiar red shelly sand or marl; and in the west of England, with the calcareous sand of the sea-shore; a practice which is thus described by Mr. Edward Bennett:—

"The quantity of sand which a barge usually contains is about ninety horse seams of two and a half cwt. each; the price varies according to the distance it is carried up the rivers Notter and Tamar, from eighteen to twenty-five shillings, and three shillings drinking money, or three gallons of cider. It is dragged for in Plymouth sound in three to six fathom water. In summer the barges frequently run on the sand bank in Whitsand Bay at two hours before low water; when the tide leaves them, they load, waiting for the flood to bring them off. For arable land, the sand is thought to be best mixed with old earth, or manure collected in roads; but for pasture it is best mixed with stable muck; the proportion is two seams of muck to one of sand; a barge load thus mixed is thought to be good manure for an acre." (*Annals of Agr.* vol. xii. p. 35.)

Farm-yard dung is usually employed in all experiments upon manures, as the basis upon which comparative results are most usually obtained; and it is not often that any substance can be found to exceed it in fertilising effects. It was compared with salt, lime, and oil cake, by Mr. George Sinclair, most of whose elaborate experiments are given under the head SALT. In my own experiments with potatoes in a light gravelly soil, I found that when the soil simply produced 120 bushels per acre, that manured with 20 tons of stable dung it yielded 219 bushels; and with 20 bushels of salt only 192¼ bushels. (*My Essay on Salt*, p. 84.) In those of my brother, Mr. George Johnson, where 20 tons per acre of stable dung produced 23 tons of carrots, 20 bushels of salt applied to a similar space produced 18 tons (*Ibid.* p. 146.); and, with the same proportions, when the salted soil produced 4½ tons of red beet-root, the spit manure yielded 6½ tons. (*Ibid.* p. 149.) In those of the Rev. E. Cartwright upon potatoes, when the soil simply produced 157 bushels per acre, the same quantity of land when dressed with

363 bushels	of	fresh dung	yielded	192	bushels
30	—	soot	—	192	—
60	—	wood ashes	—	187	—
60	—	malt dust	—	184	—
363	—	decayed leaves	—	175	—
363	—	peat	—	159	—
363	—	saw-dust	—	155	—

(*Com. Board of Agr.* vol. iv. p. 370.)

Some valuable experiments on farm-yard dung, compared in various proportions with other manures, applied to potatoes and oats, were made by Arthur Young, of which the following was the result: —

"In the last week in March, 1787," he says, "the white champion potato was planted in beds, each containing a square perch of a good sandy loam, on a wet clay marle bottom, the sets being planted one foot apart.

	Quantity per Acre of Manure.	Produce in Bushels per Acre.
Soil simple -	- -	180
Farm-yard dung	16 cubic yards	240
—	21 —	200
—	32 —	280
—	32 —	400
—	42 —	360
—	53 —	400
Soot - -	160 bushels	360
Wood ashes -	160 —	240

"At the same time, and on the same ground, twelve square perches were planted with the same potatoes, and manured as described in the following table, which also gives their respective products.

	Per Acre.	Produce in Bushels per Acre.
Soil simple -	- -	280
Dung - -	32 cubic yards	400
Wood ashes -	40 bushels	400
Slaked lime -	160 —	380
Rotten straw, with some little animal manure -	32 cubic yards	400
Urine and soap water in equal moieties -	1440 gallons	240
Barley straw -	1½ tons	300
Potash - -	340 bushels	380
Dung - - Salt - -	32 cubic yards 160 lbs.	400
Dung - - Lime - -	32 cubic yards 160 bushels	480
Dung - - Urine - -	32 cubic yards 480 gallons	520

"The great product," adds Young, "which attends the addition of urine to dung, affords a very important lesson; which is, to manage dunghills in such a manner as to save, if possible, every drop; this is a point too much neglected, and, indeed, by most common farmers very little attended to." (*Annals of Agr.* vol. ix. p. 652.)

A rood of a poor blue pebbly gravel, which yielded turnips in 1770, in June
was marked in spaces for manures, ea
two square perches, by Arthur Young
sown with oats.

2 Square Perches.	Per Acre.	Produce of O Acre.
Manure.	Cubic Yards.	Bushels.
Soil simple - -	- -	30
Farm-yard compost	80	40
— -	40	51
— -	20	45
— -	20	46
Bones - -	25	63
— -	50	57
Slaked lime -	200 bush.	38
Chalk - -	80	31
— - -	160	25
— - -	240	27
— - - Turf mixed with train oil - -	80 80	33
Chalk and urine -	80	37
Chalk - - Turf alone - -	80 80	33
Farm-yard earth from under dung	80	35
Red hungry gravel	240	29
—	320	31

"I observe," adds Young, "that du
general much exceeds all the manure
bones, the superiority of which is ver
markable. (His following remarks
how little was then known of bon
manure.) It is a manure not uncomm
this neighbourhood; all are brought
London, where are people who make it
business to collect them and break the
small pieces for those who boil them fo
grease: this operation, one would sup
would leave them of not much value
the contrary is the fact. When I f
by this and other trials, that their
was so very great, I bought all I could
the price 10*s*. 6*d*. a waggon-load, at Lo
96 bushels, which by the time they we
the farm (for I generally went on pu
for them) amounted from 25*s*. to 30*s*. a l
Five and twenty cart loads in this
being superior to fifty, was owing to
latter quantity being too great a dres
For this miserable soil, which with a sum
fallow yielded but thirty bushels, to pro
sixty-three by a moderate manuring of bo
shows their amazing effect.

"The advantage of using fresh long du
adds Arthur Young, "appears very stro
nor can any thing be clearer than the
nefit of retaining the drainings of the du
hill. The lime without mixture appear
more advantage than it has generally
with me; but even here, in the profi
view, it has done nothing." (*Ann. of A*
vol. iii. p. 67—77.)

The turf composts have nothing dec
in their effect. The urine appears to
the superiority. A portion of the
soil was planted with *potatoes*; the follo
table gives the result: —

Manures.	Per Acre.	Produce per Acre.
		Bushels.
mple - -	- -	135
: yard farm-yard		
ost - -	33¾	168¾
- - -	67½	371½
- - -	101¼	278¼
- - -	135	371¼
- - -	168¾	345½
- - -	202½	422
- - -	236¼	405
- - -	270	422
saturated with		
rainings -	33¾	270
- - -	101¼ loads	354½
slaked lime	135 bushels	
is lime -	270 ditto	253¼
yard long fresh		
dung - -	67½	405

manures are often applied in cubic
it will be well for the farmer to know
pective weight of various measures of
s. (*Farmer's Mag.* vol. xiv. p. 102.)

		cwt.	qrs.	lbs.
yard of	garden mould -	19	3	25
—	water - -	15	0	7
—	compost of dung, with weeds and lime, which had been once turned over in 9 months	14	0	5
—	new dung -	9	3	18
—	leaves and sea-weed - -	9	0	7

e have been many excellent sugges-
or the improvement of farm-yard
. The late Mr. Blakie published an
nt essay, of which I have largely
myself. Mr. Kirk of Preston Mains
Journ. of Agr. vol. viii. p. 483.) has
ted that the straw produced by dif-
soils should be kept separate, and
made into manure, applied to dif-
soils. Mr. Pearson has very properly
Journ. of Agr. vol. ix. p. 299.) con-
d the careless way in which farm-yard
e is often flooded with the rain water
buildings, &c. Mr. Baker is an advo-
for using farm-yard manure in its
t state. (*Quart. Journ. of Agr.* vol. vii.
and ix. 597.) Mr. W. Sim has re-
several comparative experiments at
mond, in Ross-shire, with barley. The
ood deep loam, on a gravelly subsoil;
vious crop peas. (*Journ. Royal Agr.*
l. i. p. 419.)

of re.	Quantity per Scotch Acre equal to 1¼ English.	Produce of Grain per Acre.			Weight per Bush.	Straw per Acre in stones of 16 lbs.	
		qrs.	bls.	ps.	lbs.	st.	lbs.
ard							
re -	18 double lds.	8	1	1	53	226	8
ust	10 cwt.	7	3	0	51½	252	8
st	10 bushels	7	5	2	53	211	14
of							
-	140 lbs.	7	5	0	52½	213	0
re -	140 lbs.	6	2	0	52½	186	0

RIER. (Fr. *ferrier*, Lat. *ferrarius.*)
n who forges horses' shoes. As the errors committed by ignorance in this art were the cause of many diseases in the feet of horses, it naturally followed that farriers were resorted to for the cure of them. Hence, the whole of the diseases of these animals came by degrees to be treated by farriers, who are, however, now superseded by a more enlightened class of veterinary practitioners.

FARRIER'S POUCH. In horsemanship, a leathern bag, used for carrying nippers, shoes, nails, and all the requisites for shoeing a horse, in case of casting a shoe.

FARRIERY. The art of preventing, curing, or alleviating the disorders to which horses and cattle are subject. The practice of this useful profession was, until within the last half century, almost entirely confined to a class of men, who were utterly ignorant of the anatomy and physiology of the horse, &c., and the general principles of the art of healing. Their prescriptions were as absurd as the reasons they assigned for administering their boluses and drenches. But the institution of a veterinary college, and a better educated class of persons having taken up the profession, has created a new era in veterinary science.

FARROW. A sow is said to farrow when she brings forth pigs; and the pigs brought forth are called a litter or farrow.

FARTHING-BOUND. A provincial term for a stoppage or obstruction in the intestines of the cow.

FARTHING-DALE. The fourth part of an acre of land, now generally called a rood. It is sometimes written *farding-dale.*

FAT. (Teut. *vet;* Ice. *feits;* Sax. ꝼæꞇ.) An unctuous solid substance, or, more properly, a concrete oil, deposited in little membranous cells in various parts of animal bodies. It is generally white or yellowish, with little taste or smell, and varies in consistency according to the relative quantities of stearine and oleine which it contains. Goats' fat, besides these principles, contains, also, hircine, to which it owes its peculiar smell. Different kinds of fat liquify at different temperatures. Lard is softer than tallow, melts at 97°; but the fat extracted from meat by boiling requires a heat of 127°. The ultimate elements of animal fat are the same as those of vegetable oils. According to the analysis of Chevreul, 100 parts of human fat are composed of 79·0 carbon, 11·4 hydrogen, and 9·6 oxygen. Hog's lard and mutton suet are very similarly constituted. Fat is insoluble in water, alcohol, and ether. The strong acids dissolve, and gradually decompose it. With the alkalies it combines and forms soap; hard with soda, and soft with potassa. Fat serves to defend the muscles and bones against cold, to temper the acids of aliments, and to invigorate and support the whole frame. (*Brande's Dict. of Science; Thomson's Chem.* vol. iv. p. 431.)

FAT-HEN. A provincial name for the wild spinach (*Chenopodium album*). It is also sometimes applied to the weed goosefoot.

FATHOM. (Sax. fæðem.) A measure of length containing six feet, or two yards; chiefly used for measuring the length of cordage, and the depth of water and mines.

FATTENING OF ANIMALS. See Food, Cattle, Sheep, &c.

FAUD. A provincial word for a truss of short straw, containing as much as the arms can fold.

FAUGH. A local term signifying a fallow, or ground repeatedly tilled without an intervening crop. It is sometimes written *fauf*.

FEABES. A country name in some parts for gooseberries. It is frequently written *Feaberries*.

FEAL. A provincial word signifying the sward or turf cut up.

FEAL-DIKE. An earthy fence made of feal.

FEAL-MANURE. Manure procured from the rotting of turf, sward, or feal.

FEATHERFOIL, or WATER VIOLET. (*Hottonia palustris.*) A little indigenous aquatic plant, growing in ditches and ponds on a gravelly soil; herbage smooth, entirely under water; root creeping; leaves crowded, three or four inches long, bright green, deeply pinnatifid; flower stalks central, solitary, naked below, rising high above the water, with numerous whorls of elegant pink or deep rose-coloured flowers of the shape and nearly the size of a primrose, making a very handsome appearance. (*Eng. Flor.* vol. i. p. 276.)

FEATHER-GRASS. (*Stipa pennata.*) This is a doubtful native; it is found sometimes on dry mountainous rocks. It is a perennial, flowering in June. The root is fibrous; stems a foot high, covered with dense tufts of long, narrow, acute, dark-green, roughish leaves; sheaths striated and very long; stipules oblong, obtuse; flowers in panicles, simple, erect, six to seven flowers; awns nearly a foot long. At the time of flowering, the produce per acre from a heath soil was 9528 lbs.; dry produce, 3454 lbs.; nutritive matter, 409 lbs. This produce was taken from a heath soil that had been *planted* with the grass, for the wild seed does not vegetate; but it may be propagated to any extent by parting the roots. Its agricultural merits appear to be so inconsiderable as to rank it among the inferior grasses. The beautiful feather-*like awns* which terminate the larger valves

of the blossom, and adhere to
serving as a sail to waft it fron
rock, have procured it a place in t
gardens of the curious, and ser
tinguish it from all other grass
feathered awns are sometimes
ladies instead of feathers, which
semble. The seed is ripe about t
of September. (*Eng. Flor.* vol.
Sinclair's Hort. Gram. Wob. p. 2

FEATHERS. (Sax. feðer;
dern.) A general name applic
exterior covering or plumage of
by which they are enabled to fly.
vary in form, size, and function, i
parts of the bird, and have a
received distinct names in orn
science. The development of f
always preceded by that of do
constitutes the first covering
birds. The mechanism concern
formation of a feather is, as mig
pected, of a very complicated
The quill part consists of coagula
men. The feathers chiefly in u
country are goose feathers. T
Somerset are considered the best
Irish feathers the worst. Great
of goose and other feathers are
imported from the North of Euro
however, are insufficient for the
hence poulterers dispose of vast n
the feathers of other domestic p
of which are much inferior to
geese. The feathers, after they ar
are generally dried in an oven.
standing every apparent caution,
thers will frequently be found to
either from carelessness in plucki
neglecting to attend to them a
In this case, the only method
them sweet is to boil them a few
in stout calico or canvass bags in
and afterwards dry them in the
In about a fortnight, if the weath
they will become perfectly sweet
for use. The bed feathers im
1828 amounted to 3103 cwt.,
6826*l.* of duty. Swan down, os
other feathers, are also largely im
ornament and dress. (*Willich's*
cyc.; Brande's Dict. of Science
Journ. of Agr. vol. x. p. 480.; *M*
Com. Dict.)

FEBRIFUGE. (Fr.) In farri
medicines as are beneficial in case
See Fever.

FEBRUARY. The second
the year.

Farmer's Calendar. — Most
siness of the last month may stil
tinued; the flail and the dung-c
the season, and the plough in ope

e ground should now be getting forward oats and barley. Early sown corn is apt to lodge, and yields the finest sam- . The Essex- and Kent farmers begin ow their barley the end of this month warm dry land. Vetches, peas, beans, vera, and other spring wheat, may now own, and rye also, where it missed plant he autumn. Hop grounds can now be and manured. For these, many pow- fertilisers may be had recourse to. e is, perhaps, no plant which delights in those of an oily nature than the The Kentish growers of the valley of Medway successfully employ large ties of sprats, for which they readily 9d. per bushel. They use from forty r, or more, bushels per acre. Other s employ woollen rags, chopped into pieces; from one to two tons per hey last for two years: these cost l. 5s. per ton. Salt, also, is an ex- addition, in conjunction with these, rate of from ten to fifteen bushels . Look to your wheat, and, if the r the grub is at work, apply the directed in the calendar for last nd dibble in spring wheat in vacant This is a good time to repair and dges, &c.: in the formation of these, manure should be added to the rows g plants, either of earth or of com- mpost; a very small quantity of ll produce great effects on the rapid of the quick. In Scotland, they find, ing the larch and other timber trees, n four bushels of lime per acre — a under each plant — is productive iderable advantage. You may now oplars, osiers, and willows, and still ber and underwood. Look to your ck: they very commonly suffer more y this month and the next, by the r, than during any others. Give your il cake when feeding on turnips: the will not be confined to the stock: reased richness of the ground, where fed with oil cake have been folded, e, in some instances, discerned for r four years. (See *Mr. Hewitt Davis's iments; C. W. Johnson on Fertilisers*, Stock ewes are now commonly ing to lamb: look carefully to their ness and their warmth, but beware of g them too much in wet yards. The will bear a dry cold better than a wet laying. On turnips, all sheep now hay or other dry food; they will ward the most unremitting attention. your fallows in ridges for the frost, iberate, and pulverise, and kill the ; do not believe, however, that snow enriching qualities in it, as the old farmers were wont to dream; neither does it contain any nitre: it protects crops from sudden transitions in the temperature of the atmosphere, and, when it melts, it kills some of the smaller vermin of the soil, for snow-water is totally free from the vital air (oxygen gas) and other gases which common water contains: even fish cannot, in consequence, exist in snow-water. Look to your fish-ponds, and break holes in the ice, not only to let in the air but to let out the noxious gases, such as carburetted and sulphuretted hydrogen, which are always generated in stagnant water. You may sow cabbage seed for planting out in May and June. The value of this plant for feeding is too little understood; they may be employed to make good the deficiencies in the turnip fields, where the plant has missed. Plough and subsoil your land for carrots and parsnips: sow the seeds, dress your grass lands, open the trenches, in meadows; crop pollard trees for firing, and other farm purposes. Sow sainfoin, and dress it with gypsum: 1½ cwt. per acre is sufficient. Sow as early as the season admits, and by the drill.

GARDENER'S CALENDAR. — *Kitchen Garden. Artichokes* defend in frosty weather. *Asparagus* sow *e.*, plant *e.*, plant in hot-bed, attend to that in forcing. *Balm*, plant. *Beans* plant, draw earth to advancing *plants;* transplant those raised under frames. *Beets*, sow *e.*, plant for seed, dig up and store any left in the bed. *Borecole*, sow *m. e. Brocoli*, sow *m. e. Cabbages*, plant and sow, plant for seed. *Cauliflowers*, attend to, in frames, plant into border *e.*, sow *b. m.*, prick out. *Carrots*, sow, *m. e.*; sow to draw young in a hot-bed, plant for seed. *Celery*, dress and earth up winter standing, sow in a hot-bed or warm border. *Chervil*, sow. *Clary*, sow *m. e. Composts*, prepare and turn over. *Coriander*, sow. *Corn* salad, sow. *Cucumbers*, sow in hot-beds, prick and plant out, attend to those in forcing. *Dill*, sow *m. e. Dung*, prepare for hot-beds. *Earthing* up, perform where necessary. *Endive*, blanch, transplant into frames. *Fennel*, sow or plant. *Garlick*, plant. *Horse-radish*, plant. *Hot-beds* are now variously required. *Jerusalem* artichokes, plant. *Kidney beans*, sow in hot-bed, &c. *Leeks*, sow *m. e.*, transplant for seed. *Lettuces*, in frames, attend to, and transplant from *e.*, sow in a warm border or hot-bed *b. m.*, and in any open situation *e. Lettuces*, prick out seedlings into a moderate hot-bed. *Liquorice*, plant, dig up three-year-old roots. *Melons*, attend to those in hot-beds, sow, prick out. *Mint*, force in hot bed, make plantations. *Mushroom beds*, make, attend to those in productions. *Mustard* and cress, sow *m. e. Onions*, sow main crop *m. e.*, clear off weeds. Winter standing potato, plant. *Parsley*, sow *m. e.* Hamburgh, sow *m. e.* *Parsnips*, sow main crop *m. e.*, dig up and store winter-standing plants for seed. *Peas*, sow, hoe advancing, stick, when three inches high, attend to those in hot-beds *b. m.* *Pennyroyal*, plant *m. e.* *Potatoes* (early), plant in hot-beds *b. m.* and in borders *m e.* *Radishes*, sow in a hot-bed *b. m.*, attend to those in hot-beds, sow in open ground. *Rape*, sow for salading (edible rooted), sow. *Rhubarb*, sow. *Spinach*, sow *b. m.*, clear from weeds advancing crops. *Shalots*, plant. *Scorzonera*, sow *m. e.* *Sorrels*, sow and plant *m. e.* *Skirrets*, sow *m. e.* *Salsafy*, sow *m. e.* *Savoys*, sow *m. e.* *Sage*, plant *e.* *Turnips*, sow *e.*, plant for seed. *Tansy*, plant *e.* *Tarragon*, plant *e.* *Thyme*, plant *e.* *Vacant* ground, dig, manure, &c. *Weeds*, destroy.

FLOWER-GARDEN. February is the first spring month, and the parterre will begin to make gradual approaches to gaiety and life. The anemones, hepaticas, &c. will now bud and flower if the weather is genial; and the crocus and snow-drop will put forth their blooms to meet the sun on his returning march. About the end of this month you may begin to sow hardy annuals; we prefer April, but it may not be convenient always to wait so long; therefore, sow now the seeds of hawkweed, lavatera, Venus's looking-glass, Venus's navelwort, candytuft, larkspurs, lupins, convolvulus, flos adonis, dwarf lychnis, nigella, annual sunflowers, &c. This month you may plant and transplant fearlessly all hardy fibrous-rooted flowering perennials and biennials, such as saxifrage, gentinella, hepaticas, violets, primroses of all sorts, polyanthuses, double daisies, thrift, &c.; rose campions, rockets, campanulas, sweet-williams, hollyhocks, scarlet lychnis, carnations, pinks, monk's-hood, perennial asters, and sunflowers, &c. Plant cuttings of roses, honeysuckles, and jasmines. If the weather is mild you may transplant many kinds of evergreen shrubs, such as phillyreas laurels, laurustinus, pyrocanthas, cistuses, &c. Let there be a ball of earth round their roots, when you take them out of the ground; if box-edging is required, plant it now; water it, and the plants will soon root; dig the borders carefully and lightly with the garden fork; make the garden neat and free from weeds; clear away dead leaves, sweep the lawn and walks, and let spring advance in its proper order.

GENERAL MONTHLY NOTICES.—February was made the second of the twelve months by Numa Pompilius, who added fifty-seven days to the Roman year. Its name is derived either from *Februa*, a title which the Romans gave to the Feralia sacrifices offered to the infernal deities during eleven days
subsequent to the 17th or the 21st,
during which the punishment of
was believed to be suspended; or m
bably from *Februs*, to purify, bec
being originally the last month of
year, the people offered an expiato
fice for their twelve months' sin.
Februa, *Februara*, or *Februalis*,
thets of Juno, because she was c
as presiding over the purification o
Our Saxon ancestors designated th
sprout-kele, because their *kele-wurt*,
wort, first began to shoot out durin
tinuance, an event of considerable
ance in those days, since it was the
tenance of the husbandman, and
they were boiled in was a common
with them, as it was with the Roma
who died 150 years before the Chri
in his treatise on agriculture, say
salutary to the bowels, and a decoct
of it is salubrious in all cases. If
to drink plentifully at a feast,
freely, eat as much as you wish
with vinegar, before supper, and
have supped eat some of it; it will
digestion, and you may drink as
you please." This last is a proper
cabbage tribe which is still foolishly
by many votaries of Bacchus. In l
the Saxons denominated this mo
monath.

Numa assigned to this month twe
days. The Decemvirs altered them
ty-eight. The original number was
to by Julius Cæsar; but August
changed them to twenty-eight, as t
ever since continued. The additi
was intercalated every fourth, or l
between the 23d and 24th, unt
Gregory XIII. made his regulatio
calendar in 1582. February was
by the revolutionists of France betw
Pluviose and *Ventose*, the first
continued from the 20th of Janu
the 19th of February; the second
day until the 21st of March. In our
February is always of uncertain
"as yet the trembling year is uncon
but rain is generally its prevailing
paniment, (hence the ancient e
"February fill-dyke,") together wit
gales, which usually increase as the
approaches. The animal and veget
ation arise from inanimation, and
the approach of more genial da
ranges of the botanist are still circu
almost entirely to the garden, that
which is indeed "friendly to th
virtue, and to peace." Gardening is
perhaps, of the purest of human p
no vegetables are so palatable as
own hands have planted in the

o fruit so grateful as that from own knife has pruned; no flower us as that which we have nurtured

ren strawberry, furze, the white e, the laurustinus, the yew-tree, n crow-foot, or butter-cup, pop- illows, blossom in the course of ; as also the hazel; "the morning- ers," the snow-drop, and the little not.

this month the naturalist re- he sweet notes of the woodlark, ld ones of the thrush, the shrill of the yellow-hammer and chaf- loud voice of the green wood- hootings of the wood-owl, and ır of the stone curlew. Rooks, sel-thrushes, and partridges begin rogs commence their croakings, locks of the mole betray that his ous borings are renewed. (*Far- mac.*)

(Sax, reðan,) The quantity of in given to a horse or other ani- time. It also signifies to fatten cattle or sheep.

RS. Fattening cattle.

A word provincially applied to grass.

The skin or hide of an animal; monger is one who dresses the les of animals.

NG TIMBER. The act of cutting for the purposes of timber. This ly used in respect to full-grown s never applied to young trees nor underwood, or hedges. Much has en respecting the proper season trees; some arguing in favour of , and others in favour of mid- The question principally turns uantity, and the value of the soft ood in the trunk of the tree to be wn by foresters and carpenters as ood. As this sap, or outer, wood is ortion of the trunk in which the ices of the tree flow, it is evi- if no value be set upon it, the be cut down at any season; be- truly valuable part of the trunk, e timber, is impermeable to the scent through the soft wood, and e in the same state at every season r. On the other hand, where much tached to the soft or outer wood, s outer wood is to be made as s possible, or where, as in the case atively young trees, the greater trunk consists of sap-wood, felling take place when there is least sap rse of ascending. This season is oubt mid-winter, which, all other circumstances being equal, is unquestionably the best season for felling timber; the next best being midsummer, when the sap is chiefly confined to the young shoots, the circumference of the soft wood and the bark. The worst time for felling timber is the spring, just before the development of the buds, when the tree is fullest of sap, and receiving constantly fresh supplies from the root; and in autumn, immediately before the fall of the leaf, when there is a superabundance of sap, from its being as it were thrown out of employment by the falling of the leaf. In general all the soft woods, such as the elm, lime, poplars, willow, &c., should be felled during winter: hard woods, like the oak, beech, ash, &c., when the trunks are of large size, and valued chiefly for their heart wood, may be felled at any time. When the bark, however, is to be taken into consideration, as in the oak, the tree should be felled in spring, as then the bark contains four times the quantity of astringent matter to that felled in winter. See TIMBER and WOODS. (*Biggin, Phil. Trans.* 1799; *Brande's Dict. of Science.*)

FELLMONGER'S POAKE AND CLIPPINGS. Poake is the waste arising from the preparation of skins, and is compounded of various proportions of lime, oil, and hair. It is commonly used as a manure, in the state of compost with earthy substances, and sometimes, when it is thought expedient to increase the powers of farm manure, also with stable dung. The clippings are the parings and scrapings of the skins. When ploughed in upon a summer fallow for wheat, these clippings have been found highly serviceable to deep loamy land, and to strong soils which are not too wet, for they not only produce a full clean grain, with a bright straw, but the bulk of the crop is also greatly increased. Care should, however, be taken to cover them well with the soil, for if left near the surface, the putrid effluvia, which they soon emit, attract the crows in swarms, and great quantities are thus lost out of the ground. From thirty to forty bushels per acre is the usual quantity applied; the price varies in different places from 4*d.* to 9*d.* per bushel heaped loose. (*Brit. Husb.* vol. i. p. 423, 424.)

FELLY. A provincial word meaning to break up a fallow. It also signifies a part of a wheel.

FELON, or FETLOW. In farriery, a term for a sort of inflammation in animals, similar to that of whitlow in the human subject.

FELT. A kind of stuff formed of fur or wool alone, or of a mixture of these articles with camel's hair, which are blended into a compact texture used principally in the manufacture of hats. Hare and rabbit fur, wool and beaver, are the chief materials used; they are mixed in proper proportions and tossed about by the strokes of a vibrating string or bow, till they become duly matted together. Felt strongly compressed is now used as cloth. It has one advantage over woven cloth, it does not become threadbare by use. (*Willich's Dom. Ency.; Brande's Dict. of Science and Art.*)

FELWORT, MARSH, or SWERTIA. (*Swertia perennis.*) An herbaceous very bitter perennial plant, nearly allied to gentian, found in watery alpine meadows. The root consists of several long, cylindrical, whitish, intensely bitter fibres; stem erect, a foot or more in height, square; herb quite smooth, bitter. Leaves, about the base of the stem, acute, ovate, stalked, one and a half or two inches long. Panicle of about a dozen light purplish flowers, on opposite angular stems, furnished with a pair of elliptic, oblong bractes; calyx purplish; germen often abortive. (*Eng. Flor.* vol. ii. p. 26.)

FEN. The name of a distemper to which hops are subject. It consists of a quick-growing mould, or moss, which spreads itself with much rapidity, and occasions great injury.

FENCE. In rural economy, is any kind of erection made for the purpose of enclosing ground; as a hedge, wall, ditch, bank, paling, &c., or any continuous line of obstacle interposed between one portion of the surface of land and another, for the purpose of separation or exclusion. The kind of obstacle or material differs according to the animals which are to be separated, excluded, or confined, and the nature of the soil and situation. In the early state of husbandry, fences were little known or wanted, except in particular places, as near houses or yards. The introduction of fences into agriculture was about as great an improvement in the progress of that art, as that of the principle of the division of labour into the art of manufacture.

Fences may be considered as of two kinds — *simple* or *compound.* Of the first sort are all such as are sufficient of themselves for the purposes of enclosure, without the assistance of another kind; as simple ditches, hedges, palings, railings, dikes, walls, &c: 2dly, such as require the assistance of another kind, either to guard and protect, or render them more secure; as hedge and ditches or banks; hedge ditches and palings, or railings; double hedges; hedge and wall; hedge ditch and wall; hedge ditch and trees; hedge, or hedge-wall and belt of planting, &c. All fences are either live or dead, or a compound of these. Live fences
are hedges; that is, rows of shru
close together, and pruned on the
as to form a sort of living wall. De
are either stone walls, mounds of
structures of wood or of other
raised above the ground surface,
ditches excavated in it. The latter
times filled with water. Mixed fe
those in which some kind of dead
used with some kind of live fence
ample, a ditch with a bank of ear
side, or a ditch with a wall or hed
side: the latter the most comm
fences. Various kinds of plants h
recommended for constructing the
fences, of which the principal in u
white and black thorn, furze, hol
and hornbeam, which are all treated
their separate heads. (See HEDGE
W. Bell received the silver med
Highland Society, for an essay "
Whin as a Fence" (see *Trans. H*
vol. v. p. 466.). There are also so
esting details on the subject of fenc
Rev. J. Willis, in the *Com. to*
Agricul. vol. vi. p. 237. (*Brande's*
Science; Willich's Dom. Ency.)

FEN LANDS, or FENS.
marshy lands, the subsoil of whic
stantly in a state of saturation wi
and the surface liable to be over
rivers or streams during spring or
The soil of these lands is general
light, and rich to the depth of two
feet; and as the surface water readil
through this soil to the subsoil,
generally produce, when properly
and cultivated, bulky crops of
corn. As they have very seldo
tural outlet for their drainage, th
ally performed by machinery;
this is the case fen lands are
ductive. (See DRAINING and W
Till lately windmills were empl
draining the English fens; but ste
frequently had recourse to as the
power, and the advantages to the
are immense, because he can lay
dry at the most convenient season;
the operation of the windmill is
matter of chance. The principal fen
land are those of Lincolnshire, Ca
shire, and the adjoining countie
full account of which will be fou
British Statistics, and *M'Culloch'*
Dict. art. "Bedford Level."
Brit. Husb. vol. i. p. 466—469.
Course of Cropping in the Fen
p. 107.) Fens generally abound w
plants, which are very nourishing
(*Brande's Dict. of Science; Will*
Encyc.; Brit. Farm. Mag. vol. i
See IRRIGATION.)

ENNEL, COMMON. (*Meum fœnicu-*
, Smith.) This is a well-known biennial
it, cultivated in our kitchen gardens as
arnish. The poor use it only as a
licine. Root tap-shaped; herb smooth,
deep glaucous green; stem 3 or 4 feet
; leaves triply pinnate; leaflets, thread-
acute, drooping; footstalks, broad and
thing; umbels, terminal, broad, flat,
numerous angular rays; the pistil,
t, slender, unequal; calyx, none; petals,
ate, broad, obtuse, golden yellow; sta-
, yellow; styles, short, with a large,
e, yellow base. The taste and aro-
qualities of the garden fennel are
known. The sweet and warm seeds
common carminative medicine for
ts. (*Eng. Flor.* vol. ii. p. 84.)

NNEL, SWEET. (*Fœniculum dulce.*)
pecies of fennel is an annual plant, a
of Italy and Portugal, where it is
ated as a pot-herb, as well as for the
and the oils which these afford. It is
ller plant than the common fennel.
em is somewhat compressed at the
the radical leaves are distichous;
bes capillary and elongated. The
have only six or eight rays, and the
s much longer than that of the com-
ennel, being nearly five lines long,
mpressed, somewhat curved and paler,
a greenish tinge. The turions are
eeter and less aromatic, and the fruit
has a more agreeable odour and
r.

fruit is imported, and affords the oil
nel and the fennel water of the drug-
Both are useful in flatulent colic;
e latter is a pleasant vehicle for ad-
ering other medicines to children.

NNEL, AZOREAN. See Azorean
EL.

NNEL, WATER. See Water
WORT.

NNEL, HOG'S. See Sea Sulphur
.

NNEL FLOWER: Devil in a
(*Nigella*, from *niger*, black; the
being black.) The species of fennel
are curious and ornamental. They
equire to be sown in the open ground.
eds of *N. sativa* and *N. arvensis* were
rly used instead of pepper, and are said
still used in adulterating it. (*Paxton's*
Dict.) The genus is known by its
ish white and singular-looking flowers
at the top of their stalks, and shel-
by a large leafy involucre, which is
divided. The flowers are yellow, or
some of the species. The seeds are
n March, and they ripen in August.

NUGREEK. (*Trigonella, Fœnum-*
.) Fenugreek is a species of trefoil
sometimes cultivated in fields for its seed; but it yields a very uncertain crop, owing to the variable nature of the weather in England. The stem is a foot high, erect, with round branched stalks, trifoliate leaves, toothed; the flowers small and white; the fruit a sessile, straight, erect, some curved, acuminate, flat pod; containing a number of yellowish seeds having a strong disagreeable smell, and an unctuous, farinaceous, and somewhat bitter taste. These seeds are very emollient, and useful in cataplasms and fomentations.

FENUGREEK, RUSSIAN. (*Trigonella ruthenica.*) A hardy perennial native of Siberia, blowing yellow papilionaceous blossoms in July and August. It loves a strong loamy soil, and an open situation. It is propagated either by parting the roots in spring, or from seed.

FERMENT. (Lat. *ferveo*, I boil.) Any substance employed to raise or produce fermentation when mixed with or applied to another. Ferments are therefore either such substances as are naturally present in the vegetable juice, as in the grape and apple: or are added, as in the manufacture of beer and bread, where yeast and leaven constitute the ferment. Fermentation is met with in fermenting liquors of different kinds, as wine and beer, and the froth or head thrown up by them and its principles are contained in the newly expressed saccharine juices of various summer fruits.

Ferments are of an albuminous and glutinous character; and the presence of nitrogen seems essential in their composition.

FERMENTATION. When certain vegetable substances are dissolved in water and subjected to a temperature of 65° to 85°, they undergo a series of changes which terminate in the production of alcohol or spirit; these changes constitute the phenomena of *vinous fermentation*. Sugar and some ferment are essential to the process, and during the formation of the alcohol the sugar disappears, and carbonic acid is more or less abundantly evolved. The simplest case of fermentation is that of *must*, or of the expressed juice of the grape, which when exposed either in close or open vessels to a temperature of about 70°, soon begins to give off carbonic acid, and to become turbid and frothy; after a time a scum collects upon the surface, and a sediment is deposited; the liquor which had grown warm gradually cools and clears, loses its sweet taste, and is converted into wine. The chief component parts of must are water, sugar, mucilage, gluten, and tartar (bitartrate of potassa). During the fermentation carbonic acid escapes, the sugar disappears, and with it the greater part of the mucilage; the gluten chiefly forms the scum and a portion of the sediment; and the tartar originally in solution is thrown down in the form of a coloured deposit. Sugar and water alone will not ferment; the ingredient requisite to the commencement of the change is the gluten, which absorbs in the first instance a little oxygen from the air, becomes insoluble, and induces the subsequent changes. The reason why grapes never ferment till the juice is expressed, seems to depend upon the exclusion of air by the husk or membranes. In beer the alcohol is derived from the sugar in the malt. When wine is exposed to air and a due temperature, a second fermentation ensues, which is called the *acetous fermentation*, and which terminates in the production of vinegar. During this process oxygen is absorbed, and more or less carbonic acid is evolved; but the apparent cause of the formation of vinegar is the abstraction of hydrogen from the alcohol, so as to leave the remaining elements in such proportions as to constitute acetic acid. Thus alcohol is theoretically constituted of charcoal, water, and hydrogen, and acetic acid of water and charcoal only: the oxygen of the air, therefore, converts the hydrogen of the alcohol into water, and so effects the change into vinegar. See Alcohol and Brewing. (*Brande's Dict. of Science, &c.*) To illustrate these facts let us suppose that the following substances are put together to undergo fermentation: — 300 parts sugar, 600 parts water, 60 yeast; — the products will be 771·5 parts of weak spirit, of which 171·5 is alcohol of spec. grav. 0·822; 94·6 carbonic acid, which flies off and carries with it 41·9 of water, 12 nauseous residue, and 40 residual yeast.

Or it may be illustrated in reference to the formation of the alcohol and the carbonic acid, which are the only real products of vinous fermentation, by the changes which take place in the chemical components of the sugar. If we take 162 parts of sugar, and 18 of water, regarding any yeast employed as merely the means of commencing the fermentation, the product should be 92 of alcohol and 88 of carbonic acid —

	Carbon.	Hydrogen.	Oxygen.
162 parts of sugar consist of	72	10	80
18 parts of water consist of	..	2	16
Ingredients - -	72	12	96
92 parts of alcohol consist of	48	12	32
88 parts of carbonic acid consist of - -	24	..	64
Products - -	72	12	96

Thus we see that the 72 parts of carbon of the sugar is divided between th
and the carbonic acid; that the
the hydrogen both of the sugar
water enter into the composition
cohol, and only 32 parts of the oxy
sugar, and none of that of the wat
mentation, therefore, effects merely
in the distribution of the compone
bodies subjected to its action; th
ferment being the agent which eff
changes without itself entering
products resulting from them.
if added, remains as residual m
where no yeast is required, that
is one of the products of the proce

But this is only that species of
tion which is denominated vinou
fermentation proceeds beyond
which has been described, such c
already stated, take place; and
acetic acid is generated, and the
then termed *acetous fermentation*.
kind of fermentation also follows i
getable matters, namely, the *putr*
which there is a large production
and vegetable mould or humus.
parlance, however, the term *fe*
implies either the vinous or th
fermentation.

FERMENTED LIQUORS ar
quids obtained by the process de
the preceding article. See also Br
Wine, Alcohol, &c. All liqu
have undergone the vinous fer
are considered as great antidotes
faction; for it has been remarked
the custom of brewing and distilli
has prevailed in Europe, many
cutaneous and putrid diseases
our forefathers were afflicted hav
frequent and severe than they
were. The total abstinence from
ed liquors by the Turks is furthe
as one of the chief causes why
more liable to the plague and
tagious diseases, than those nati
whom beer or wine is the common
(*Willich's Dom. Encyc.*) This opi
ever, is purely hypothetical.

FERN. An acotyledonous or
class of weeds, of which there
species in this country. They gr
in mountainous tracts of natura
Fern is extremely difficult to er
the roots in deep soils have been
the depth of seven or eight
however troublesome this plant
to the industrious husbandman,
altogether useless. It forms a
for cattle, and may be used as
though inferior to many other m
will last ten or twelve years.
good manure for potatoes whe

serves for fuel, where it is
rewing, baking, heating ovens,
&c. The ashes, which the
in great abundance, yield
he poor in some districts mix
water and form lye balls for
n, which are a useful and
te for soap. In Norway the
re infused in hot water, and
wholesome and relishing food
tic cattle, which eat them
anage to thrive and grow fat

rt of Mr. David Campbell to
Society of Scotland, it appears
ing is the expense of thatch-
He says, "I shall apply the
a house 40 ft. long, and the
oof 13 ft. on each side, which
face of 115½ square yards, or
to be thatched. If the fern
and easily taken out of the
tive man will pull about a
in a day, for which he would
. This cart load it is con-
thatch about 6½ square yards,
d take 18 cart loads to thatch
ce, thus making the expense

	£.	s.	d.
n, about - -	1	7	0
ays, at 1*s*. 6*d*. -	1	5	6
n, at 9*d*. per load -	0	13	6
f for rigging, and he thatch - -	0	9	0
	3	15	0

more than 7¾*d*. per square
nd of thatch, if done properly,
he south or sunny side of a
hteen to twenty years; (in
s it has been known to endure
rs;) while on the north side,
annot be calculated on much
or ten years; for while heat
contribute to the preservation
et and damp hasten its decay.
. *Soc.* vol. ii. p. 189.)
ical point of view, it would
and useless to describe the
n this work; we shall therefore
ularly those only which are
other uses than thatching, or
n of alkali from their ashes, or
manure, as they may all be
these purposes.
ield Fern (*Aspidium filix-mas*)
growing in woods, dry ditches,
banks. Its roots are tufted,
its fronds or herbage are
ne root, three feet high, doubly
t; the midribs scaly, and the
e, serrated, partly confluent; the masses of seminal capsules near the midrib, and not occupying more than the half of each leaflet; and the capsular cover orbicular.

The root is nauseous, and was at one time much used as a remedy for tape worm; it indeed was the principal ingredient in the celebrated remedy of Madame Nouffer, who received 18,000 francs from Louis XVI. for her secret: but since the introduction of the oil of turpentine, as a remedy for tape worm, fern root has ceased to be employed.

2. Maidenhair (*Adiantum capillus veneris*) is a perennial found on moist rocks and old walls near the sea. It is an elegant fern; the roots are blackish, shaggy, creeping; the fronds from 6 to 12 inches high, doubly compound; the leaflets alternate on capillary stalks, wedge-shaped, lobed, deep green, smooth, and each segment terminated in a roundish, flat scale, with the cover transversely oblong.

This fern, as well as another species of the same genus, *A. pedatum*, is employed for making the well-known syrup called *capillaire*, which is, when diluted with water, a pleasant beverage in fever.

3. Fir Club Moss (*Lycopodium selugo*). A perennial, common on the Derbyshire and Yorkshire hills, and in the Highlands of Scotland. The root is fibrous; the stem 5 to 10 inches high, once or twice forked, and level at the top. The leaves uniform, crowded in eight rows, lanceolate, obtuse, entire, slightly spreading; capsules on the uppermost shoots, kidney-shaped. See CLUB MOSS.

The Highlanders use this fern instead of alum to fix colours in dyeing. The root is a powerful emetic and purgative; but its action is attended with giddiness and convulsions, consequently it is dangerous.

4. Greater Rough Horsetail (*Equisetum hyemale*). A perennial, found in boggy woods. The root is black and variously branched; the stem 2 to 3 feet high, erect, naked, rough, branching at the top, embraced by tight whitish sheaths, black at the top and bottom; and the teeth deciduous. The fruit is in a terminal catkin, and abounds with whitish powdery seeds.

This fern is well known for its use as a polisher, owing to the flinty particles (*silex*) deposited in the furrows of the cuticle. It is usually imported from Holland, and is therefore called Dutch rushes. (*Willich's Dom. Encyc.*; *Low's Prac. Agr.*)

FERN, BLADDER. See BLADDER FERN.

FERN, BRISTLE. See BRISTLE FERN.

FERN, FEMALE. See BRAKES.

FERN, FILMY. See FILMY FERN.

FERRET. (*Mustela furo*, Lin.) An useful animal, which came originally from Africa, whence it was introduced into Spain, and subsequently into this country. It has red fiery eyes; the colour of its whole body is of a pale yellow; and its length from the nose to the end of the tail is about 19 inches. The female is rather smaller in size, and produces, twice annually, from five to eight or nine young ones, after a gestation of six weeks. Ferrets are principally employed for the purpose of hunting rabbits, to which they are mortal enemies, and of destroying vermin in corn stacks and outbuildings. These animals are always kept confined in a box or cask, and fed upon bread, milk, &c.

FERRUGINOUS SOILS. Soils which contain a large proportion of iron.

FESCUE GRASSES. See Festuca.

FESTING-PENNY. A term provincially applied to the earnest given to servants when hired at fairs, markets, and other places.

FESTUCA. The *Fescue Grass.* A very extensive genus of grasses, of which the meadow fescue (*F. pratensis*) and the hard or smooth fescue (*F. duriuscula*, vel *glabra*) are those of the greatest use in permanent pasture. Combined with cock's-foot grass, and some other of the natural grasses, these two species of festuca will be found well adapted for the alternate husbandry, and secure the most productive and nutritive pasture in alternation with grain crops. Sir J. E. Smith, in his *Eng. Bot.*, observes, "that in this genus it is hard to say what may, or what may not, be a species;" and with his usual force and clearness he reduces the *F. glauca*, *F. glabra*, *F. Cambrica*, *F. duriuscula*, and *F. rubra* of Hudson, Lightfoot, Withering, Winch, and Stillingfleet, &c. into one species. All these grasses vary much from change of soil and situation; the flowers are particularly apt to vary in number as well as in the length of their awns. There is one character, however (says Sinclair), which I have never found to change under any variety of culture, which is the creeping root; and this is also an agricultural distinction which is never to be lost sight of, as it always produces a *specific* effect upon the soil, very distinct indeed from that of the fibrous-rooted kinds. It will be sufficient, therefore, for the purposes of the agriculturist, to consider these grasses as two distinct species, the fibrous-rooted and the creeping-rooted, noting at the same time their varieties from other parts of the plant. Following the experiments instituted by Sinclair, in his valuable work on the grasses, I shall proceed to notice, *seriatim*, the different species of festuca, and point
relative properties.

Festuca alopecuris. Foxtail-lik
grass. Root annual. Although
classed as *a. Bromus*, this grass is
a. Festuca. Culms smooth, upri
larger valve of the blossom furni
long, straight, flat-lying hairs at
which distinguish it from every oth
of fescue. The long, linear,
smooth, glaucous leaves also dist
at first sight from the differe
species of fescue or brome grass.
amount of produce and nutriti
afforded by this annual fescue,
found much inferior to the soft br
(*Bromus mollis*), many-flowere
grass (*B. multiflorus*), and other
nual indigenous grasses, and it
therefore appear suitable for a
purposes. The leaves attain to a co
length, and contain more nutriti
but the culms less, than most of
annual grasses. It flowers abou
of July, and the seed is ripe in
ning of September.

Festuca bromoides. Barren fe
Panicle nearly erect, racemose.
tapering, shorter than their awn
cylindrical, rough at the top;
row, tapering, sometimes hairy on
side, shorter than their sheaths;
of their stem naked. Root of
brown fibres; annual; some sa
Stems several, 4 to 12 inches hig
some of the lowest joints. A pal
slender, insignificant grass of shor
at least after it has flowered in Ju
Flor. vol. i. p. 142.)

Festuca calamaria. Reed fe
Panicle repeatedly compound,
while in flower, erect. Florets
5, oblong, cylindrical; root fibro
Spikelets small in comparison
herbage, erect, often tinged with
brown. Stems several, upright,
high, leafy, round, smooth. Lea
late or linear, flat, taper-point
many-ribbed, rough at the edges,
times on both sides, from 6 to
long, of a deep green colour. T
which is too large and coarse to
agricultural merits, is found in m
woods in Scotland, Ireland, and
west part of England. There i
variety, with much narrower le
times met with in Scotland.

Festuca Cambrica. Welsh fe
constant variety of *F. rubra*
Engl. Flora, vol. i. p. 142.) is
tinguished from the *F. ovina*, a
rieties of *F. rubra* and *F. du*
the pale green colour of the

oot leaves grow more upright
en cultivated, the spikelets
or 12 florets. Roots creep-
l. Flowers about the first
, and the seed is ripe in the
Experiments tend to prove
is greatly inferior to the *F.*
the quantity, and nutrient
produce. It springs rather
e hard fescue, and also rises
being cropped, but not ap-
sufficient degree to compen-
eficiencies in other respects.
being so common as the *F.*
d inhabits the drier sorts of
e yield and value of this grass
stages of growth is about
superior weight of nutritive
d by the crop at the time the
arises from the increase of
kes place during the time the
ing.

metorum. Pubescent wood-
Root perennial, slightly
anicle branches pointing in
ns. Leaves long, slender,
, and pointing downwards;
g. The whole plant is of a
colour, the spikelets nearly
e numerous fine hairs that
The peculiar pubescence of
nd the distorted figure of the
remains unaltered from seed,
listinguish this species from
h, Welsh and creeping fescues.
ich appears to belong to the
is a native of woods, where
y and sandy. Its nutritive
out one third inferior to those
, although it yields a larger
o much later in the produc-
in the spring, and the latter
eficient.
n the second week of June,
is ripe about the middle or

iuscula. Hard fescue. Pa-
l, oblong, much spreading
r; florets longer than their
und, upper leaves flat, root fi-
al; scarcely creeping, though
wing out short lateral shoots.
feet high, erect, leafy, stri-
(*Eng. Flor.* vol. i. p. 141.)
e early attains to maturity;
succulent and nutritious; it
after being cropped, and
early. From the above de-
very deficient in the weight
t appears to be one of the
e or dwarf-growing grasses.
most prevalent on light rich
also continually found in the

richest natural pastures where the soil is retentive of moisture, and is never absent from irrigated meadows that have been properly formed. It attains to the greatest perfection when combined with the *F. pratensis* and *Poa trivialis*. From its property of withstanding drought in rich natural pastures better than many other grasses, added to the merits above-mentioned, this grass is entitled to a place in the composition of the best pastures, but not in any very large proportion on account of its inferior productive powers.

When cultivated on a poor silicious soil, or on a thin heath soil, the culms become very fine and slender, and promise to be valuable for the manufacture of straw hats. This grass flowers about the middle of June, and the seed is ripe late in July.

Festuca elatior, var. *fertilis*. Fertile-seeded tall fescue-grass. This is a coarse but nutritious grass, forming sometimes a considerable proportion of the crop of marsh land hay. Root somewhat creeping, with downy fibres penetrating deeply into the mud or clay. Stem about 4 feet high, reedy, striated, smooth, and leafy. Panicle a foot or more in length, repeatedly compound, spreading widely. Every part is nearly twice the size of *F. pratensis*. (*Eng. Flor.* vol. i. p. 149.) This grass differs from the common variety of tall fescue in having the panicle somewhat drooping; spikelets six-flowered, more ovate and flat; the larger husks of the calyx often uncovered, and the awn is fixed on the apex more in the manner of a bromus than of a fescue. Leaves smoother, and of a less dark green colour. For damp soils, that cannot conveniently be thoroughly drained, this would be a most valuable plant, either to be cut for soiling, or made into hay, and reduced to chaff as it might be wanted. This grass (which is nearly allied to the common *F. elatior*, next to be described) perfects an abundance of seed (though not entirely free from diseased portions), and is therefore not liable to the objection which takes so much from the value of that variety. It is equally early in the produce of foliage, and the nutritive properties are about the same. It flowers early in July, and the seed is ripe in the first week in August.

Festuca elatior, var. *sterilis*. Barren-seeded tall fescue. This species greatly resembles the *F. pratensis*, but is larger in every respect, and flowers eight or ten days later. The panicle of the *pratensis* is upright at first, afterwards drooping; while the panicle of the *elatior* is drooping at first, and afterwards erect; spikelets of a green and purple colour, cylindrical, generally awned; leaves rougher and less pointed than those of the *F. pratensis*. Root perennial, fibrous. This is a grass admirably adapted for tenacious clay soils, and might be cultivated with advantage by the farmer combined with some of the other highly productive grasses, in such moist spots of the soil as are peculiarly suited to the growth of this species, although less fitted for the growth of proper pasture grasses. It is nutritive and very productive, and one of the first grasses in the production of foliage early in spring. The produce, like that of all grasses which yield a great weight of crop, may be considered coarse when compared with the *F. pratensis* and *Alopecuris pratensis;* but this objection may be overcome by reducing the hay to chaff, and mixing it with clover-hay. The nutritive matter contains but little bitter extractive or saline matter, while the clover contains an excess. It flowers in the second week in July; the seed is universally affected with the disease termed *clavus*, and consequently unfertile; it can only, therefore, be propagated by parting and planting the roots.

Festuca gigantea. Tall fescue-grass. Root fibrous, perennial, fibres woody; from two to four feet high, erect, naked, round, striated, smooth; leaves sword-shaped, dark green, a foot and a half long; panicle nodding at the top; awns somewhat flexuose, longer than the husks. This species is confined to woods in its natural state; but it continues in the soil, and appears to thrive equally well when cultivated in open situations. It is a coarse grass, and but little nutritive, although greatly superior to the spiked and wood fescue grasses. The seeds are eaten by birds; and this appears to be the chief use of the plant, its large structure being apparently intended to enable it to perfect its seed among bushes. where it would else be choked up. It flowers late in June, and the seed is ripe towards the close of July.

Festuca glabra, var. Smooth fescue. Panicle branched, upright, compact; spikelets spear-shaped, 4-6-flowered, smooth, awned; root fibrous; perennial. This grass is nearly allied to the *F. duriuscula* and *F. rubra.* According to Sir J. Smith, it is a variety of the last-named. It differs in having the awns longer; panicles, branches, and spikelets smoother; spikelets shining; root scarcely creeping; root-leaves much longer. The distinction of creeping root is sufficient to guide the agriculturist in this instance, for the varieties of the creeping-rooted species are all to be rejected as less desirable for cultivation; and among the fibrous-rooted varieties of the *F. duriuscula*, there is not so great a difference in their comparative value as to render the adoption of one for the other of so much importance as in many other instances, where the distinctions are equally minute. From the trials made with this grass, it seems to be inferior both in produce and nutritive matter to the *F. duriuscula*, but is superior in regard to early produce, and the herbage is uncommonly fine and succulent. These merits, however, appear hardly sufficient to compensate for the deficiency of produce. If it be compared with some of the early grasses, *Anthoxanthum odoratum*, for instance, it will be found superior in nutritive matter in the proportion of about one third. While this grass cannot be recommended in preference to the *F. duriuscula*, yet, among the fine-leaved fescues, it will be found the best substitute for that species when wanting. It is not so common as the *F. duriuscula*, being more confined to the moist spots of pastures, although occasionally found also on the drier places in company with it. It comes into flower about the middle of June, and the seed is ripe about the middle of July.

Festuca glauca. Glaucous fescue-grass. Panicle rather spreading; spikelets spear-shaped, awned; culms and leaves smooth; whole plant glaucous; root perennial, fibrous. Mr. Curtis, in his enumeration of British grasses, mentions this grass as indigenous; but it is very rare to meet with it in its natural state. There is a variety of this species with subulate leaves, which grow in dense tufts. Every part of the plant is smaller than the first variety, and, from its difference in the shade of colour, it may be called var. *glaucescens.* Unlike the *Poa trivialis*, and some other grasses, the yield of dry produce is no greater when the seed is ripe than at the time of flowering, which affords one out of many proofs that might be advanced, of the value of the culms of grasses intended for hay. The culms, at the time of flowering, are of a very succulent nature; but from that period until the seed be perfected, they gradually become dry and wiry; and neither in the stem, leaves, or any other part of the plant, except the seeds and roots, does any apparent increase take place.

The *F. glauca* is a native of alpine situations, but thrives better when cultivated on lower ground than most other species having the same origin. Although its merits do not appear sufficiently great to entitle it to a prominent place among the superior grasses for light soils, yet its hardy and nutritive nature, and property of forming a thick turf, prevent it from being altogether rejected as of no value. It flowers in the second week of June, and the seed is ripe about the first week of July.

Festuca loliacea. Darnel-like fescue-

arranged so as to stand facing
lk; while in the darnel-like
tand with their back towards
ss possesses all the valuable
rye-grass, and few of its de-
roduce is larger; it springs
nproves by age, which is not
common rye-grass. It would,
the best substitute for that
ernate cropping; but, unfor-
es not perfect a sufficiency of
ers generally proving abortive,
its propagation inconvenient
e. In rich meadows this grass
mon, particularly where the
ically overflown. The darnel-
wers in the close of June, and
ny) is ripe in the third week

urus. Wall-fescue, Capon's-
anicle drooping, elongated,
florets tapering, shorter than
ough at the top; leaves awl-
leafy to the very summit. It
he "trembling rye-grass" of
annual (*Eng. Flor.* vol. i.
e flowers have only one sta-
istinguishes it from all other
scue. This grass has great
barren fescue (*F. bromoides*),
e plant is larger and stouter,
hed with leaves to the top, and
ur times as long. The inner
blossom is fringed towards the
s are longer than those of the
. This grass is found on walls,
en, sandy places. As soon as
ripe, they fall out of the husks,
quickly after, without any
arth. The plants are of the

leafy below, square in the upper part; leaves very numerous, composing dense tufts, folded, bristle-shaped; stipulæ very short and obtuse; (*Eng. Flor.* vol. i. p. 139.) root fibrous, perennial. The awns appear to be an uncertain character in this grass, as it is frequently awnless, and there are varieties of it having awns. All the varieties may, however, be distinguished at first sight from the *F. duriuscula*, *glauca*, *rubra*, &c., to which it is nearest allied, by the compact though simple appearance of the panicle, which more distinctly faces one way.

Linnæus affirms that sheep have no relish for hills and heaths that are destitute of this grass. Emelin, in his *Flora Siberica*, also informs us that the Tartars select places for pasturage during the summer where this grass is in the greatest plenty, because it affords a most wholesome food for all sorts of cattle, but chiefly sheep. Dr. Anderson, in his *Agricultural Essays*, affirms that it is capable of affording an immense quantity of hay. Mr. Curtis, however, in his *Practical Observations on British Grasses*, very justly combats this opinion, and asserts that it is more fitted for forming grass-plats; but even for this purpose it will only succeed on soils which are nearly as dry and light as that on which it is spontaneously produced. From trials which have been made, the sheep's fescue does not appear to possess the nutritive powers usually ascribed to it. It has, however, the advantage of a fine and succulent foliage, and may, on that account, be better adapted to the masticating organs of sheep than the larger grasses, whose nutritive powers are greater. Hence it may be of some value as variety. It flowers earlier than any of the other fescues, and appears to possess sufficient merit to entitle it to a place in the composition of the best pastures, particularly as a substitute for the *F. duriuscula*, on soils of a drier or sandy nature. Its nutritive qualities are nearly the same as those of the *F. duriuscula*, but it is superior to that species, and to most others, in the produce of early herbage in the spring; and the herbage is very fine, tender, and succulent. The culms are well adapted for the manufacture of the finest straw plait, being very distant in the joints, and of an equal thickness throughout. This grass flowers in the last week of May, and the seed is ripe in June.

Festuca pinnata. Spiked heath fescue-grass. This is the winged-spiked brome-grass of some botanists, and seems to connect the bromes and fescues in a natural series. Spike simple, erect, two-ranked; spikelets nearly cylindrical, a little distant, awned; awns after flowering a little spreading, shorter than the husks; leaves nearly smooth; root perennial, scaly, rather creeping. It is found sometimes in open fields and heaths, on a chalky soil, but grows chiefly in dry, hilly woodlands, particularly where the soil is calcareous. This grass cannot as yet be considered in any other light than a noxious weed; for though the weight of the produce is considerable, it is neither early, nor nutritive, nor relished by cattle. This, and the *F. sylvatica*, which is also an inhabitant of woods where the soil is silicious, may be considered the least useful of the British grasses. It flowers about the third week of July, and ripens the seed late in August.

Festuca pratensis. Meadow fescue-grass. Panicle nearly upright, branched, spreading, turned to one side; spikelets linear, compressed; florets numerous, cylindrical, obscurely ribbed; nectary four-cleft; root fibrous, perennial.

Dr. Withering makes this grass a variety of the *F. elatior;* but it is more justly made a distinct species by Sir J. E. Smith. It differs from the *F. elatior* in being only half as high, the leaves only half as broad, and the panicle shorter, and containing only half the number of flowers. The panicle is but once branched, droops but slightly, and leans to one side when in flower, and the flowers grow all one way. In the *elatior* the panicle branches both ways, it droops much at first, and the flowers grow more loosely; the spikelets are rounder, ovate, and pointed, while in the *pratensis* they are somewhat linear, flat, and obtuse.

The *F. pratensis* is eaten by horses, cattle, and sheep, which are all very partial to it. In point of early produce in the spring, this grass stands next to the meadow
(*Alopecurus pratensis*) and is superi
respect to the cock's-foot.

The meadow fescue constitute
considerable portion of the herba
rich natural pastures and irriga
dows; it makes excellent hay, and
large plant, yet the herbage is succ
tender, and much relished by cat
does not form rank tufts like th
grasses. Although essential for p
pasture, yet this grass is not by it
adapted for the alternate husban
should be combined with cock's-f
grass, and rough-stalked mead
The *F. pratensis* is not so abunda
deep alluvial soils of Lincoln, as i
districts. In the vale of Aylesbu
stitutes a considerable portion of
valuable and fattening pastures of
grazing district. Mr. Taunton's e
of this grass grown on a stiff cl
proved that a copious crop of s
may be obtained the second year
ing. It flowers in June, and ripen
late in July, or early in the followi

Festuca rubra. Creeping or p
cue-grass. Panicle unilateral, s
florets longer than their awns; leav
on the upper side, more or less
root perennial, extensively cre
the sea coast often extending to
or even yards in length. Ther
varieties of this species; one wit
bristle-shaped root-leaves, and
with broader leaves. It has muc
to the *F. duriuscula*, from which i
ever distinguished by the leaves,
broader and longer, and the branc
panicle are also longer; the shea
leaves are always more or less p
— but the essential and unerrin
tion is the creeping root, whic
broader-leaved variety is nearly
as that of common couch-grass
smaller-leaved variety the root is l
fully creeping. The resemblan
exists between the *F. duriuscula*,
F. Cambrica, and *F. rubra* is ve
but there is not much difference
gard to their comparative value a
except the distinction of the cre
of the latter, which is of the m
quence to the farmer.

From the detailed table of ex
on the next page, it will be seen
creeping fescue has no sufficient
those species it resembles in habit
pensate for the impoverishing eff
creeping roots to the soil. T
flowers in the third week of June
seed is ripe in the second week of

Festuca sylvatica. Slender wo

e wood brome-grass of some bo-
pike simple, drooping; spikelets
arly cylindrical, turned to one
longer than the glumes or husks;
ht green, spreading, pointed,
re or less hairy; root fibrous,
This species appears to be nearly
e *F. pinnata*, but the distinction
less obvious: in this the spike
lding, in that erect; the awns of
ata are shorter than the blossom;
e *F. sylvatica* are longer. The
former is creeping, but this grass
s root. The general appearance
se grasses promises but little to
labours of the experimentalist.
l place of growth of the *F. syl-*
woods, hedges, and damp shady
en, horses, and sheep refuse this
offered to them. Hares and
y crop the extremities of the
ng deep snows and severe frosts;
irds seem to neglect the seeds,
other resource fails. This grass flowers in the second week of July, and the seed is perfected about the first week of August. It is very subject to the rust at the time of flowering.

Festuca uniglumis. Single-husked fescue-grass. Panicle erect, nearly simple; spikelets erect, or a little turned to one side; florets tapering, compressed, awned; one valve of the calyx very short; stems several, from 6 to 14 inches high, erect, leafy nearly to the top, simple, very smooth; leaves acute, somewhat involute, furrowed and often hairy on the upper side; root biennial, fibrous, slightly downy. This grass is found on the sandy seacoast, chiefly of Sussex; it possesses no agricultural merits, and Sinclair does not even notice it.

The following tabular arrangement is condensed from the extensive and valuable experiments made on these grasses by the late Mr. George Sinclair. There are some few which he has not thought it worth while to submit to trial. (*Sinclair's Hort. Gram. Wob.; Smith's Eng. Flor.*)

Species of grass.	Description of Soil.	Produce per Acre in lbs.		
		Green.	Dry.	Nutritive Matter.
ecurus, in flower	Silicious sand	8,167 8 0	2,624 2 0	319 0 0
ubrica, in flower	Sand	6,806 4 0	2,892 10 8	239 4 8
——, when seed ripe	—	13,612 8 0	4,083 12 0	478 9 0
actorum, in flower	Rich black sand, incumbent on clay	10,890 0 0	5,445 0 0	170 2 8
———, when seed ripe	—	9,528 12 0	2,858 10 0	223 5 4
iuscula, in flower	Clayey loom, manured	18,376 14 0	8,269 9 8	1,004 15 12
———, when seed ripe	—	19,057 8 0	8,575 14 0	446 10 9
ior, var. *fertilis*, in flower	Black sandy loam, incumbent on clay	54,450 0 0	23,821 14 0	4,253 14 0
——, var. *sterilis*, in flower	Black rich loam	51,046 14 0	17,866 6 8	3,988 0 9
————, seed ripe	—	—	—	2,392 13 2
anica, in flower	Rich silicious sand	27,225 0 0	1,063 7 0	837 7 11
bra, in flower	Sandy loam with manure	14,293 2 0	5,717 4 0	446 10 9
——, seed ripe	—	9,528 12 0	3,811 8 0	186 1 0
uca, in flower	Brown loam	9,528 12 0	3,811 8 0	446 10 0
——, seed ripe	—	—	—	223 5 4
acea, in flower	Rich brown loam	16,335 0 0	7,146 9 0	765 11 0
——, seed ripe	—	10,890 0 0	4,492 2 0	553 2 0
urus, in flower	Silicious sand	9,528 12 0	2,858 10 0	223 5 4
na, in flower	Light sand	5,445 0 0	212 11 0	66 7 0
——, when seed ripe	—	—	—	127 9 0
hordeiformis, in flower	Sand with manure	13,612 8 0	4,083 12 0	478 9 0
————, seed ripe	—	9,528 12 0	3,811 8 0	260 13 0
ovata, in flower	Silicious sand manured	20,418 12 0	8,167 8 0	398 12 0
tensis, in flower	Fertile peat manured with coal ashes	13,612 8 0	6,465 15 0	957 2 1
———, seed ripe	—	19,057 8 0	7,623 0 0	446 10 9
bra, in flower	Light sand	10,209 6 0	4,338 15 0	239 4 0
——, seed ripe	—	10,890 0 0	4,900 8 0	340 5 0
vatica, in flower	Rich silicious sandy loam	20,418 12 0	8,167 8 0	638 1 6
ipara, in flower	Light sand	6,806 4 0	—	283 9 0

vivipara. Viviparous fescue-
anicle unilateral, rather close;
pressed, keeled, awnless, some-
y, as well as the edges of their
e and the calyx; stem square;
ed, bristle-shaped, smooth. The
es, and general habit nearly agree
F. ovina, of which most botanists
ned this a variety. This grass
urious exception to the general law of nature in the propagation of plants by their seed. It has every part of a flower, except the two most essential ones, for its propagation, namely stamens and pistils. Yet from this imperfect flower it produces perfect plants. The rudiment of the future palnt originates in the upper floret of each spikelet, and in its first stage appears like a minute globule of water, scarcely visible to the naked eye; but after the spike is deve-

loped, it gradually assumes an oblong figure, becomes pointed, and at last puts forth a single leaf, after the manner of perfect seed of grasses; other leaves succeed to this, till the weight of these (now a perfect plant of grass, except the root) forces it to fall from the spike to the ground, or bends down the spike, where it soon strikes root. This grass continues viviparous on all soils. Many other grasses are viviparous, as *Alopecurus pratensis*, *Cynosurus cristatus*, *Poa alpina*, *Phleum pratense*, *Anthoxanthum odoratum*, &c.; but in these the seed is first perfected, and merely vegetates in the husk from accidental circumstances, such as growing in shaded places, and from long continuance of moist warm weather.

This grass, which is natural to alpine situations, can only be propagated by parting the roots, or by planting the young plants formed in the ear. But from the trials that have been made of it, it appears to have no excellence that can recommend it to the notice of the agriculturist.

FETLOCK. In horsemanship, the part of the leg where the tuft of hair grows behind the pastern joint of horses; those of low size have scarcely any tuft. In working horses, which have them large with much hair, care should be taken to keep them clean, in order to prevent the grease. The fetlock joint is a very complicated one, and from the stress which is laid on it, and its being the principal seat of motion below the knee, it is particularly subject to injury. An affection of this part should be well fomented and immediately blistered.—(*The Horse*, p. 252.; *Clater's Far.* p. 258.)

FETTER. A term applied to the chain used for confining the legs of animals.

FEVER. In farriery, a disease that frequently attacks horses and cattle, and in which there is an increased quickness of circulation of the blood. Fevers may be of different kinds; but in that with which horses are the most commonly attacked, the symptoms are, great heat and dryness of the skin, jaws, and tongue, restlessness, the creature ranging from one end of the rack or stall to the other; his flanks beat; his eyes are red and inflamed; his tongue parched and dry; his breath hot, and of a strong smell; he loses his appetite, and nibbles his hay, but without chewing it, and is frequently smelling to the ground; the whole body is hotter than ordinary; he dungs often, little at a time, usually hard, and in small bits; he sometimes stales with difficulty, and his urine is high coloured; he seems to be thirsty, but only drinks little at a time and often; his pulse beats full and hard.

The first effort in this kind of fever is bleeding, to the quantity of two
quarts, if the horse is strong an
condition, and repeated if necess
give a gentle dose of physic, whi
assisted by a glyster if necessary,
a fever ball composed of

1 drachm tartar emetic, 1 drach
phor; with linseed meal and treacl
to form a bolus.

FEVERFEW. (*Pyrethrum*;
fire, the roots being hot to the t
this interesting genus of plants, t
caria of Linnæus, three species o
digenous.

1. The common feverfew (*P. pa*
a biennial which grows in waste
hedges, and walls, flowering in
July. Root tapering, small a
stem erect, branched, leafy, rou
flowered, about two feet high; leav
of a hoary green, pinnatifid. Fl
merous, like daisies, white or ye
a corymbose panicle, sometimes c
on long naked stalks, erect, abo
inch broad. The whole plant ha
disagreeable smell, a bitter taste,
a volatile oil by distillation. It
merly reckoned tonic, stimulating,
hysterical, and the oil is still re
such. It contains much tannic
in Germany it has been usefully
in tanning and currying leather.

2. The corn feverfew, or scent
weed (*P. inodorum*), is very co
cultivated fields, and by wayside
velly soils. Root tapering, rath
annual, flowering in August or S
Herb nearly destitute of the pecul
able or disagreeable odours of
Stem branched, spreading, leafy,
smooth. Leaves sessile, pinnate.
as in the last. The seeds crown
membrane, the best diagnostic ch
the species.

3. The sea feverfew (*P. mari*
perennial, flowering in July or
found on the sea coast in sandy
ground. The thick, woody, long-
root runs deep into the ground, p
a number of hollow stems, sprea
cularly on the ground, often tin
purple. Leaves crowded, sessile
pinnate, of a dark shining green;
the seeds lobed; stem diffuse. Fl
quite so broad as those of *P.*
The whole herb is slightly aromati

The common wild chamomile, M
chamomilla, was formerly classed a
few. The greenhouse kinds of fever
in any rich light soil, and young
root readily when planted unde
Any common soil suits the hardy ki
are increased by divisions or seeds

ie properties of the real chamomile rked degree, and might be substi- or it as a medicinal agent. (*Eng.* l. iii. p. 451.)

. A provincial word signifying to grain with the natural wind; and lean wells or ponds.

. A word of Gothic origin, ap- the northern parts of the island, to averaged returns of the prices of r the current year in the different , which are fixed by the sheriffs vely, with the assistance of juries, onth of February. When the jury n called, evidence of the prices of erent grains raised in the county laid before them; and the averages by the jury and sanctioned by the e termed the *fiars* of the year in hey are struck, and regulate the f all grain stipulated to be sold at prices. These fiars also regulate o price has been otherwise agreed e contract price upon delivery for own in the county. Having the f grain, &c. ascertained in each as greatly facilitated the introduc- Scotland of the practice of letting corn rents, convertible at the prices ay. In England, where there are authentic local returns, there is fficulty in converting corn rents ey rents, as reference can only be the prices of some particular mar- h would be too limited a criterion, e kingdom at large, which, on the nd, would be too extensive. (*Bell's* t.)

D. (Sax. ꝼelꝺ; Germ. *feld*; Dutch, A portion of land enclosed by a rendered distinct by some line of n, and set apart either for tillage or In former times, and until within the centuries, almost all the land cul- with the plough throughout Europe nclosed; and the term "field" was plied, in Britain at least, to the lands culture by the plough. Subse- , when farmers enclosed and sub- a portion of the lands near the farm- ese portions were called fields, and e distant portion which remained s called open field, or common field, rass lands unenclosed were called s. In the present improved state lture, every farm is divided into ther simply by lines of demarcation, re sufficient when no animals are to d on the farm, or by lines of sepa- which will act as fences, such as edges, ditches, &c., where cattle are grazed. Each field on a farm is known by a particular distinguishing name. Without some regular fixed division of arable lands, it would be next to impossible to conduct a rotation or succession of crops. It is interesting to observe that, as agriculture in a rude state had no fences, so this is also beginning to be the case in agriculture in its most refined form; because it is found much more advantageous, both for the production of butcher's meat and manure, to consume the grass and herbage grown on farm lands in farm yards, with the single exception of that portion which is eaten by sheep; and these are now often merely confined to successive portions of grass and other green crop lands by light netting or hurdles, scarcely visible at a short distance. (See FOLDING.) By thus getting rid, to a more considerable extent, of fences of every description, from a tenth to a fifth will be added to the contents of the greater number of corn farms; and a very considerable first cost and annual expense will be saved in planting hedges or building walls, and in keeping them in repair afterwards. (*Brande's Dict. of Science, &c.*)

FIELDFARE. (*Turdus pilaris.*) A bird of the thrush tribe, which is a seasonal visitant in this island. It seldom makes its appearance before the beginning of November, migrating in flocks from the colder northern parts of the continent, numerous according to the severity of the season. The fieldfare leaves us again about February or March, and retires to breed in Sweden, Russia, and Norway, where they are very plentiful. They fly in a body, and, if the weather continues open and mild, spread themselves over pasture lands in quest of worms, slugs, the larvæ of insects, and any other soft-bodied animals; but on the occurrence of snow or frost they betake themselves to the hedges, and feed greedily on haws and various other berries. When the fieldfare breeds in this country, (which is a very rare occurrence,) it fixes its nest, formed of sticks, coarse grass, weeds, and clay, against the trunk of a fir, and lays four to six eggs, of a light blue, mottled with spots of dark-red brown, one inch three lines long by ten lines broad. The call-note of the fieldfare is harsh, but its song is soft and melodious. The whole length of the bird is ten inches; general colour of the plumage ash-grey, mottled with brown; chin and throat golden amber, breast reddish-brown, belly white. (*Yarrell's Brit. Birds*, vol. i. p. 189.)

FIELD GATE. See GATES.

FIELD LARK. See LARK.

FIELD MOUSE. See FIELDVOLE.

FIELDVOLE. (*Arvicola agrestis.*) A name of the short-tailed field mouse or meadow mouse; a species which subsists exclusively on vegetable productions; and being, like the rest of the rat tribe, extremely prolific, multiplies occasionally to such a degree, even in this country, as to become the most injurious of our wild quadrupeds. "After having followed the labours of the reaper, and taken their share of the harvest," the fieldvoles, says Mr. Bell, "attack the newly-sown fields, burrowing beneath the surface, and robbing the husbandman of his next year's crop, and at length, retreating to the woods and plantations, commit such devastations on the young trees as would scarcely be credible, were not the evidence too certain to be doubted. In the years 1813 and 1814, these ravages were so great in the New Forest and the Forest of Dean, as to create considerable alarm, lest the whole of the young trees in those extensive woods should be destroyed by them." A timely and assiduous attention to restraining the increase of this pernicious species, by the aid of terriers, ferrets, and traps, is imperative on those who have the charge of young plantations; but when the numbers of the fieldvole have surpassed the usual bounds, then it is recommended to dig holes about a foot in depth, and the same in diameter, taking care to make them much wider at the bottom than at the top, so that the animal once in cannot easily get out again. In holes of this kind, Mr. Jesse states that at least thirty thousand fieldvoles were caught in the course of three or four months in Dean Forest plantations; that number having been counted out and paid for by the proper officers of the forest. (*Brande's Dict. of Science.*)

FIG. (*Ficus.*) The genus to which the common fig-tree belongs is of considerable extent; and its species are among the most noble objects belonging to the vegetable kingdom. In tropical countries the trees which yield caoutchouc (India rubber) of the finest quality belong to this species, particularly *F. elastica*. The celebrated banyan-tree (*F. religiosa*) of India is a kind of fig-tree. It is remarkable that the common fig-tree (*F. carica*), although it produces so agreeable a fruit, is in some measure poisonous, particularly the milky juice which exudes from the leaves and the branches when wounded, and which is acrid to the taste. The fruit of the fig-tree is of a different nature from the orange, apple, and other fleshy seed vessels; being a hollow receptacle, containing a multitude of minute flowers; the ripe fruit of which is the seed, as it is wrongly called, that is imbedded in the pulp. The fig is a native of Asia and Barbary, and also inhabits the south of Europe; according to the *Hortus Kewensis*, it was first planted in this country
The varieties in fig countries are
numerous as those of the grape.
held most in esteem in England
brown chestnut-coloured Ischia,
Genoa fig, the small white early
large white Genoa fig, the blac
brown and black small Italian
Malta fig, the Murrey or brown
the green Ischia, the Madonna, th
wick or Hanover fig, the commo
purple fig, the long brown Naple
small brown Ischia fig, the yellow
and the Gentile fig. According to
the figs proper for a small garde
large white Genoa, the early
Murrey fig, the small brown Ischi
black Ischia. Figs may be propag
seed, cuttings, layers, suckers, roo
ingrafting; the most generally app
thod is by layers or cuttings, w
into bearing the first or second ye
ard fig-trees require protection d
ter, and should be covered with
reed, pease-haulm, straw, or
light covering.

The only orchards of standard f
England are at Tarring and Som
Worthing: the produce is great
figs of a very superior quality.
been analysed by Bley, and fou
tain the following substances, 62·
0·9 fatty matter, 0·4 extractive wi
of calcium, 5·2 gum with phosph
150·0 woody fibre and seeds (*ache*
are nutritive and laxative. The
taplasm on record was compose
In the illness of Hezekiah, Isaiah s
a lump of figs; and they took
on the boil, and he recovered."
chap. xx.; *Loudon's Ency. of Gard.*,
Dict. of Science.)

FIGWORT. (*Scrophularia.*)
four kinds of indigenous figwort,
nial; the herbaceous part is fœti
or downy, sometimes shrubby;
erect, more or less acutely qua
leafy, panicled; leaves opposite,
simple or pinnate. Flowers
usually with dark coloured tips,
altogether yellow. The species
are all of the easiest culture, grow
in a light soil, preferring moist
may be propagated by seed. Th
species require protection in wi
are, 1. The knotty-rooted figw
dosa), which grows in woods
hedges. 2. Water figwort or wa
(*S. aquatica*), found in wet me
margin of pools and rivers, and
places. 3. Balm-leaved figwort
donia), a very rare species, growi
banks of rivulets in the south.

y some authors to be an effica-
y for scrofulous ulcers. The
oultice, is useful in piles. An
ide with the juice is used in
affections of the skin. The
rid, and when taken internally
onous. 4. Yellow figwort (*S.*
o a rare species, met with
thickets, under hedges, and
places. The two first species
ig, and used in scrofula. (*Eng.*
p. 137.; *Paxton's Bot. Dict.*)

, or FILBERD. (*Corylus*
amed from Abella or Avella, a
npania, where the best were
Pliny, b. xv. c. 22.) This well-
of the cultivated hazel nut is
inclosed within an involucre
is organ is of the same nature
f the acorn, and the prickly
the nuts of the sweet chestnut
a mast are enclosed. In the
hell or husk is much longer
ommon nut; and this character,
thened shape of the nut, dis-
e two races of nuts and filberts,
which there are numerous va-
best known varieties of the
e white, the red, and the friz-
white is the kind most com-
a in this country. In the
od of Kent many hundred acres
with filberts, for which the
ebrated, and whence the Lon-
s principally supplied. When
filberts will keep for several
y room; and if the air is ex-
e nuts placed in an air-tight
l keep good and retain their
n indefinite period. (*Phillips'*
ts; Brande's Dict.)

or THILLER. A term pro-
lied to the horse which is fast-
iately to the cart, and which
shafts. It is most commonly
r.

A young mare, or female of the

ERN, TUNBRIDGE. (*Hy-*
Tunbridgense; from *hymen*, a
nd *phyllon*, a leaf; alluding to
The genus to which this species
among the most elegant of the
a native of wet mossy rocks or
ees, most plentiful in tropical
This species is the only one of
rowth, and flourishes amongst
ry shady places, in the rocky
ous parts of Great Britain, and
st parts of Europe from Nor-
. The roots are long, slender,
, creeping horizontally; fronds
ect, smooth, of a filmy pellucid
texture, curling up as they dry; the stalk wiry, without any wing or border. The filmy ferns thrive best when grown in small pots, in a mixture of loam and peat, and increase freely by seed, or dividing the roots. (*Eng. Flor.* vol. iv. p. 325.; *Paxton's Bot. Dict.*)

FIMBLE-HEMP. A local term for early ripe hemp.

FIN. A term applied to the sharp or cutting plate, fixed upon a sock or coulter of a plough. It is also a provincial name for the troublesome weed called Rest-harrow.

FINCH. The common name for a large variety of birds, including, among others, the bullfinch, chaffinch, goldfinch, greenfinch, hawfinch, mountain finch, &c. See these separate heads.

FINCHED, or FINCHBACKED. A term signifying streaked with white in cattle.

FINE BENT-GRASS. See Agrostis.

FINGER GRASS, COCK'S FOOT. (*Dactylis sanguinalis*, from *dactylos*, a finger; the head is divided so as fancifully to resemble fingers.) This is an uninteresting native wild grass, found in sandy cultivated fields, but not common: like all other plants it is variable in its places of growth. Root fibrous; stems numerous, bent and decumbent at the base, then ascending about a foot long, jointed, with swelling sheaths, bent with little warts, crowned with bristles. Leaves broad, pointed, striated, wavy at the edges, besprinkled, like their long swelling sheaths, with little warts, many of which bear bristly hairs. Flowers in pairs, dark purplish, erect. The specific name is said to have originated in the use made of this grass in Germany, which is to procure bleeding at the nose by thrusting its spikes up the nostrils. (*Eng. Flor.* vol. i. p. 96.; *Paxton's Bot. Dict.*)

FINGERS AND TOES. The common name for a disease in turnips. See Anbury.

FIORIN GRASS. A name under which a variety of the longer leaved creeping bent (*Agrostis vulgaris*, or *stolonifera*, var. *latifolia*) was introduced about twenty-seven years ago, by Dr. Richardson of Clonfeale, in the county of Tyrone, Ireland. That gentleman laboured with great zeal, by his writings and practice on a large scale, to prove the superiority of this grass over every other for meadow purposes. One of his modes of propagating fiorin was to plant the stoles of the grass, which are as vivacious as those of couch grass, on fallow ground, and thus create a meadow; but his favourite and most expeditious system was to encourage its spontaneous growth on alluvial and flat peaty ground. Unquestionably Dr. Richardson did ex-

hibit extraordinary crops of fiorin on the level surface of denuded and cut-out bog land of little value, and for several years mowed enormous crops. Fiorin, being one of the indigenous grasses of Ireland, especially on peaty soil, is seen abundantly on the black shallow bogs which have been drained in any degree, and particularly on the margins of pools or ditches. Cows relish it much if it be not soured by stagnant water, and yield milk abundantly when fed upon it. However, though it has produced from six to ten tons per acre when top dressed and preserved from the poaching of cattle, the attempt to keep any land under the occupation of this grass for meadows, to the exclusion of all others, has been totally abandoned. Two great objections to fiorin are, the difficulties of mowing it, as it lies flat and entangled, and of saving it at the very late season when it is ripe for the scythe. Some writers very erroneously describe the *Agrostis alba* as fiorin; and add, "it sometimes passes under the name of black couch grass." I am surprised that any person of experience should mistake fiorin for black couch grass (though the Woburn reports make a similar remark), to which it scarcely bears any resemblance, and from which in some respects it is essentially different. Fiorin is a soft silky-like grass, with a very narrow or linear leaf, and, although rough on both sides, yet not creeping, throwing out roots with its joints under the surface: it is very easily pulled out, and has not those knotted and vivacious roots which characterise black couch. The varieties may sometimes be mistaken for one another, but the different species have always some broad distinguishing marks of difference. As it is of great importance to the farmer to be able to distinguish fiorin from the other species of bent grass, which are unprofitable and pernicious weeds, I will here point out a few distinguishing characteristics. In fiorin the body of the seed is covered with the husks of the blossom, which do not open: it is cylindrical, but tapers to a point at each end. The seed of the clayey couch grass (*A. alba*) is very slender and smooth, one half the size only of the fiorin, and more slender than the *A. vulgaris*. The seed of the *A. canina* is furnished with a jointed awn of a brown colour, which readily distinguishes it from the other species. There is an awnless variety of the *A. canina* which is distinguished by being shorter and more plump than the fiorin of the clay couch bent. The seed of the *A. fascicularis* is not one third of the size of that of the fiorin, more rounded at the bottom, and of a light straw colour. The *A. palustris* has seed about one fifth
shorter than that of the fiorin, of
browncolour, and more plump and
The variety of fiorin called *aristata*
awn which distinguishes it at onc
the seed of the more valuable variet
distinguishing characters of the
species of agrostis are well set forth
late Mr. G. Sinclair's valuable
grasses; but it would rather tend to
than inform were I to attempt any
notice, which must necessarily be
abridgment. See AGROSTIS. (*Hort.*
Wob.; *Pract. Husb.*; *Com. to B*
Agr. vol. vi. p. 108.)

FIRE BLAST. A term of very
ful meaning, like the word blight, bu
rally implying an accident to whi
are very liable: it usually occurs
month of July, and sometimes scor
whole plantations from one end
ground to the other, when a hot
sunshine has come immediately
shower of rain; while at others it onl
them partially, or in a particular p
the plant. When the lower leaves
are shrivelled up and unhealthy,
said to be *fire blasted*. This is stated
from the want of sufficient nourish
the root, the whole supply of the
being required to complete the g
the hops on the top of the pole,
can return to the lower leaves: thi
ticularly observable when the h
ripening, on those hills which have
a pole put to them. (*Brit. Husb*
p. 354.; *The Hop Farmer*, p. 89.)

FIRE BOTE. A faggot or qu
wood bound up for fuel.

FIRES. Sax. ꝼẏꞃ. The legisla
wisely afforded very considerable fa
the insurance of farming stock. B
3 & 4 W. 4. c. 23. s. 5. *farming stock* is
ed from duty. "The Farmer's In
Institution" insures it at 1*s.* 9*d.* p
without the average clause; thus
paired are the ravages of the incen
accidental fires, and lightning. T
farmers and others, also, the legisla
the 5 & 6 W. 4. c. 64., have incre
facilities for life insurance by redu
stamp duty for policies under 50*l.*
and under 100*l.* to 5*s.* All such
ought, however, to be entirely a
for they are, in fact, as it has been
marked, taxes upon prudence.

The tenant from year to year, i
sence of a special agreement, i
obliged to insure his landlord's
nor is he liable for accidental fi
6 Anne, c. 31.); and if he is p
and the plaintiff is nonsuited, he
ceive treble costs. When in a leas
venant is to insure the property,

pecifies to what amount, or in what office, but "in some sufficient office within the cities of London or Westminster" will suffice. (*Doe* v. *Shewin*, 3 Campb. 134.) When the covenant is merely to insure, and there is no provision to apply the insurance money in case of fire, this is merely a personal contract; it binds only the covenantor nd his representatives, but not an assignee the term. If the term is forfeited by a ach of the covenant to insure, the Court Chancery will not relieve the tenant. *hite* v. *Warner*, 2 Merr. 459.; *Green* v. *dges*, 4. Sim. 96.) And it will be a ch of the covenant to insure, the sufg the premises to remain uninsured for so short a period, even if no damage s, such as if he omits to pay the pre- within the fifteen days allowed by ffice. (*Doe* v. *Shewin*, 3 Campb. 137.) enant has no equity to compel a land- who has received money from an ince office, to expend it, on the demised ses being burnt down, in rebuilding remises, or to restrain the landlord ucing for the rent until the premises ebuilt. (*Leeds* v. *Cheetham*, 1 Sim. See ARSON. (*Farmer's Almanac.*)

uses of Fire. Mr. J. Murray has republished a letter in a Liverpool paper frequency, causes, and prevention of hich contains many facts well worthy entive consideration. Among other ations, he says:—

here is far too little attention paid to comotive engine on our railroads. gnited coals that fall below are often to considerable distances, carried into djoining fields, and may, in contact farming stock, prove a serious evil; have witnessed brushwood and tufts ss consumed by this means. A green coloured as it is by means of oxide pper, when blown out, acts on an istic principle, and may continue to d of the coil in an ignited though ess state, and, in contact with comle materials, may prove seriously deive. It has set a mahogany table on providentially discovered in time. rags, *en masse*, may spontaneously re, and have consumed the premises. d and other oils, but especially that eed, have been the fruitful sources of gration in cotton factories and the ouses of the merchants. Nets dipped and cast over the rafters in an outer et them on fire; and a bale of cotton burst into a flame from linseed oil poured upon it. Even animal matuch as woollen, under such circum-s, come within the precincts of danger, that strong red fuming nitrous acid will set fire to straw; and an accident of this kind once occurred to myself. The vapour of sulphuric ether, instead of being volatile, and ascending, as is generally supposed, falls to the ground like water; and accidents in the laboratory and shop of the druggist, from ignorance of this fact, are by no means unfrequent. I am personally acquainted with three distinct cases, wherein the premises were set on fire originating in this source. Specks or bull's eyes in window glass may, on the principle of burning lens, ignite inflammable substances brought within the limits of their focus; hence the curtains used in some factories may be easily ignited: thus, too, a water-bottle left in a window may in sunshine be the means of setting premises on fire, especially in a house shut up during the absence of the family; and I have seen a silk curtain consumed to tinder by the concentrated rays of the sun, in passing through the show-bottle in the druggist's window. Spirits of turpentine will inflame if poured out in the hot sunbeam; and I am informed by the distillers of tar and turpentine that the head of the still cannot be safely removed for thirty hours after the fire has been extinguished, as an explosion might be otherwise anticipated. Lucifers, or Congreve matches, are one of the fruitful sources of fires. Those that are called Dutch, containing phosphorus, and having a very fœtid phosphoric smell, are exceedingly dangerous: they may ignite spontaneously at the temperature of summer heat; and it may now suffice to say that a recent conflagration has been traced to this cause. The cigar and the pipe are pre-eminent sources of modern conflagration; and I have no doubt that of the seat of the Marquis of Londonderry, and the late one of York Minster, are entirely attributable to the pipe or cigar used by the workmen engaged in repairs. It is not generally known that tobacco contains nitre, and that, like "touch wood," it continues ignited for hours. Fires occurring from this cause are, I apprehend, too notorious to need specific detail. It is clear that the end of a cigar dropped among wood shavings might be fanned into a flame by a current of air; and tossed from the top of the coach into an adjoining field, and carried by the breeze into a farmer's stack-yard, hay-ricks and wheat stacks may even burst into a flame. I believe many a cigar smoker is an unintentional incendiary."

Fires in farm yards, also, may originate from quick lime left in a cart under a shed, and moisture getting to it. Heat sufficient to cause combustion is developed. The spontaneous combustion of haystacks from the dampness of the hay, is a danger to which the negligent farmer is often exposed. In our present state of chemical knowledge it is idle to attempt to follow this phenomenon through its course, or explain the reasons for the heat produced in fermentation. As water must be present in fermentation, it is probable that it is decomposed, and it is commonly said that the flame produced is the result of intense chemical action; but, as Dr. Thomson remarks (*System of Chem.* vol. iv. p. 364.), "All the phenomena of fermentation lay for many years concealed in complete darkness, and no chemist was bold enough to hazard an attempt even to explain them. They were employed, however, and without hesitation too, in the explanation of other phenomena; as if giving to one process the name of another of which we are equally ignorant, could, in reality, add any thing to our knowledge."

FIRING. In farriery, an operation performed on different parts of the horse, but which is growing into disuse. It is principally resorted to in bad cases of sprains. In firing about the sinews and nervous parts, great care should be taken not to go too deep, for if the fire once touches the sinew the horse will go lame for life. Firing is sometimes resorted to in cattle, in order to remove bony tumours about the region of the eye, which incommode or obstruct the vision. In general, this operation is performed in a manner calculated to excite great pain to the horse. When the iron is white hot, and is rapidly applied, the life of the part is instantly extinguished, and all sensation being destroyed, no pain, except when the iron is approaching the part, is experienced; but much pain follows the application of an imperfectly heated iron.

FIRKIN. A measure of capacity, being the fourth part of a barrel, or containing 9 ale gallons, or 7½ imperial gallons; that is, 2538 cubic inches.

FIRLOT. A dry measure used in Scotland, but of different capacities, according to the article it is used for measuring: four firlots make a boll. The Linlithgow *wheat firlot* is to the imperial bushel as ·998 to 1; and the *barley firlot* to the imperial bushel as 1·456 to 1. M. Somerville, in his *Agricultural Survey of East Lothian*, says the firlot differs in size in the proportion of 21, 25 to 31. Wheat, rye, beans, and peas are, he says, sold by the small firlot; malt, barley, and oats by the large one. Four small firlots are equal to 4·087276 Winchester bushels; four large ones to 5·96263 Winchester bushels.

FIR, SCOTCH. See Pines.

FIR-TREE. (Lat *Abies*; Sax. ꝼuꞃh; Welsh, fyrr; fir-wood.) "The fir, the pine, and the larch," says Mr. Baxter, "constitute a perfectly natural genus or
and, next to the oak, are the most
able of our timber trees; but, ind
ently of their value in this respect,
beautiful foliage and magnificent
ance have at all times rendered the
jects of admiration and attention.
constitute the greater part of the
order *Coniferæ*. The term fir is of
discriminately applied both to the
the *pine*, or *Abies* and *Pinus*, and he
frequently hear the Scotch pine imp
called the Scotch fir, by those who
acquainted with botanical nomen
The most obvious and ready chara
distinction between the different
Abies and *Pinus* is to be found in
tural arrangement of the leaves. T
(*Abies*) have the leaves solitary, or
from one scale or sheath on the bark
branches, over which they are scat
The catkins of male flowers are also
not racemose; the scales of the co
imbricated, and thin at the apex, and
turned to one side. They are furth
tinguished from the pine by their
pyramidal form. The spruces have
leaves growing singly round the br
and all spreading equally.

The *larches* have the leaves grow
clusters, which are deciduous.

The *cedars* and pines have from two
leaves issuing from one sheath at the
growing also in little bundles or tu
they are evergreen. Of these four
tribes, into which the firs resolve them
the *silver fir* may be taken as the
sentative of the first, the *Norway s*
the second, the *Larch* of the third,
Cedar of Lebanon of the fourth. A
others are noticed under their
heads, we have only to confine our at
in this place to the firs. One pro
common to all the species of this gen
of affording resinous matter, eithe
the wood, bark, or cones.

The silver fir (*A. picea*, or *pecti*
grown in this country for ornam
nerally. We call it the *silver* f
the colour of its leaves on the und
which are shorter, broader, and
thicker on the spray than those
firs and pines, and have a beaut
very appearance when the under
viewed, or when the wind turns the
from the eye; whilst the upper
of the brightest and handsomest
all the species of fir. It is a fine
tree, and the most beautiful, but
same time the most delicate, of the
usually cultivated in Britain. Th
very rapid in its growth, and soo
to a great size; but the timber i

able as that of the pine and the spruce It yields, however, Burgundy pitch ence its name of *picea*) and Strasburgh entine; and it is much used on the Con- t both for carpentry and ship-building. silver fir likes a deep soft soil, and eltered situation. From its extreme ency to lose its leader it does not ap- to be well suited for exposed grounds. e of the finest trees in England are in vale of Mitcham, between Dorking and ldford, where the soil is nothing more a deep soft sand lying on chalk. The -known disease of the larch, commonly d American blight (see this head), or t lice, proves fatal to the silver fir. Miller says he has cured the disease a wash of lime water; but recommends, dvanced stages of the disease, free and y pruning. This doctrine may startle y wood growers; but the Colonel, in f of the soundness of his opinion, adds, he has adopted it successfully for many s. No large branch should, however, emoved when the tree is near maturity. Swedes and Norwegians prune their s freely, and hence the reason why they luce such a large quantity of sound ber, and are so free from knots. A weak tion of spirits of turpentine and to- o liquor appears to be a useful wash the disease.

The balm of Gilead fir (*A. balsamea*). s is also a delicate ornamental tree, it rarely attains to any considerable This species and the silver fir are n confounded, but may be distinguished : "the leaves of the silver fir are nged nearly on opposite sides of the nch, comb-like. The under sides of the es have a white line running lengthwise each side of the mid-rib, which gives m a silvery hue. The leaves of the m of Gilead fir are shorter, blunter, and d nearly upright in double rows, on the er side of the branches; while in the er fir they are flattened and irregularly gle-rowed." The balm of Gilead fir is so ed because the clear transparent tur- tine which is obtained from the wounds his tree is very similar to the true balm Gilead of the shops, which is the pro- tion of the *Balsamadendron Gileadense*. commonly passes under the name of Ca- lian balsam. The wood of this tree is of ale yellow colour, and but slightly resin- ; its principal use is to split up into es for fish barrels, for which the wood of e of the other species is much preferable.

The Norway or spruce fir (*A. excel-* when standing singly, with its regular amidal figure, and its long drooping nches reaching to the ground, forms a beautiful object; but it does not thrive well generally in exposed situations. It grows best in moist and springy places, and likes a deep soil. The spruce is readily known by its leaves of one uniform dull green colour, spread equally round the branches, and by its long pendant cones. All these firs may be raised from seed, which can be separated from the cones by moderate heat before a fire, care being taken not to destroy the vegetative power. Or the separation may be facilitated by steeping the cones a few hours in warm water. The seed ripens in December, and the cones should be preserved till April, which is the proper period for sowing. The seeds must be only covered about half an inch deep. The soil should be tolerably rich. The seedlings must be transplanted the second year; for if left longer it will be completely spoiled. For the Scotch pine or fir I must refer the reader to the head PINES (*Pinus*); and other information on the subject of firs will also be found under the head LARCH. It may, however, be well to enumerate the principal other firs: anything like a description in this place would be needless.

1. FIRS. The Siberian silver fir (*A. Siberica*). The great Californian fir (*A. grandis*). The large-bracted fir (*A. nobilis*). The double balsam fir (*A. Frazeri*). Webb's fir (*A. Webbiana*). The hemlock spruce fir (*A. Canadensis*). The deciduous silver fir (*A. Brunoniana*). The sacred Mexican fir (*A. religiosa*). The hairy fir (*A. hirtella*). The Indian silver fir (*A. Smithiana*).

2. SPRUCES. The oriental fir (*A. orientalis*); the white spruce fir (*A. alba*); the black, or red, spruce fir (*A. nigra*); the Douglas fir (*A. Douglasii*); the Menzies fir (*A. Menziesii*).

3. LARCHES. The common larch fir (*A. larix*); the red larch fir (*A. microcarpa*); the black larch fir (*A. pendula*).

4. CEDARS. The cedar of Lebanon fir (*A. cedrus*); the sacred Indian fir (*A. deodara*). See CEDAR OF LEBANON.

A large number of almost unknown varieties might be added to the above list. (*Baxter's Lib. of Agr.*; *Penny Cyclo.*; *Trans. High. Soc.* vol vi. pp. 505—516.; *Phillips's Shrubbery*, vol. i. p. 225.; *Tredgold's Prin. of Carp.*)

FISH. (Lat. *Pisces*; Germ. *Fische*; Du. *Visscher*; Dan. and Swed. *Fish*.) A term used in natural history to denote every variety of animal inhabiting seas, lakes, rivers, ponds, &c. that cannot exist for any considerable time out of the water. But in a commercial point of view, those fishes only are referred to that are caught by man and used either as food, or for some other useful purpose. Among the most important of these are the herring, salmon, cod, pilchard, mackarel, turbot, lobster, oyster, whale, &c. The most natural and popular division of this subject is into *fresh* and *salt*-water fish; the former will be found noticed under their separate heads, and with the latter in a work of this character we have little or nothing to do.

According to Linnæus, there are about 400 species of fish with which naturalists are acquainted, but those yet unknown are supposed to be still numerous, and many species will probably remain for ever undiscovered. The anatomy and physiology of fish offer a wide field of study for the enquiring mind. Their extraordinary fecundity is truly astonishing. Having already treated of the different methods of angling for fish, baits, &c., I shall in this place confine myself to a few general observations. Fish in general are less nourishing than other animal food, but are not difficult of digestion, when in a fresh state, to a healthy stomach; but from the large quantity of undissolved egestar, it is irritating to a dyspeptic stomach. Except in London and a few sea-port towns, the consumption of fish in England is not great. See BREEDING PONDS AND FISH PONDS. (*Willich's Dom. Ency.; M'Culloch's Com. Dict.*)

FISH, AS A MANURE. The fish which are usually employed as manures are sprats, pilchards, herrings, sticklebacks, and whale blubber. These are very rich fertilisers; the fleshy or muscular portions abounding in oil. The scales are composed of coagulated albumen and phosphate of lime; their bones are full of oil, and the solid portion is composed of phosphate of lime and carbonate of lime, in different proportions.

Sprats. In the counties of Essex, Kent, and Suffolk, the use of this manure is very general, although the practice is not of very long standing. The quantity applied per acre varies from 25 to 45 bushels, the poor gravelly soils requiring more than the loamy lands. They are spread by hand, from seed baskets, and on winter fallows intended for oats, on which, especially if the summer is not too dry, it produces most luxuriant crops, of a peculiar dark green colour, yielding 10 or 11 quarters per acre, and that on land of a very second-rate description. The effect of the application, however, remains only for one crop. They produce an equally good result if mixed with earth, and suffered to remain and dissolve, for some time, in the heap, before they are carted on the land. In this way they answer exceedingly well for turnips.
They are usually obtainable at
from 6*d.* to 8*d.* per bushel.

The extent to which this man
may be judged by that of the
fishery, which is solely devoted
these fish. Upon this fishery the
of the House of Commons of th
1833 reported: — "This fish
prevails principally upon the Ke
folk, and Essex coasts, has been
your committee to occasion very
injury to the spawn and brood o
nets used in it are of a very fine
so small as not to let a pen pa
and they enclose not only sprat
spawn and young brood of all
of fish; and as these nets are
drawn along the ground, and
waters, during the breeding sea
the winter months before the
are gone into deep waters, an im
struction of the spawn and bree
the inevitable consequence; w
the almost unlimited demand for
of manure for land, and there be
sale for all that can be procured,
of fishing has greatly increased;
are at present from 400 to 500
gaged in Stow-boating on the Ke
only, which remain upon the fishi
frequently for a week together,
purpose of catching sprats or any
to be sold as food in the market
they have obtained full cargoe
fish for the purpose of manuring

The farmers of Essex and S
chase these fish by thousands of
a time, and carry them in wag
15 miles into the inland districts.

Pilchards are extensively e
Cornwall and Devonshire, both i
and in the salted state. The pil
small fish not larger than a herrin
part of the coast of Cornwall and
large shoals, during the months
and September, and again in No
December. The refuse fish, whic
principally used by the cultivator,
mixed with earth, sea-sand,
some other substance, to prevent
causing too rank a growth. Th
these pilchards, according to Si
are apparent for several years. T
is a very oily fish, and may be ha
inexhaustible quantities. Betwe
9000 persons, at sea and on sho
ployed in this fishery, and about 3
heads are annually exported ei
West Indies or the Mediterrane

The Herring. — The employm
valuable fish for the purpose o
the ground is limited to those d
the sea to which the shoals of

y visitors; and even there, their
onfined to those seasons in which
an unusual glut, as occasionally hap-
the coasts of Scotland and the
side of England. They are a very
, and produce the same rank luxu-
of growth as sprats or pilchards.
Young has given us an account of
riment, in which some wheat, ma-
ith these fish, grew so luxuriantly,
as entirely laid before the period of
Very numerous or accurate com-
experiments with this fish can
e expected, for its use must neces-
confined to peculiar districts; and
tained, it is generally ploughed in
siderable expedition, or dug into
ps, which is a mode found to answer
y well. And it has been found, in
of spoiled red herrings, that their ap-
is extremely advantageous to the
tations. (*Essay on Salt*, p. 101.)
backs.—The use of the stickleback
pally confined to the neighbourhood
ns of Lincolnshire and Cambridge,
it breeds with great rapidity, and
shallow waters they are caught,
n seasons, entirely as an article for
They are used in much the same
ons, either by themselves or mixed
th, &c., as sprats, and are not more
in their good effects.
at or Blubber of the Whale.—Whale
was employed by the late Lord
lle, at his farm at Fairmile, in
as a manure, and produced the
rops. It was mixed with the sandy
d suffered to dissolve in the heap.
at the wharf in London, twenty
, and, with the expenses of carriage,
wo pounds per ton. It answered
ell upon arable and pasture lands,
g most luxuriant crops; and its
ects were visible for two or three
Its general high price, however,
dmits of its employment by the

e blubber is composed principally of
and other animal matters; but the
far the largest portion of the blub-
d to the presence of this fish oil,
es not appear to differ materially
sition, from whatever fish it is ob-
must be attributed the chief fer-
alue of all fish. Train oil has been
by Dr. Thomson. He found in
s— (*Chemistry*, vol. iv. p. 433.)

	Parts.
bon - - -	68·87
lrogen - - -	16·10
gen - - -	15·03
	100·

Spermaceti oil, according to Dr. Ure, contains, in 100 parts—

	Parts.
Carbon - - -	78·
Hydrogen - - -	11·8
Oxygen - - -	10·2
	100·

Fish oils, therefore, are composed of exactly the same materials that constitute almost all vegetable substances, differing only in the proportions; for sugar, starch, gluten, gum, &c. &c., are all composed of these three substances—carbon, hydrogen, and oxygen; blubber, therefore, may be regarded as the most condensed manure that it is possible to apply to a soil: it contains little, if any, water, and every portion of it is food for plants. The same remarks will apply to the dregs of train oil, &c., which are sometimes applied, mixed with earth, to the same purpose; but it is seldom that these substances can be procured in any quantity, at a sufficiently reasonable rate.

It is evident, from the experience of all who have tried blubber, that it is best used when previously mixed with from ten to twenty times its weight of earth, and turned over once or twice during three or four months. In its uncombined state, it is evidently too powerful. When mixed with mould, it speedily undergoes a strong fermentation, and the mass becomes of the most friable and fertilising description. Train oil has also been employed with the most decided success; it has been used united with screened earth, and produced the most luxuriant of crops. In an experiment made by Mr. Mason, of Chilton, which is described by Lord Spencer, in a communication furnished to the Doncaster Agricultural Society, 40 gallons of unrefined train oil, which cost 8½*d.* per gallon, were mixed with 120 bushels of screened earth, about a month before it was applied to one acre of a tenacious soil, sown with turnips; and on an adjoining acre of similar land, were applied 40 bushels of bones, broken small, and mixed with 80 bushels of burnt earth; the crop produced was as follows:—

	Produce of turnips per acre.		
	tons.	cwt.	st.
Oil, 40 gallons - Screened earth, 120 bushels	23	5	6
Bones, 40 bushels - Burnt earth, 80 bushels -	21	18	6

And in *The Mark Lane Express* of February 8. 1841, Mr. W. Sharp of Scarthing Moor, in Nottinghamshire, thus describes his experiments with fish oil, mixed with bone dust:—"I will give you my experiment with oil. The soil is a poor gravel,—the farm in the parish of Edwinstow, and inclosed off the old Forest, near to Thorseby Park.

"My attention was drawn to the use of oil, in consequence of the serious expense (3*l.* to 4*l.* per acre) I was obliged to go to in bones and rape dust, for I never use yard manure for turnips, as the soil is so poor, I cannot get wheat without manure; I therefore save it all for my wheat. My first trial was in 1839, on 2 acres, in a 9-acre field, and nearly in the middle of it. I give you the cost of one acre—

	£	*s.*	*d.*
5 strikes of half inch bones, the dust in (2*s.* 7½*d.* per strike), per acre	0	13	1½
3 gallons of train-oil, at 2*s.* 6*d.* per gallon - - - - -	0	7	6
10 strikes of coal ashes - -	0	0	0
	1	0	7½

Remainder of the field as below:—

	£	*s.*	*d.*
16 strikes of bones, as above, at 2*s.* 7½*d.* per strike - -	2	2	0
5 hundred of rape-dust, at 6*s.* 9*d.* per hundred - - -	1	13	9
	3	15	9
With oil - - -	1	0	7½
Balance in favour of oil	2	15	1½

"The oil turnips were as good as the remainder of the field; and all as fine as I could wish, for the land. The barley as good—and the clover is now excellent. My next trial in 1840, on 9 acres—

	£	*s.*	*d.*
11 strikes of half-inch bones, dust in, at 2*s.* 6*d.* per strike, per acre -	1	7	6
3 gallons of train-oil, at 2*s.* 6*d.* per gallon - - - - -	0	7	6
	1	15	0

"11 acres, dressed as below, is a trial against oil.

	£	*s.*	*d.*
16 strikes of bones, at 2*s.* 6*d.* per strike, per acre - -	1	17	6
5 hundred of rape-dust, at 6*s.* 9*d.* per hundred - - -	1	13	9
16 strikes of pigeon manure, at 1*s.* 6*d.* per strike - -	1	4	0
	4	15	3
With oil - -	1	15	0
Balance in favour of oil	3	0	3

"I think the 9 acres with oil rather the best field, and the turnips are decidedly better. The rape-dust I sow broadcast, on the surface; it is then drawn in its proper place by ridging; I then drill my
the ridges 22 inches apart—th
were white tops. I do not like
mixed with the oil; it makes it
bad to drill; the 11 strikes of bo
fully mixed will absorb the oil, so
excellent. I let them lie about
after mixing. I know your rea
say, how is barley grown after s
dressing? I answer—with my feed
I use oil-cake, and with my store sh
coombs, and the straw in the y
consumed—with oil-cake I take
up for wheat.

"Some farmers may possibly d
corectness of my assertion, that all
cipal vegetable substances are co
precisely the same ingredients a
other purely animal matters; and
the first importance that the
should clearly understand the re
the decomposition of animal mat
nishes such admirable food for veg
must beg of him to compare the a
the oils which I have already sta
that of the following common
substances, as ascertained by the m
ful analysis. I will merely giv
three substances:—Sugar, 100
which are composed, according to
lius, of—

Oxygen - - -
Carbon - - -
Hydrogen - - -

(*Ann. of Phil.* vol. v. p. 262.)

In 100 parts of starch from wh
are found—

Oxygen - - -
Carbon - - -
Hydrogen - - -

(*Gay Lussac, Rech.* v. ii. p. 291.)

The wood of oak is composed o

Oxygen - - -
Carbon - - -
Hydrogen - - -

(*Ibid.*, vol. ii. p. 294.)

"All oily and other animal
therefore, as they decompose in th
slowly converted into those gas
stances, which are the food or
vegetable life, such as carbonic
(fixed air), or carburetted hydr
gas employed for illumination),
are absorbed either by the roo

e plant as they are formed.
e or no waste in these, for when
sition of the oils and fibrous
h is finished, there is very little
or solid matter remaining use-
il. In this, again, the experi-
rmer substantiates the chemist's
r he uniformly tells us in an-
enquiries, that "the fish only
rop."

t of England, the farmers of
onveniently situated for water
loy to a very considerable ex-
ure, several kinds of fish be-
such as five-fingers, cockles,
and this use is only limited by
or what is commonly a more
pediment, the difficulty of trans-
any distance while sufficiently
n once the fish begin to putrefy,
ng properties rapidly diminish;
the fermenting sprats I have
g from the waggons as they
ng: thus they speedily lose in
become intolerably obnoxious
ict through which they pass;
ctions have, indeed, taken place
eighbours in Essex, for carry-
ig fish through towns and po-
es.

rdly a matter of astonishment,
rmer, who has to convey a
eral hundred bushels of sprats,
or twelve miles, has often much
e allowed him for that purpose.
rhaps, arrive stale. Is a load
contrary winds, or prevented
ances from reaching another
the farmer has to be informed
al; he cannot despatch his teams
as the nature of the case re-
fish become offensive, and his
he improvement of his land is
a magistrate's summons and a
or a nuisance. These are the
h retard the use of these kinds
anure, but cannot entirely pre-
eing employed. Their use is
of all impediments, annually
specially in the neighbourhood
ces to which the fishing smacks
access.

eneral formation of railroads,
or, even of the inland soils of
l have all these valuable sources
ent offered for his service —
even national interest, since
n from an inexhaustible source,
yment to a branch of industry
n a maritime point of view, as
r seamen, and have, moreover,
nd paramount advantage, that
the permanent riches of the
land, and are not, as is the case with other fertilisers, drawn from one district of the state to enrich another. There need be no fear of the supply not keeping pace with the demand, for the ocean is inexhaustibly tenanted with fish. As fresh agricultural markets arise and are furnished by the railways, fresh sources of supply will be discovered, other coasts explored, and increased fisheries established. (*Johnson on Fertilisers*, p. 113.)

FISH, ARTIFICIAL BREEDING OF. Some practical instructions for the breeding of salmon and other fish artificially, by Sir Francis A. Mackenzie, have been recently published. He makes the following remarks: — "In the autumn of 1840, having selected a brook flowing rapidly into the river Ewe, a hollow spot adjoining to it was cleared out, of the following dimensions: — Length, twenty-three yards; breadth, from twelve to eighteen feet. All large stones having been removed, the bottom was covered one foot thick with coarse sand and small gravel — the largest stones not exceeding the size of a walnut. A stream from the brook was then led into this hollow, so as to form a pool of about eight inches in depth at the upper, and three feet at the lower end: thus giving it one gentle uniform current over the whole pool, whilst the supply of water was regulated by a sluice, so as to have the same depth at all times, and a strong stone wall excluded all eels or trout, so destructive to both spawn and fry.

"On the 13th of November, four pair of salmon, male and female, were taken by net from the river Ewe, and carefully placed in the pool. On the 18th they showed a disposition to spawn, but on the 20th the whole were carried away by some ill-disposed persons, and, on examining the pool, only a small quantity of ova appeared to have been deposited. On November 23d, four pair of salmon were again caught, and placed in the pool, which were observed to commence spawning on the day following. They were caught carefully, and about 1,200 ova were gently squeezed from a female into a basin of water, and then they were covered over with an equal quantity of milt pressed from a male fish. The two were stirred about together gently, but well with the fingers, and, after allowing them rest for an hour, the whole was deposited and spread in one of the wicker baskets recommended by Professor Agassiz, having above four inches of gravel below and two or three inches of gravel above them.

"A similar quantity of ova treated in the same way was also deposited in one of the copper wire bags, as used by Mr. Shaw, and both were then immediately placed under water in the pool. A little of the ova was buried in the open gravel at about three inches in depth. In another basket, and also in another copper wire-bag, two or three inches of gravel were placed over the bottom of each, and both basket and bag laid in the pool, covered with about four inches of water. The ova of a female and milt of a male were then successively squeezed from two fish on the gravel in both basket and bag, and spread over it regularly with the hand one after the other; and after leaving them exposed in this state to the water for a few minutes, the whole was covered with two or three inches of gravel and left in the pool. These four pair of fish afterwards emitted voluntarily a small quantity of spawn which had been left with them, and on the 1st December they were all turned out into the river. On the 3d December, three pair of salmon, which had already partially spawned in the Ewe, were caught, and the spawn treated in another bag and basket in the same way as last described. These fish were then also allowed to deposit voluntarily the little spawn of which they had not been deprived, and afterwards turned out to the river.

"On the 19th of February the ova were examined, life was plainly observed in the baskets, wire-bags, and unprotected gravel, both where placed artificially, and deposited by the salmon themselves.

"On the 19th March, the fry had increased in size, and went on gradually increasing, much in proportion to the temperature of the weather.

"On the 22d the eyes were easily visible, and a few of the ova had burst, the young fry having a small watery bladder-like bag attached to the throat.

"On the 18th of April the baskets and bags were all opened. The bags had become detached from their throats; the fry measured about three quarters of an inch in length, and they swam about easily, all distinctly marked as par.

"The baskets recommended by Professor Agassiz proved themselves superior to the wire bags used by Mr. Shaw. In the latter only about 20 per cent. came to maturity, whilst in the former not above 10 per cent. proved barren; and in the baskets used on the 5th of December, not above 5 per cent. was unproductive. It is impossible to say exactly the proportion of ova which came to life, either of that artificially impregnated and deposited in the open gravel, or of what was spawned by the fish themselves naturally. But, so far as could be judged, they succeeded equally well with that in

the baskets. Perhaps the baskets m
a preference over the other method
as affording more certain protection
spawn during winter; and it is
state that the last described mode
positing the ova and milt was mo
cessful.

"There can be no doubt, from the
which has attended the above de
experiments, that the breeding of
or other fish, in large quantities, i
paratively speaking, easy; and that
may be produced, protected from
danger, and turned out into their
element at the proper age, which M
has proved, by repeated experimen
small scale, to be when they have
about two years of age, when t
marks disappear; they assume the
scales of their parents, and distinct
a strong desire to escape from confi
and proceed downwards towards the

"Professor Agassiz asserts, and S
cis Mackenzie believes with truth,
ova of all fish, if properly impregna
be conveyed in water of a proper te
ture even across the Atlantic, as s
if it were naturally deposited by
rent fish; so that any quantity of sa
other spawn can, after impregnation
banks of a river, be carried to other
however distant, which may be fa
for hatching. It is right to obser
as the fry are to remain two years in
tificial pools where hatched, fresh
must be used every second season
spawn, as even one-year old fry will
spawn, or their more infantile bre
left together. Old spent salmon a
destructive to both spawn and fry.

"It can only be ascertained by ex
what kind or quantity of food will
quired for the fry. Carrion hung
top of the pool would, in the opinion
fessor Agassiz and Mr. Shaw, supp
with maggots; but in this there
culties, and when tried by Sir Franci
enzie, this season, a few of the fry we
dead round the carrion given to the
droppings of cattle allowed to rest
dry, and occupied by worms and th
insects, appears to suit them best.

"About the 1st of September
Francis, when on an agricultural
Belgium, visited an establishment b
to King Leopold, adjoining his ne
of Ardennes, on a much more e
scale than that now described, wh
breeding of trout had been tried
three previous seasons, though with
success.

"A very few small trout, bred
were still alive; but the ova of 18

plete failure, chiefly from not properly
ring the spawn with gravel, and other
rs. Bread made of brown and white
mixed was the food found best suited
e few living, who, judging from their
e as seen swimming about in a small
, were in excellent condition. The trout-
ding establishment of Ardennes, how-
, proves that trout spawn, if treated in
ame way as that of salmon above de-
ed, will produce the same successful
ts; and that any one possessing a con-
ent pond or stream may stock it with
est kind of trout or other fish in one
o years, and by good feeding have them
gh condition. Where the trout already
, of small size and inferior quality, Sir
cis advises wholly destroying the breed
aturating the water with quick lime, or
other mode more advisable, and pro-
g spawn or fry from lakes where the
kinds of trout are found, in Scotland or
here. The same may be said of gray-
pike, or any other kinds of fish suited to
s, brooks, or rivers, as may be desired
eir owners; which renders the disco-
now made known of value to all."
Ponds.

SHING. The 'art of catching fish,
her by means of nets, spears, or of lines
ooks. The former are used in fresh
alt waters, for the taking of large fish,
h go in shoals; the latter are employed
tching single ones, such as carp, trout,
The most important points to be con-
ed in fishing, are the proper season,
bait, and mode of application. In
h, April, and September the warmest
are the most successful for this sport,
the bait should be deep, for during
cool months the fish lie near the bot-
For fly fishing the most proper season
m April to June, after a gentle shower
in has beaten the insects down upon the
r, without rendering it turbid; and the
promising hours are about nine or ten
e morning, and three or four in the
noon: in still warm evenings, however,
will bite readily till night approaches,
use at those seasons gnats are flying in
t numbers. In the hot days of Mid-
mer and in cold weather, little success
be expected in any water. The north
east winds are particularly unfavourable
shing, as well as tempestuous weather
eneral; but if a gentle breeze prevail it
considerably facilitate the operations of
angler. For further particulars relative
he proper seasons, and the necessary
le for taking fish, I must refer the in-
rienced angler to Blaine's *Ency. of
al Sports*, and Isaac Walton's *Complete
ler*, where he will find ample instructions, blended with considerable amusement.

FISHING, LAW OF. Every person has a general right to fish in the open sea, and in the tideway of rivers, but in rivers which are not navigable, the fish belongs to the owners of the soil on each bank. (*Carter* v. *Thurcot*, 4 Burroughs, 2163.) In this case Lord Mansfield C. J. said, "In navigable rivers the fishery is common, it is *primâ facie* in the king, and is public. If any one claims it exclusively, he must show a right. The presumption is against him unless he can prove such a prescriptive right." And in the absence of an exclusive right by grant or prescription, every subject has a right to the fish found between high and low water mark (*Bagot* v. *Orr*, 2 Bos. & P., 472.); but it is doubted whether the right extends to fish shells. (*Id.*) And there may be even an exclusive right by prescription to the fish in an arm of the sea. (*Orford* v. *Richardson*, 4 T. R. 439.) Every one who fishes in a private water is, of course, liable to be considered as a trespasser; and by the act of parliament, the 7 & 8 G. 4. c. 29. s. 34. it is enacted, That if any person shall unlawfully and wilfully take or destroy any fish in any water which shall run through or be in any land adjoining or belonging to the dwelling-house of any person, being the owner of such water, or have a right to fishery therein, every such offender shall be guilty of a misdemeanor, and, being convicted thereof, shall be punished accordingly; and if any person shall unlawfully and wilfully take or destroy, or attempt to take or destroy, any fish in any water not being such as aforesaid, but which shall be private property, or in which there shall be any private right of fishery, every such offender, being convicted thereof before a justice of the peace, shall forfeit and pay over and above the value of the fish taken or destroyed (if any), such sum of money, not exceeding *5l.*, as to the justice shall seem meet; provided always, that nothing hereinbefore contained shall extend to any person angling in the day-time; but if any person shall, by angling in the day-time, unlawfully and wilfully take or destroy, or attempt to take or destroy, any fish in any such water as first mentioned, he shall, on conviction before a justice of the peace, forfeit and pay any sum not exceeding *5l.*; and if in any such water as last mentioned he shall, on the like conviction, forfeit and pay any sum not exceeding *2l.* as to the justice shall seem meet; and if the boundary in any parish, township, or vill shall happen to be in or by the side of any such water as is hereinbefore mentioned, it shall be sufficient to prove that the offence was committed either in the parish, township, or vill named in the indictment or information, or in any parish, township, or vill adjoining thereto.

FISHING NET. A contrivance of a recticular texture appropriated to the taking of fish. They are mostly made by hand, but machinery is sometimes made available for the purpose. The net principally used by the angler is termed a "landing net," and is intended to render the capture of the fish after it is hooked more secure. The hoop net is intended to keep the fish alive, by suspension in the water after they are caught. The minnow net is used to secure these small fish for bait.

FISH PONDS. Reservoirs made by art, for the breeding, rearing, fattening and preserving of different kinds of fish. (See Breeding Ponds, and Fish, Artificial Breeding of.)

Fish Ponds, destroying of. The 7 & 8 Geo. 4. c. 30. § 15. enacts, That if any person shall unlawfully and maliciously break down or otherwise destroy the dam of any fish pond, or of any water which shall be private property, or in which there shall be any private right of fishery, with intent thereby to take or destroy any of the fish in such pond or water, or so as thereby to cause the loss or destruction of any of the fish, or shall unlawfully and maliciously put any lime or other noxious material in any such pond or water, with intent thereby to destroy any of the fish therein, or shall unlawfully and maliciously break down or otherwise destroy the dam of any mill pond, every such offender shall be guilty of a misdemeanor, and, being convicted thereof, shall be liable, at the discretion of the court, to be transported beyond the seas for the term of seven years, or to be imprisoned for any term not exceeding two years; and, if a male, to be once, twice, or thrice, publicly or privately whipped (if the court shall so think fit), in addition to such imprisonment.

FISTULA. (*Lat.*) A long sinous ulcer, often communicating with a larger cavity, and having a small external opening.

All animals are liable to fistulas, but the horse more particularly so; they attack the withers and the poll. They are produced by blows, by bruises from the saddle, and whatever causes inflammation; also by the presence of extraneous substances.

In curing this disease, it is requisite, in the first instance, to ascertain the direction the fistula pursues, and whether it materially interferes with any of the larger blood-vessels, so as to render a full incision into the parts a matter of too much hazard to be attempted. When secure from any danger of this nature, the most effectual practice is, to lay the fistula, or fistulas, when more than
one, so thoroughly open, as to h
plete view of their internal surf
not, however, necessary in the si
where the matter is in a healthy
requires only a sufficient passag
cases where the discharge, by h
long detained, indurates and c
contiguous parts; as the means
quate to remove the former av
the radical cure of the latter, a m
practice of course becomes neces

When the fistular cavities have
laid open by the knife, they should
with powerful caustic compositio
unsound parts slough away, and
presents a healthy appearance. C
with more mild applications, sho
had recourse to, taking care that
be not closed before the cavities a
and uniformly healed.

FITZHERBERT, SIR AN
was born at Norbury, in Derbysh
studying at Oxford, he removed
one of the Inns of Court, and wa
be a Serjeant-at-Law in 1511.
created a knight in 1516, and s
subsequently was raised to the d
Justice of the Court of Common
followed husbandry as a recreatio
years, and he was the first English
wrote upon this subject. He di
and was buried at Norbury. His
are numerous, of which his "*Gra
ment*," is the most noted. The
which he deserves mention here,

1. The *Boke of Husbandrie*, very profitab
sary for all persons, London, 1532. 8vo.
also appeared in 1534, 1546, 1548 (by Th
1559 (by John Awdeley), and 1562, all i
other editions appeared without dates. T
print of this and the following in 1767, t
treatise of Xenophon's. 2. *Surveying, and
bandry*, London, 1547, 8vo. Again in 156
1598, 4to. There are some differences o
specting the first appearance of the work
careful survey of the various authorities,
above will be found correct. — (*G. W. Joh
Engl. Gard.*; *Quar. Journ. of Agr.* vol. ii

FIXTURES. In Law, a term
applied to all articles of a perso
affixed to land. This annexatio
by the article being let into, or u
the land, or with some substance
connected therewith. Thus a ba
a frame not let into the earth, is
ture; a brewer's stills set in
resting on a foundation, are fix
the application of the same prin
in every case the true rule to jud
any thing be a fixture or not.
is thus fixed becomes by law pa
freehold or realty. It is therefo
neral principles, not removable;
are exceptions to this rule esta
custom. (*Brande's Dict. of Sci*

The law with regard to fixtu

ed to the freehold, is by no means
nd defined as is desirable; and
anted in favour of trade, to the
f fixtures erected for the pur-
anufacture, does not extend to
ns made by the tenant for agri-
urposes. — The agreement made
e farmer and his landlord should
always contain a covenant by
power should be clearly defined.
rated judgment of Lord Ellen-
Elwes v. *Mawe*, 3 East, 38., con-
an epitome of the law of fixtures,
ll insert at length the opening
it: —

as an action upon the case in
of waste by a landlord, the re-
n fee against his late tenant, who
under a term for twenty-one
m, consisting of a messuage and
ouses and barns, &c., and who at
eserved, stated that during the
about fifteen years before its ex-
e erected at his own expense *a*
carpenter's shop, a fuel house, a
a pump-house, and a fold-yard.
ngs were of brick and mortar,
nd *the foundations of them* were
t and a half deep in the ground.
nter's shop was closed in, and
uildings were open to the front,
ted by brick pillars. The *fold-*
as of brick and mortar, and its
as in the ground. The tenant
o the expiration of his lease,
n the erections, dug up the foun-
d carried away the materials,
premises in the same state as
ntered upon them. The case
ated that these erections were
nd convenient for the occupation
; and the question for the opinion
t was, whether the tenant had a
e away those erections? Upon a
ration, we are all of opinion that
a right to take away those erec-

any special agreement, a tenant
ove a border of box planted by
mpton v. *Soden*, 4 B. & Ad. 655.);
n ordinary tenants remove fruit
gh planted by themselves (*Amos*
, 279.), but nurserymen may.
hold is sold without any stipu-
t the fixtures, they pass with the
legrave v. *Dios Santos*, 3 D. & R.
her can the fixtures be taken in
by the sheriff. (*Wynne* v. *Ingelly*,
47.) Ranges and ovens are fix-
d. and Bell's *Lyde* v. *Russel*, 1 B.
) But a pump erected by a te-
o fixed as to be removable with-
to the freehold, may be taken away by him at the expiration of his term, as being an article of domestic use or convenience. (*Gyrimes* v. *Boweren*, 1 Bing. 437.) A conservatory on a brick foundation, affixed to and communicating with rooms in a dwelling house by windows and doors cannot be removed by the tenant, even if he erected them. (*Buckland* v. *Butterfield*, 4 Moore, 440.)

FLAG, THE WATER; or FLEUR-DE-LIS. See IRIS.

FLAG, THE SWEET. See AROMATIC REED. (*Calamus aromaticus.*)

FLAG. A term sometimes applied to the turf, or surface of the ground, which is pared off for burning. It also signifies a large flat paving stone, and the furrow-slice of ley lands, when under the plough. See PARING and BURNING.

FLAIL. (Lat. *flagellum.*) A wooden implement for thrashing corn by hand. It anciently was truly a whip, and sometimes had two or more lashes: the modern flail consists of the handle or handstaff, which the labourer holds in his hand, and uses as a lever, to raise up, and bring down the swiple, or part which strikes the corn, and beats out the grain and chaff from the straw. The swiple is joined to the hand-staff by the caplins or couplings, which are thongs of untanned leather, and sometimes the skins of eels or of other fish. These thongs are passed through holes in the ends of the handle and swiple, and made fast by being sewed together. The whip-flail was in use among the Romans, though the prevailing mode of separating corn from straw among the nations of antiquity was by treading it out with cattle in the open air. (See AGRICULTURE.) In the colder parts of Europe, this could never have been generally the case, for obvious reasons; and hence the flail was the universal thrashing implement till the introduction of the thrashing machine, which is now taking the place of the flail in all countries where capitalists engage in farming. See THRASHING MACHINE. (*Brande's Dict of Science.*)

FLANDERS, THE AGRICULTURE OF. The mode of tillage adopted by the cultivators of Flanders has long and beneficially engaged the attention of the British farmer; who, whatever may be his superiority to the Fleming in most respects, yet in some particular instances has learnt, and in others (such as in the careful husbanding and preparation of manure, the succession of crops, the deepening of the soil, &c.) may still profitably imitate the practices of the small industrious cultivators of Flanders. The best report of the modern agriculture of the Flemish farmers is that drawn up for the Society for the Diffusion of Useful

Knowledge, by the Rev. W. Rham, from which, and from his paper in the *Journ. of Roy. Agr. Soc. of Eng.* vol. ii. the chief facts of this article are obtained. The climate of Flanders pretty closely resembles that of Kent and Essex: it is, however, rather warmer in summer, and the snow lies longer in winter. The soil is various; there are extensive districts of sand which are brought into cultivation by dressing them with mud. In proportion to the quantity of the mud, which is a very fine clay, with a portion of decayed shells and organic matter, the soil is more or less fertile; and when the mud enters into it in considerable proportion, it forms a rich compact loam. In many places there are alternate narrow strata of sand and loam, which, being mixed together, form a very productive soil. A small portion of carbonate of lime produced from the decomposition of sea shells, is found in the mud when it is analysed; but there is no chalk, nor marl, in any portion of this coast.

The industry of the tenants of these sands is proverbial. The poor sandy heaths which have been converted into productive farms, evince their indefatigable industry and perseverance. The sand in the Campine can be compared to nothing but the sands on the sea shore, which they probably were originally. It is highly interesting to follow, step by step, the progress of improvement. Here you see a cottage, and rude cow-shed erected on a spot of the most unpromising aspect. The loose white sand, blown into irregular mounds, is merely kept together by the roots of the heath: a small spot only is levelled, and surrounded by a ditch. Part of this is covered with young broom; another part is covered with potatoes; and perhaps a small patch of diminutive clover may show itself; but there is a heap of dung and compost forming. The urine of the cow is collected in a small tank, or, perhaps, in a cask sunk in the earth; and this is the nucleus from which, in a few years, a little farm will spread around. (*Outlines*, p. 11.)

Of their use of *liquid manure*, I shall hereafter, under that head, have occasion to speak. Their implements of husbandry are much inferior to ours. They employ, however, the spade to a much greater extent than we do; thus it is a common practice with them to deepen the trenches between the lands with the spade, and spread the earth over the surface of the ground: by this means the land is gradually completely trenched, and the immediate good effect by keeping the soil of the field dry is very considerable.

Their rotation of crops on sandy soils is commonly, 1. Flax and carrots; 2. Rye and turnips; 3. Rye and turnips; 4. Potatoes,
peas, and carrots; 5. Oats and ry
ver; 7. Rye, or barley and t
Turnips, oats, and potatoes; 9.
carrots; 10. Rye and turnips.

In a stiff loam near Alost, the
rotation is adopted: — 1. Potato
tons of dung per acre; 2. Whe
tons, and 50 barrels of urine; 3.
12 tons of dung, 50 barrels of ur
cwt. of rape cake; 4. Clover, with
of wood-ashes; 5. Rye, with 8 ton
and 50 barrels of urine. 6. Oat
barrels of urine; 7. Buck-whe
manure.

They grow large quantities of
tobacco; and are large exporter
of all kinds. With such exhaus
therefore, an attention to the car
of all kinds of manure is absolutel
to the preservation of the fertil
soil; and no cultivators are more
in this respect than those of Flan

They keep large quantities
" A beast for every three acres
a common proportion; and in
occupations, where much spade
is used, the proportion is still
These are maintained on turnip
carrots, &c., which are chopped
a tub, with beans, rye, or buck-
and mixed with boiling water (
call *brassin*), about two pails full
each cow.

" The horses of Flanders have
noted for their bulk. Flanders
at one time in request for the
carriages of the nobility and men
in England and on the Continent.
improvement in the roads, and in
of streets, activity has been pr
strength, and the English carri
now partake more of the breed
and are more nearly allied to
The Flanders horses are probabl
at this time as they were a cen
but compared with the present
coach and cart-horses in Englan
inferior. They are in general l
carcase, and pretty clean in the le
and enduring, if not too much
They are steady in the collar, an
a dead pull, in consequence of th
but they are very heavy in the
inclined to get fat, and deficient
They fall off in the rump, and the
out too much from the ribs.
point in most of them is the se
the tail, which is low, and point
wards. These are the general ch
the real Flemish horse. A more
of horse, although not so sleek,
the provinces of Brabant and Na
they draw heavy loads of stones an

The feet of the Flemish horses
y flat, denoting the moist pas-
h they are fed when young, or
the stables in which they have
any of them have never been
ose, and have been reared and
ble as the cows are. This will
vant of vigour and muscle, as
e propensity to get fat. The
rmers' horses is not calculated
hard flesh: green clover in
roots with cut straw in winter,
provender."

de-husbandry of Flanders, the
cription is given by the author
already quoted so freely:—
sbandry of the whole of the
part of East Flanders, where
good sandy loam, may be con-
nixed cultivation, partly by the
partly by the spade. Without
would be impossible to give
o the land, after it is sown,
it appear so like a garden, and
chief cause of the more certain
f the seed. There is a great
d by this practice, as may be
nparing the quantity usually
ders with that which is required
tries, where the spade is more
d. In large farms in England,
only used to dig out water-
to turn heaps of earth, which
composts with different kinds
But in Flanders, where the
y laid in stitches of about six
wide, the intervals are always
the spade, and the earth spread
l, as they call it) over the seed
een harrowed in. The earth
of a fertile nature below the
rface; sometimes it is only a
or a hard till; but this is no
t should not be dug out. If it
and poor, a good soaking with
days before it is dug out, will
ient fertility to it. If it is very
s must be broken as small as
e digging, as is done when stiff
nched in gardens; and what is
n on the surface, and not pul-
passing the *traineau* (a kind
oad wooden sledge, made of
od and boards) over it, will in-
educed to a powder by the frost
Thus the land is not only per-
d, but the seed, being covered
r more of earth, is placed out of
birds, without danger of being
ep. The soil from the bottom
h contains few seeds of weeds,
-weeds are necessarily cleaned
preading. This earth, spread over the surface of the land, keeps it clean, by burying the smaller seeds, which the harrows may have brought to the surface, and preventing their vegetating. It is for this reason that the roller, or the *traineau*, is made to press the surface, or that, in very light soils, men and women tread it regularly with their feet, as gardeners do after they have sown their beds. The trench, which is thus dug, is a foot wide, or, more properly, one sixth part of the width of the stitch, or bed; and the depth is from a foot to eighteen inches, according to the soil. Thus, a layer of earth, about two inches deep, at least, is thrown over the seed, which has been sown on a surface made even by the small harrows, or the bush-harrow. These two inches gradually incorporate with the soil below; and thus, at every such operation, the soil is deepened so much.

The trenches are so arranged, that every year a fresh portion of the ground is dug out, and in six years the whole land will have been dug to the depth of at least one foot. In the next course, the trench is dug a few inches deeper, which brings up a little of the subsoil; and, after four or five such courses of trenching, the whole soil comes to be of a uniform quality to the depth of eighteen or twenty inches; a most important circumstance to the growth of flax, potatoes, and carrots, all of which are very profitable crops to the farmer, and the two last indispensable to the maintenance of the labourers and the cattle. In the Waes country, they proceed differently, for they have a soil which, by repeated trenchings, has long been uniform in quality to the required depth. There they regularly trench one sixth part of the land every year, and plant it with potatoes, or sow carrots in it.

"From this outline of Flemish husbandry," concludes Mr. Rham, "the general principles which pervade the whole system are easily discovered. The garden has evidently been the model for the operations of the farm. The spade has originally been the chief instrument of cultivation; and when a greater extent of farms necessarily introduced the plough, the favourite spade was not entirely laid aside. A Flemish farm of forty or fifty acres must still be looked upon as an enlarged garden; and if a comparison is instituted with the cultivation of land in England, we can only compare the Flemish husbandry, as far as tillage is concerned, with those large unenclosed gardens which are found in the neighbourhood of London, where the common vegetables are raised which supply the markets; where green crops are cut early for horses and cows kept in London; and where the soil is continually enriched by the manure which is brought every time a cart returns from having carried out the produce. In these grounds, the system is similar to the Flemish—deep digging, or trenching, abundant manuring, and a rapid succession of crops." (*Flemish Husb.*; *Journ. of Roy. Agr. Soc. of Eng.* vol. ii. p. 43.)

FLANNEL. See Woollen Manufacture.

FLAX. (Lat. *Linum*, from the Celtic word *llin*, a thread; whence the Greek *linon*, the Ital. and Span. *lino*, and Fr. *lin.*) An extensive genus of plants, of which more than seventy species are enumerated by botanists. It belongs to the natural order *Linaceæ*. The plants are distinguished by the tenacity of their fibres, the mucilage of their seeds, and, generally, by the beauty of their flowers.

Four species only are indigenous, of which the common flax (*L. usitatissimum*) to be next noticed, is the most important and useful. As ornamental plants, they are well worth cultivating in every collection. The greenhouse and frame kinds grow best in a mixture of loam and peats; the hardy shrubby kinds do well in any light soil. The hardy herbaceous species are well suited for ornamenting flower-borders; but the dwarf kinds do best on rock-work, or in pots, that they may be protected by a frame in frosty or very wet weather; they may be increased by divisions of the root, by cuttings, or by seeds. The annual and biennial species should be sown in the open ground in April. (*Paxton's Bot. Dict.*) The indigenous species are — 1. Common flax (*L. usitatissimum*) which is an annual, rising one to two feet high, with a smooth slender upright stem, branched near the top, narrow lanceolate leaves, rather glaucous, blowing in July a corymbose panicle of pale purplish-blue flowers. The seed-vessel is globular; the seed flattened, oval, glossy, brown exteriorly, white within. The testa or skin of the seed abounds with mucilage; the cotyledons with oil, easily procured by pressure. The mucilage extracted by hot water is demulcent, the oil a mild laxative. The use of linseed oil in the arts is very extensive. 2. Perennial blue flax (*L. perenne.*) 3. Narrow-leaved pale flax (*L. angustifolium.*) 4. Purging flax (*L. catharticum*) rises only from two to six inches high; the flowers are white, small, and drooping. The plant has no odour, but has a bitter taste: it is purgative, but is seldom used. The first and fourth are mentioned further in detail in articles which follow. The others require little notice; they are found growing in sandy or chalky soils, and are perennial, flowering in June or July. (*Eng. Flor.* vol. ii. p. 118.)

FLAX, BASTARD TOAD.
tard Toad-flax.

FLAX, COMMON. (Sax.
flex, Ger. *flachs*; Dutch, *vlasch.*)
of the *Linum usitatissimum*, whi
undergoing the process of washing,
and other operations, is spun int
and woven into linen textures,
The seed is also crushed for oil; ar
fuse husk, after the oil is expressed
into oilcake for cattle. The fibr
bark of this important plant h
applied to the manufacture of th
cloth in this and other countries
remotest periods. "Flax," says
Low, "being a native plant, is su
hardy to endure the climate of
other northern countries. It ha
a wide range of temperature, bei
vated, and for the like purpos
Egypt almost to the polar circle
wild flax grows in corn-fields, and
or sandy pastures; but, when cult
thrives most luxuriantly in d
mould, but particularly in untille
soils.

Its roots sink very deep when it h
and it is generally said that the
good flax should strike into the
depth equal to half the length, at
the stem above ground. A porou
or one that is well drained, is the
sential. In Flanders, flax may
dered as a staple commodity, an
portion of the population of that c
employed in preparing large quan
exportation; the cultivation and
of it, is, therefore, most perfectl
stood, and the Dutch flax is al
dressed, and of the finest quality.
miums given by the legislature
country to force the cultivation
have had very little effect, it bein
the most exhausting crops when a
ripen its seed; and its culture bei
to be much less profitable than co
native growth of flax being quit
cient to the demand for home con
&c., we have long been in the hab
porting a large proportion of our
The principal countries from wh
obtain flax are Russia, the Net
Prussia, and France, with small
from America, Italy, New South
&c. The duty is at present 1*d.* pe

In Ireland, flax usually follows
In Scotland, land that has been sev
in pasture, and from which one
grain has been taken, is prefer
Flanders, the crops which immedia
cede flax, in light soils, are barle
with turnips after them the same y
these crops are more highly manu

and before the flax-seed is sown, peat
at the rate of thirty bushels per acre,
read and harrowed in, and a few days
ards ten hogsheads of strong liquid
e is poured regularly over the land,
ft for a week or ten days to soak
ghly into the soil. The seed is then
ery abundantly; cloudy or showery
r is the time chosen; the quantity
but the general proportion is 160 lbs.
acre. It is lightly covered in by a
arrow, drawn over the land, for if
ed were buried more than half an
eep it would prevent its vegetating.
hoice of seed requires great care and
spection: good fresh seed should be
right colour, with a sweet taste, and
feel smooth, slippery, and plump, and,
ng broken, should appear of a greenish
colour, and should sink in water.
ne seed will average 18 lbs. per peck,
ood Riga seed is somewhat lighter.
weeding should be attended to when
ems are from two to three inches
the surface, for when the flax is
, it is liable to be injured by the
rs. The proper time for pulling flax,
not intended for seed, is when about
irds of the stalk is observed to turn
, and to lose the leaves. If intended
d, the flax should not be pulled until
psules have acquired a brown colour,
he points have become firm, and so
as to fix themselves in the hand when
d, and when nearly all the leaves and fo-
ave withered and fallen from the stem.
en flax is raised both for the seed and
it is submitted to an operation called
g, which consists in separating the
from the stalk, by passing the flax
gh a kind of comb, before it is steeped
er. The iron teeth of these combs
aced so close together that the heads
t pass through, and are consequently
off. Another practice is to beat out
ed in the field with a piece of wood,
eavier stick than that of the common
nd then to sift the seed into a large
In preparing flax for the manufac-
, the first operation it undergoes is
f steeping it in water, to loosen the
and separate it from the stalk; for this
se it is tied into small bundles, and
placed in a pond or reservoir of soft
. The sheaves are slightly covered
traw, fern, rushes, or coarse herbage
down by stones or heavy bodies), to
nt the flax from being discoloured by
m. In the course of seven or eight
the rind will be sufficiently loosened,
he flax must be taken out of the water
pread out to dry. Phillips says there
act of parliament in force, which forbids the steeping of flax in rivers, or any waters where cattle are accustomed to drink, as it is found to communicate a poison destructive to the cattle which drink of it, and to the fish which live in such waters. The odour it exhales is most disagreeable, and has often been productive of fever. Another, but far more tedious process, resorted to for separating the bark from the stalk, is called *dew retting*, and consists in spreading the flax upon grass lands, and exposing it to the constant action of rain and dew. Hot water and soft soap are said to decorticate the stalk in a few hours. Grassing or bleaching the flax on old grass ground is the next operation, and is intended to rectify any defect in the steeping. The last process is that of bruising and scutching, previous to which it should be moderately dried. The woody part of the stem was formerly beaten or bruised with a hand mallet; but this operation is now more effectually performed by machinery. Flax-mills, with suitable wheels and rollers, now greatly facilitate the processes of bruising and scutching. Mr. James Durno (then British consul at Munich) gives an interesting account in the sixth volume of the *Com. to Board of Agr.* p. 75., of "the mode of cultivating flax and hemp in Russia, Prussia, and Poland;" and Mr. Robert Somerville of Haddington has also a very excellent paper in the same volume (p. 84.), urging very strenuously the necessity for a more general home cultivation of those essential articles, hemp and flax, and suggesting improvements in the processes of dressing, &c., many of which have since been carried out. (F. H. *Phillips's Cult. Veg.* vol. i. p. 189.; *Brit. Husb.* vol. iii. p. 42.; *Quart. Journ Agr.* vol. iv. p. 159.; *Pooler's Manual; Irish Farmer's Mag.; Low's Prac. Agr.; Baxter's Agr. Libr.; M'Culloch's Com. Dict.*)

FLAX, PURGING. Mill mountain. Dwarf wild flax. (*Linum catharticum.*) This is a pretty herb, seldom more than eight or ten inches high, growing in parks, warrens, and dry hilly pastures. The stalk is slender and delicate, round, firm, and divided into small branches. The leaves are small, obtuse, bright green, and standing two at each joint. The tremulous flowers are small and white, pendulous before expansion, and not unlike chickweed. The root is small and tapering. This plant is bitter and cathartic. Dr. Withering found two drams or more in a dose, of the dried herb, useful in obstinate rheumatisms. It is purgative in doses of 3 scruples. (*Eng. Flor.* vol. ii. p. 120.) The country people boil it in their ale or beer for the cure of rheumatism; but it is not so useful as a dose of colchicum.

FLAX-SEED. See Linseed.

FLAX-SEED, THYME-LEAVED. (*Radiola millegrana*). A little white-flowering insignificant plant, found in wet sandy places. It is an annual, flowering in July and August; root small and fibrous; stem repeatedly forked, one or two inches high; leaves sessile, ovate.

FLAY CRAKE. A provincial name for a scarecrow, hung in gardens or fields.

FLEABANE. (*Erigeron*, from *er*, spring; and *geron*, an old man; the plants become old in the beginning of the season.) This extensive genus comprehends many exceedingly handsome species, varying from a few inches to two feet or more high, and producing a great and copious display of blossom; they will grow in almost any soil, and are increased with facility from either seeds or divisions. (*Paxton's Bot. Dict.*) The fleabane has lost its reputation both for banishing fleas and insects by its smell, and answering other superstitious incantations, for which it was celebrated in former times. There are four indigenous species. The Canada fleabane (*E. Canadensis*), and blue fleabane (*E. acris*), which are diuretic. The alpine fleabane (*E. alpinus*), and pale-rayed mountain fleabane (*E. uniflorus*). The first is annual, the second biennial, the third and fourth perennial. (*Eng. Flor.* vol. iii. p. 421.)

FLEABANE, COMMON. (*Inula dysentareca.*) This plant is very abundant in clear ditches and in watery places about road sides. It is a perennial, with a creeping root; herb more or less woolly or cottony, glutinous, with a peculiar acid aromatic scent, somewhat like the flavour of peaches. The stem is 12 or 18 inches high, branched and leafy, corymbose at the summit, with many bright yellow flowers. Linnæus records, on the authority of General Keith, that the use of this plant cured the Russian army of dysentery; — hence the specific name. Its medical properties, however, are simply diuretic. The small fleabane (*I. pulicaria*) is an annual, and is said to banish insects by its smell. It grows on moist sandy spots, especially where water has stagnated during winter. There is another species, the samphire-leaved fleabane, which grows on the sea-coast, in a muddy soil. (*Eng. Flor.* vol. iii. p. 440—443.)

FLEABANE, GREAT. Ploughman's Spikenard. See Spikenard.

FLEAK. A wattled hurdle or kind of gate, which, by negligent farmers, is sometimes set up in the gaps of their hedges. See Hurdle.

FLEAM. In farriery, an instrument used for letting blood in horses or other animals.

FLEA-WORT (*Cineraria*, from ciner ashes; referring to the soft white do which covers the surfaces of the leave These are downy or cottony herbs, som times shrubby, more numerous in Southe Africa than elsewhere. There are but t native species; the marsh flea-wort (*C. p lustris*) found in ditches and the bog margins of deep pools, chiefly in the easte parts of England. It has a stout shag stem three feet high, corymbose at the t a long fibrous root running deep into t mud, leaves broadly lanceolate; flow numerous, of a bright lemon colour.

The mountain flea-wort (*C. integrifo* is only found on chalky downs or limesto cliffs. The stem is only 6 or 8 inches hi terminating in an imperfect umbel of th or four bright yellow flowers. The cultiva species thrive best in a mixture of lo and peat, and young cuttings root fre under a glass. (*Eng. Flor.* vol. iii. p. 44 *Paxton's Bot. Dict.*)

FLEA-WORT. (*Plantago.*) A gen the greater number of the species of whi are mere weeds, of the easiest culture a propagation. See Plantain.

FLECKED. A provincial term used signify pied, as cattle.

FLEECE. The woolly covering sh from off the body of the sheep. Mr. Jam Dickson of Edinburgh contributed a ve able prize essay to the Highland Soci (*Trans.* vol. vi. p. 205.) "on the treatm of sheep, with a view to the improvem of the fleece." The earliest and rude method of obtaining the fleece was to dri the flocks hastily through a narrow passag when by their pressure against each oth the greater part of the fleece was loosene or completely detached. To this succeed another more inhuman mode. The she was caught, and the fleece pulled from i back. This barbarous practice prevailed a very recent date in the Orkney Island The average value of the fleece in 1315 w 6*d.* (7*s.* 6*d.* of the present money), bei nearly half as much as the value of the ca case. (*The Sheep, Lib. of Use. Know.* p. 205.) See Hair, Sheep-Shearing, a Wool.

FLEETWOOD, WILLIAM, was born the Tower of London, where his father h his residence in 1656. In 1706, he w created Bishop of St. Asaph, and eight ye afterwards was translated to Ely, of whi he died the diocesan in 1723. Fleetwo requires notice here from being the auth of "Curiosities of Nature and Art in Hu bandry and Gardening." London, 17 8vo.

FLEMISH HUSBANDRY. See Fla ders, Agriculture of.

[. Muscular flesh, which is too
n to need any particular descrip-
mposed of a number of white or
, compounded of still smaller
is united in ordinary cases with
f substances, such as blood, fat,
inew, and nerves. It has been
y M. Berzelius who found in it—

	Parts.
essels and nerves -	15·8
matter - - -	1·9
and lactate of soda -	1·80
and colouring matter of od - - -	2·20
e of soda - -	0·90
- - - -	0·15
holding in solution phos- of lime - - -	0·08
d loss - - -	77·17
	100

ef nutriment afforded by animal
ived from muscle or flesh. That
imals is more nutritive than that
nimals; hence beef and mutton
adapted to support the frame
or lamb. The latter yield most
at the popular idea of the nutri-
ty of animal jellies is erroneous.
MILK. In the country, means
as has been skimmed, or had the
n from it.

A provincial name for the
leme, used in bleeding cattle.

. Common flints are nearly pure
ch is composed of a metal (*sili-*
oxygen gas; it is tasteless, inso-
ter, or fluoric acid, and dissolv-
y means of potash. Flints usually
rregular nodules in chalk. They
nsiderably in some sorts of soils.
mmonly chiefly composed of flint.
a of flint analysed by M. Klaproth

	Parts.
- - -	98
na - - -	0·25
of iron - -	0·25
- - -	1·50
	100

hen exposed to intense heat, be-
que, and forms a kind of porcelain.
well illustrated in the fire in the
1841. The flints of the muskets
hus changed. See EARTHS.

VEED. See HEDGE MUSTARD.

T. A raft of timber bound to-
be conveyed by water. It also
cally to turn water upon meadow
mproving it; and likewise to pare
face or sward.

FLOAT BOARDS. The boards fixed to the rim or outer circumference of the undershot water wheels of mills.

FLOATING OF MEADOWS. See IRRIGATION.

FLOATSTONE. A porous variety of flint, which floats upon water. Thomson (*Sys. of Chem.* vol. iii. p. 344.) describes a species of floatstone found at St. Omer, near Paris, which he states to be of a yellowish grey, very soft, and rather brittle in its texture. Specific gravity 0·448. 100 parts consist of 98 parts silica, and 2 lime.

FLOCK. An indefinite number of sheep kept together under a shepherd.

FLOUNDER (*Pleuronectes.*) This fish is very numerous in the seas around the British coast, and in all rivers that communicate with them. It may easily be distinguished from plaice and other fish of the same genus by a row of small but sharp spines, which surround its upper sides. The superior part of the body is of a pale brown, sometimes marked with a few spots of dirty yellow: the belly is white. Flounders seldom grow to a large size in the rivers, few exceeding the weight of five or six pounds. Brandlings that are taken from rotten tan, well scoured, are the best baits, but they will take the lobworm, minnows, or greaves. (*Walton's Angler; Blaine's Rural Sports.*)

FLOUR. (Span. *flor;* It. *fiore;* Fr. *fleur de farnie.*) The meal of wheat corn or other grain, separated from the husk or bran, and finely ground and sifted. There are three qualities of flour, denominated *first, seconds,* and *thirds,* of which the first is the purest. (See BREAD and CORN LAWS.) The proportion of flour which a bushel of grain affords greatly varies. A bushel of Essex wheat, Winchester measure, weighs upon an average about 60 lbs., which, when ground, will yield (exclusive of the loss incurred by the grinding and drying) 45½ lbs. of the flour called *seconds,* which alone is used for baking throughout the greater part of England, and affords the most wholesome, though not the whitest bread. Besides the *seconds,* such a bushel of wheat yields 13 lbs. of pollard and bran: the total loss in grinding seldom exceeds one pound and a half.

The corn of the different species of grain produces, when ripe, nearly the following quantities of meal or household flour and bread per bushel: viz.

Wheat if weighing	60 lbs.,	of Flour	48 lbs.	of Bread	64 lbs.
Rye —	54	—	42	—	56
Barley —	48	—	37½	—	50
Oats —	40	—	22½	—	30

The flour of wheat which is cut before it is quite ripe is whiter than that which is allowed to come to maturity, and bears a higher price in the markets. The grain which is intended for the miller should, therefore, be reaped before it has reached its utmost growth; but that which is meant for seed should be allowed to stand until the last moment at which it can be cut with safety. The corn is ground into meal of various degrees of fineness, and a bushel of 60 lbs. generally yields, when dressed, about the following quantities, viz.

Fine flour - -	25½ lbs.
Household flour - -	22½
Pollards - - -	8
Bran - - -	3

A bushel of wheat, therefore, averages 48 lbs. of both kinds of flour of the sort called "seconds," and a sack of marketable flour should by law weigh 280 lbs. These products must, however, vary according to the quality of the grain; some will produce more or less bran, as the husk may be more or less thick; and the bakers admit they can make two or three more quartern loaves than the usual quantity from one sack of flour, when it is the genuine produce of good wheat. Thus it was found upon a comparative trial between English and Scotch wheat, of apparently equal quality, that there was a difference in favour of the former of no less than 13 lbs. of bread upon 2½ cwts. of flour. (*Willich's Dom. Ency.; Brit. Husb.* vol. ii. pp. 137. 155.; *Farmer's Mag*. vol. xxii. p. 2.)

FLOWER DE LUCE, OR LIS. FLAG. See IRIS.

FLOWERING ASH. (*Scopoli.*) All the species of the genus Scopoli are ornamental and useful; they are easily cultivated, and may be raised from seeds, like the common ash, or they may be increased by budding or grafting on the common ash.

FLOWERING RUSH, COMMON. (*Butomus umbellatus.*) This beautiful aquatic plant is a native of ponds, ditches, and the margins of our rivers on a gravelly soil. It flowers in July and August. The leaves are narrow, acute, nearly a yard long. The stalk is still taller, round, and very smooth, and bears a large bracteated umbel of handsome rose-coloured flowers, each about an inch broad, without scent. This rush may be increased with little difficulty. The leaves of this plant are said to cause the mouths of cattle to bleed that crop it; hence the name, from *bous*, ox, and *temno*, to cut. (*Paxton's Bot. Dict.; Eng. Flor.* vol. ii. p. 246.) It was some years since much celebrated in Russia as a remedy for hydrophobia; but like all specifics, its fame was destroyed by excess of praise. It has no influence in curing that disease.

FLOWERS. The most beautiful parts of plants and trees, which contain the organs of fructification. (See BOTANY.) From

their frequent utility as medicinal
as well as their external beauty,
tivation of flowers in our gardens
an object of some importance. As
treated of almost every flowerin
alphabetically under its separate
shall confine myself in this place
general remarks. Flowers are
them excellent indicators of the ap
ing weather by expansion or clos
other motions. It is an establish
that flowers as well as fruits grow
the shade, and ripen and decay
when exposed to the sun. The im
cause of the various colours prese
some flowers, such as poppies,
hitherto been distinctly ascertain
louring matter is contained in almo
flower and root of vegetables,
be extracted by a very simple
Flowers which are to be used
served for medicinal purposes shou
a few exceptions, be gathered in ful
and dried as speedily as possible.
Rosa Gallica, is gathered before
blown. In drying flowers, the calyce
&c. should be previously taken of
the flowers are very small, the caly
or even the whole flowering spike,
greatest portion of the labiate flow
some instances, as in the *baulis*
pomegranate flower, the active matte
chiefly in the calyx. Compound flow
pappous seeds, as colt's-foot, ough
dried very high, and before they are
open, otherwise the slight moisture
mains would develope the pappus,
a kind of cottony nap, which would
hurtful in infusions, by leaving i
particles in the throat. Flowers of
no smell may be dried in a heat
100° Fahr. The succulent petals
liliaceous plants, whose odour is ve
cious, cannot well be dried, as th
cilaginous substance rots and grow
Several sorts of flowering tops, as
lesser centaury, wormwood, melilo
germander, &c., are tied in small
and hung up, or else exposed to
wrapped in paper cornets, that th
not be discoloured. After some ti
flowers, as those of violets, bugloss
rage, grow yellow, and even bec
tirely discoloured, especially if
kept in glass vessels that admit th
if, however, they are dipped for a
in boiling water, and slightly presse
they are put into the drying stove,
colour is rendered permanent.
Sup. to Pharmacop.) It is proba
varieties in the colours of single
raised from seeds may be gener
tained by sowing those which alre

nt shades contiguous to others of
pecies; or by bending the flowers
our, and shaking the anther-dust
of another. The origin of *double*
believed to result from the luxu-
th of the plant, in consequence
ve nourishment, moisture, and
hey arise from the increase of
of the flower, and the conse-
usion of others: thus the stamens
onverted into petals. Botanists
rly term such multiplied flowers
onsters, because they possess no
r pistils, and therefore cannot
eds. There subsists (says Dr.
curious analogy between these
nonsters and those of the animal
a duplicature of limbs frequently
latter, as chickens and turkeys
legs or four wings, and calves
eads, &c. The science of flori-
the culture, propagation, and
nagement of plants, divides itself
ections, viz. 1. Stove plants; 2.
e plants; 3. Hardy trees and
Hardy herbaceous plants; 5.
nd biennials. But as I do not
o into the separate consideration
ferent heads, I shall merely refer
who wishes to study the subject
to the "Florists' Manual," "The
nd Greenhouse Manual," "Lou-
clopædias of Plants and Garden-
nd numberless other excellent
h are published on this subject.

LIN, TOADFLAX, or SNAP-
. (*Antirrhinum.*) Of this genus
two indigenous species noticed
1. The round-leaved Fluellin
m), which is a rare plant, with
ny leaves. 2. The sharp-pointed
. elatine), which is more slender
st, with halberd-shaped, usually
aves. It is very common in corn
harvest, on a gravelly or chalky
ng its pretty purple and yellow
hich are paler, smaller, and less
s than those of the first-men-
cies. The stalks are spreading
mbent, about six inches long.
ra, vol. iii. p. 132.)

WORM. (*Distoma hepati-*
ola hepatica, Linn.) A small flat
worm, about an inch long, which
ducts of the liver and gall bladder
t animals, especially sheep. In
have died of the rot, it is gene-
d fixed by two points, one at one
and the other about the middle
omen of the worm; it bears some
e to the seed of the common
thence is often called the *gourd-*
e Sheep, Diseases of.

FLY-CATCHER, THE SPOTTED. (*Muscicapa grisola.*) This bird is one of the latest, but at the same time one of the most regular, of our summer visitors. Mr. Selby says, this bird seldom makes its appearance till the oak leaf is partly expanded, and it begins to form a nest of moss, roots, grass, and feathers immediately on its arrival. It frequents orchards, gardens, lawns, and pleasure grounds, and is not a little remarkable for the singularity of the places in which it sometimes makes its nest. It has been known to fix its nest on the crown of a lamp, in a bird cage left hanging out of doors, in the head of a garden rake, &c. The more usual places for this bird's nest are the side of a faggot-stack, a hole in a wall, or on a beam in an out-building; whence arises one of its provincial names, that of Beam-bird; it also fixes its nest on a branch of a pear tree, a vine, or a honey-suckle when trained against a building. These birds are believed to feed almost exclusively on winged insects. The eggs of the spotted fly-catcher are four or five in number, white, tinged with blue, and spotted with pale red; nine lines in length by seven in breadth. The upper surface of the body and wing-coverts of the bird are hair brown, with a few darker spots upon the top of the head, breast, and chin; legs, toes, and claws black. Whole length of the bird five inches and five eighths. (*Yarrell's Brit. Birds*, vol. i. p. 164.)

FLY-CATCHER, THE PIED. (*Muscicapa atricapilla.*) The pied fly-catcher is much less numerous as a species than its generic companion last described, and, except in certain localities, is a rare bird in England, and can be considered only as a summer visitor to this country, arriving in April, and quitting it to go further south in September. It appears to be most plentiful in the vicinity of the Lakes of Cumberland and Westmoreland, and in some of its habits, particularly in its mode of feeding, and the nature of its food, it resembles the well-known spotted fly-catcher; but with these distinctions, that it builds in the holes of decayed oaks or pollard trees, is exceedingly noisy and clamorous when its retreat is approached, and that it lays sometimes as many as eight eggs. Its nest is a loose assemblage of roots and grass, with a few dry leaves, dead bents, and hair; eggs eight and a half lines long by six and a half in breadth, of an uniform pale blue. Colour of plumage: upper part of head and neck dark brownish black, edges of the greater wing coverts, and some of the other feathers, white; whole of the back a decided black; all the under surface of the body white. The whole length of the bird, five inches and one eighth. (*Yarrell's Brit. Birds*, vol. i. p. 169.)

FLY IN SHEEP. See SHEEP, DISEASES OF.

FLY IN TURNIPS. (*Altica nemorum.*) The vulgar name for a species of flea-beetle, which attacks the turnip crop in the cotyledon, or seed leaf, as soon as it appears: it is sometimes called the black jack, and sometimes the flea, or black fly. A universal and very remarkable characteristic of this family of beetles, is the property of making great leaps by means of their very thick hind legs. There appear to be at least two species of fly or beetle injurious to the turnip crop, the striped, and the brassy, or tooth-legged, also called saw-fly. The habits of the latter are not known. As the former is the most general and destructive, I shall confine my observations principally to that species. All the species are among the smallest insects; several are scarcely a line long: the length of the largest is hardly two lines, and one in breadth. The greatest number are shining green, with a brown or yellowish hue. Early in spring they are seen sitting on walls in great numbers; in winter they live under leaves, stems of plants, and in chinks in walls: during summer they are the most dangerous enemies of various vegetables, particularly the cabbage tribe. They also attack different sorts of the root genus *Brassica*, such as the turnip, &c., as well as the radish, the common cress, and the water cress. Besides these sorts of vegetables, they also prey upon flax, tobacco, hops, seedling clover, and sainfoin, but more especially the summer and winter turnips, which are left for seed, and often entirely spoil the future harvest during the flowering season, when the weather is warm and dry. So extensive are the ravages thus committed, that whole fields have often to be resown. Arthur Young calculated the loss in Devonshire, from this cause alone, in 1786, at 100,000*l.* We could scarcely believe that so small a creature was capable of causing perceptible injury to vegetation; but what these beetles want in size is made up by their numbers and voracity: the extent of the injury is also much increased by the circumstance of their attacking, when young, many vegetables, and not gnawing the tender leaves, like most other insects, only on the edge, but eating their surface, piercing them like a sieve, and disturbing the cellular tissue, thus preventing their growth, and finally causing the total destruction of the plant. They love warmth and sunshine; thus are seldom found in shady places: and it is a very just observation that plant beds bordered by many trees have little to fear
from them. The turnip beetle bel
the *order* COLEOPTERA, from its win
which it flies being folded benea
horny cases. It is included in the
CHRYSOMELIDÆ, or golden beetles,
tain scientific reasons, in conform
its structure, and is one of about one
species forming the *genus* ALTICA
times written HALTICA.

The *striped turnip beetle* is name
catalogues *Altica nemorum.* The
word, derived from the Greek, al
the leaping powers of the genus,
latter signifying that this species
woods and groves, which were mo
cially its haunts before turnip cu
became general.

Mr. Curtis says the eggs are l
the under side of the rough leaf fr
to September: they hatch in t
The maggots live between the two
cuticles of the rough leaf, and arriv
turity in sixteen days. The ch
buried just beneath the surface of
where it remains about a fortnig
beetles live through the winter in
state, and revive in the spring.
five or six broods in a season, and
that the insects are most to be
fine weather; for heavy rains, col
and long droughts destroy them
scent appears to be very perfect
against the wind, and are attract
long distance.

Professor Rennie says the egg
in July, and the dusky-brown
hatched in the following May.
the pupa state fifteen days, the be
pear in July, and die after they
eggs. Turnips, therefore, sow
earlier or later than this, are safe.
times radish seed, or, what is chea
may be sown between the turnip
the beetles to feed on, and save th
Some say the larvæ live where th
insect does; others, that they at
roots and stems of plants. No nat
mies are yet known of these destru
sects. Shade, coolness, and rainy
are the surest protection of you
from the attacks of the flea-beetle

Remedies are not wanting, wh
been recommended by various agri
and gardeners, against these ins
these remedies are enumerated
perly explained in an excellent t
M. Wundram, a clergyman at
Hanover (in the *Trans. R. I. Ag*
Vienna, new series, vol. i. p.
those particularly deserve to b
mended which are proposed by the
they have been tested by many y
rience, are easily tried, require s

will afterwards attack them. rness lasts so long that the plants puire a second watering, unless heavy showers fall soon after. y also be rescued from the greedy of these small devastators in a le and easy manner by the applithe second remedy, viz. road dust. of chalky stones is to be gathered d in a fine day, and stowed up in e for future use. As soon as it is that the earth flea-beetles appear nips, a night must be chosen when eal of dew has fallen, and while plants are still wet they are to be rinkled with the road dust till as if covered with powder: whedust is injurious to their bodies or only by covering the leaves it or is injurious to the action of ns of manducation, is not known, arth flea-beetles all at once disrticularly if the sun shines brightly ing day, and the dust is dried on . If heavy rain falls immediately irst sprinkling, and washes the dust nts, it must be repeated as before. cent investigations which have ce in this country, of the habits of fly, have enabled us to clear up nts in the natural history of this eetles. The committee appointed oncaster Agricultural Association, to institute enquiries "On the y, and the means of its preven-l the proposal of this subject by nological Society of London as one Prize Essays, have led to the pubf a report by the former body, g a vast deal of practical matter; especially to the production of a

spreading the ashes afterwards over the ground will prove an additional security; but this system does not suit sandy soils, and could not be regularly followed up on any land. Feeding off the turnips is strongly recommended as an antidote to the beetle, as well as from its peculiar advantages of manuring and preparing the land for the barley crop and succeeding seeds. The benefits to be derived from sheep-folding, as regards the beetle, are doubtless principally to be attributed to the perfect stamping down of the soil and herbage, by which all insect life is destroyed, rather than to any peculiar quality in sheep manure, unless it be contained in their urine.

It is the opinion of a great many agriculturists that raw and long manure harbours the beetle, and if turnips be sown on a stubble crop they are often completely destroyed.

Powdered lime and soot have met with some advocates, but do not appear to be of any use.

Hoeing and rolling may harass and kill many of the beetles; and as this process promotes the more rapid growth of the plants, it must be attended with no slight advantages. From the dislike the fly has to repeated wet, frequent watering the turnips would evidently be very beneficial, particularly with brine (not strong enough to injure the plants) or liquid manure, which would stimulate the growth most effectually; and many of the beetles would necessarily be forcibly brushed off, and get set fast in the earth, and die. Sulphuric solutions sprinkled by machinery would also have a powerful effect. Nitrate of soda has been tried in a few instances on crops of Swedish turnips with very beneficial

The first appearance of the beetles is to be punctually observed, as affording the best chance in applying remedies.

The rapid growth of the plant appears to be the best security against the ravages of the insect; and to insure this, plenty of seed should be sown, all of the same year's growth. Deep ploughing will be found advantageous when the chrysalides are in the soil. Drilling is far superior to broadcast sowing, and in Scotland is believed to keep away the beetles. Early sowing is attended with disadvantages; for the same warmth and sunshine that make the seed vegetate will also bring the hungry swarms of beetles from their winter quarters. Charlock, hedge mustard, common ladies' smock, and all cruciferous weeds in fields and hedges should be carefully destroyed, as they afford support to the beetles before the turnips come up.

Fumigation, by burning brimstone, stubbles, green weeds, or furze, damp straw, &c. in heaps round the field, so that the smoke drives along the ground, has been found one of the most effectual remedies, and can be the most easily resorted to, because it is in dry weather that the fly infests the turnip crop. A correspondent of the *Mark Lane Express* proposes, on the first appearance of the turnips above the ground, that the following mixture, calculated for two acres, should be strewed over it:— 1 bushel of flour of brimstone, 1 bushel of sulphuret of lime (from a gas work), and 6 bushels of dry sand.

Such are a few of the remedies and preventatives proposed; the subject still offers a wide field for inquiry and observation, and can scarcely be grasped and properly understood until correct data are obtained from every sort of soil under the various influences of climate and effects of cultivation.

The Doncaster committee received upwards of 100 answers in reply to the queries which they addressed to practical farmers and others in all parts of England. The evidence afforded by those various communications are certainly most valuable; but the remedies recommended in the following practical directions which they publish, cannot be considered as altogether efficacious, though probably preventive:—

1. That, most effectually to insure the speedy growth of the plant, the land should be kept in the best possible state of cultivation.

2. That scuffling or ploughing the land before winter, and clearing the hedge bottoms, and every other place which can harbour the insect, should be systematically attended to.

3. That the fallow should be
as early as possible, so as to give
tunity for choosing a favourable
sowing.

4. That the system of ridging
with manure under the rows, a
on the ridges, be in every po
adopted.

5. That the most favourable o
for ridging be chosen; particular
land be not ridged in too dry a s

6. That as soon as the land be
the manure, it be laid in, the ridg
and the seed drilled immediat
quicker these operations follow
the better chance of the crop.

7. That the manure chosen
will be adapted to the soil, and
speediest growth of the young
that a full quantity be allowed.

8. That the seed be not deposi
manure; but the manure be thin
with soil, and the seed drilled in

9. That a very liberal allowan
be given, as much as 3 or 4 lbs.
for drill, and 6 or 7 for broadcast
this seed be of one year's growth.

10. That as soon as the pla
above ground it be dusted with
and this repeated as often as rai
beats it off and the fly reappears.

11. That in places which suit,
sons particularly dry, watering b
ing-machine be resorted to.

Under these precautions the
confidently trust that the loss of
the turnip fly, may be, in most
vented.

Having spoken thus at length
nip flea-beetle, I have little room
on the turnip saw-fly (*Athalia*
which is a less common depre
occasionally found in company
former. A very minute accou
given by Mr. Duncan. (*Quart.*
Agr. vol. vii. p. 558.) It receive
from the use and appearance of
ment with which it deposits its e
is placed at the extremity of the
of the female, on the under side,
constructed that it combines the
of a saw and auger. (*Kollar on*
jurious to Farmers, Miss Loudon's
Doncaster Report; Mr. Curtis
affecting the Turnip Crop; Pract
dry.)

FLY IN WHEAT. (*Tipula t*
by; *Cecidomyia tritici*, Latr.)
wheat is in blossom, it is sometime
by this small beautiful fly, with
coloured body and white wings,
its eggs in the middle of the b
means of a long retractile oviposit

s are hatched, the larvæ, which are
all, from ten to fourteen being some-
und in one grain, prevent the fruc-
n of the grains, probably by eating
llen, and thus frequently destroy
art of the harvest. Mr. Shirreff
Journ. of Agr. vol. iii. p. 501.) says
generally appears when the wheat
omes into ear. In 1829 and 1830,
re first seen by him on the 21st June,
1831, on the 10th of the same month.
væ, after a period, fall to the ground,
row in the earth, where they remain
following summer. According to
rrie (*Mag. Nat. Hist.*, Sept. 1829,
all the larvæ have quitted the ears
t and descended to the earth by the
August; going into the ground to
he depth of half an inch, where it is
e that they pass the winter in the
ate.

xtraordinary smallness of this insect,
its larva and perfect state, with the
tance that the destruction of the
akes place when it is in blossom, and
t all the ears on one and the same
attacked, allows of but little that
effected by human aid against this
of grain. The safest and almost
tain means of diminishing such an
the succeeding year, consists in not
wheat again on the same field, nor
ighbourhood; for, in all probability,
æ lie in the earth, and will only be-
es next year at the season when the
in blossom. Fortunately, nature
his case provided another still smaller
e insect allied to the family of Ich-
s, to keep the midge also within its
bounds. Mr. Kirby, who first made
ainted with the natural history of
ect, calls the parasite *Ichneumon*
It is a species of the genus *Platy-*
of Latreille, belonging to the family
rapidæ.

Gorrie states, that from experiments
he made in the season 1831, the va-
f wheat cultivated under the name
e wheat (*Triticum turgidum*) is not
o the attacks of the fly (*Quar. Journ.*
vol. iii. p. 639.) Mr. Shirreff (*Ibid.*
), also considers the Polish wheat
lonicum) to be in a measure secure
s attacks.

ravages committed by the wheat-
sometimes very extensive. It is
by Mr. Shirreff, that throughout the
of East Lothian, during the years
828, 1829, and 1830, the fly injured
eat crop to the amount of 30 per
Should the fly abound in this pro-
throughout the kingdom in suc-
years, the loss to the community would be incalculable. Mr. Gorrie seems to think that the wheat-fly maggot might be so buried as not to be able to work their way up through the superincumbent soil; if, in ploughing in the wheat stubble, a scarifier or skimmer were fixed upon the beam before the coulter, so constructed as to lay about an inch of the surface in the bottom of the furrow. There is another kind of fly or midge (*Tipula cerealis*, Sauter), which is particularly injurious to spelt (a kind of dwarf wheat) and barley. (*Kollar on Insects injurious to Agriculture. Quar. Journ. of Agr.* vol. ii. p. 3.; *Westwood on Wheat Flies, in Gard. Mag.* vol. xiii. p. 289.)

FOAL. (Su. Goth. *fole;* Sax. ꝼola.) The young of the horse kind; the male being termed a colt foal, and the female a filly. The foal and its mother should always be well fed, and two feeds of corn, at least, be added to the green food which they get, when turned out after their work at night. The growing colt should continue to have liberal nourishment; bruised oats and bran should form a considerable part of his daily provender. In five or six months, according to the growth of the foal, it may be weaned. It should then be housed for three weeks or a month, or turned into some distant rick-yard. The process of breaking in should commence from the very period of weaning; and the foal should be daily handled, partially dressed, accustomed to the halter, led about, and even tied up; for on this much of the tractability, good temper, and value of the horse will depend. After the second winter, the work of breaking in may commence in good earnest. (*The Horse*, p. 225.)

Management of Foals after Weaning.— The principal object with most breeders is to have their stock large and powerful at an early age. It is really wonderful what may be done towards effecting this by means of good food judiciously supplied, proper shelter, and liberty of range in favourable weather. It is natural to suppose, when a foal is first taken from its dam, that it will, in some degree, fall away in condition and lose flesh; the nutritive properties of its "mother's milk" cannot be taken from it without affecting its yet tender constitution. To guard against this, every attention must be directed to the quality as well as quantity of food which is presented to it; that which contains most nourishment must be provided, and although the bulk of hay which a foal consumes is very trifling, it should be of the best quality. For foals, when they are first weaned, linseed gruel should be their constant beverage, and, indeed, it cannot be too highly recommended for all horses. A liberal allowance of oats is likewise necessary; foals, if in health, will eat at least two quarterns per day; and, as they increase in age, this allowance may be augmented. The seeds which are left from the linseed gruel, should be given with the corn. I have frequently recommended the practice of bruising the oats, and must certainly repeat it, even in opposition to the arguments of some persons who are averse to it. Bran mashes may be given at least once a week, and in some instances more frequently. Carrots will likewise be found a very proper food for young stock, and should be given once or twice a day. Too long a continuance of the same food cloys the appetite. Boiled barley is found to be very nutritious food, and most horses are very fond it. As an alternative, it may be given with great advantage, if foals do not consume their corn with their usual appetite. It requires to be well boiled for two or three hours in a small quantity of water, frequently replenishing it that the grain may not burn, and constantly stirring it that every grain may undergo an equal process; it may be considered sufficiently boiled when all the corns have burst, and, when given, should have a little bran or finely-cut hay mixed with it. About ten days or a fortnight after they are weaned, each foal should have a gentle dose of physic—one drachm to a drachm and a half of aloes, with a drachm of Castile soap, and the same quantity of ginger, will generally be found sufficient.

FOALING. A term applied to the act of parturition, or bringing forth young in the mare. Good feeding and moderate exercise are found to be the best preventives against slinking, which is most prevalent when half the time of pregnancy has elapsed. (See ABORTION.) If a mare has been regularly exercised, and apparently in health while she was in foal, little danger will attend the act of parturition. If there be false presentation of the fœtus, or difficulty in producing it, it will be better to have recourse to a well-informed veterinary practitioner, rather than injure the mother by the violent and injurious attempts which are often made to relieve the animal. As soon as the mare has foaled, she should be turned into some well sheltered pasture, with a hovel or shed to run into when she pleases; and as, supposing she has foaled in April, the grass is scanty, she should have a couple of feeds of corn daily. The mare may be put to moderate work a month after foaling. (*The Horse*, p. 222.)

FODDER. (Germ *futter;* Sax ꝼoððoꞃ; from ꝼoeðan to eat; Irish, *foder*, straw; Icel. *fodr.*) In agriculture, the ordinary food given to cattle, which consists of the stems
and leaves of plants, such as clove
chopped straw, &c.; the culmiferou
of the grasses, the haulm of legum
tatoes, &c. Corn, beans, turnips, an
articles which present nourishmen
more concentrated form, are not in
under the term fodder, but are rather
as solid food. See FOOD.

FOG (Dan. *fog.*) In meteoro
dense vapour near the surface of t
or water. Fogs in general are the
quence of the nocturnal cooling of
mosphere. The air, by its rapid
becomes surcharged with moisture;
of which being precipitated in the
a cloud, gives rise to the ordina
During the day the heat of the su
rally disperses the fog, because the
of moisture which the air is capable
ing becomes considerable in propo
its temperature is increased. In ca
ther the surfaces of rivers, lakes,
frequently covered with fog. Th
is this. During the night the air
than the water; the strata of air in
with the water are consequently hea
become saturated with moisture. T
ture of the vapour with the air,
with its elevation of temperature,
the air specifically lighter. It rises
sequence, and mixing with the co
the superior strata, is cooled, and
tates its moisture. The cloud or
sulting from this precipitation can
to a small height, because the unifo
temperature is soon restored. He
easy to see how winds, or a great agi
the water, prevent the formation of
the surface of water. In the eq
regions, fogs sometimes continue
considerable part of the year. In th
seas thick fogs often prevail, even
the warmest months; and they are
that objects frequently cannot be
guished at the distance of a few
(*Brande's Dict. of Science.*)

FOGGAGE (Low Lat. *fogagium.*)
or rank grass not eaten down in t
mer or autumn. The practice of
grass-lands for the winter support
has been found highly useful.

FOGGE. A common word in th
that properly signifies the grass wh
mediately springs after the hay-c
been taken, but it is sometimes used
long grass remaining in the pastu
winter. (See AFTER-GRASS.) It is al
for *moss*, in some parts of Scotland:
fog-house means a house built
with moss.

FOGGING. A peculiar practice
management of grass-lands, confined
to the district of South Wales. It

the whole growth of grass in up-
lows free from either scythe or
esting it in the following winter.
ung states, that many years ago,
Suffolk clergyman, who was in
r habit of this singular practice,
of it as a most profitable one.
e says, tried it thrice, and with
nd he finds that it thickens the
eatly, and yields far more valu-
and spring food, than any per-
expect, who never tried it. But
e practised only on dry or toler-
nd.

N. A local term sometimes used
he natural juice or moisture of
er herbs.

or FOUST. A provincial word
nouldy or musty.

(Sax. fealde.) A temporary pen
e for keeping cattle or other agri-
imals together, either for the pur-
nfinement during the night, or
protection and feeding. Some-
sheep are folded for the purpose
g. Sheep-folds are of two kinds;
es or sheds set apart for that
ljoining to the farm-yard, or
folds formed by hurdles, &c.
ntinent, sheep are principally
eds, &c., the floors of which are
h straw, sand, or clean dry earth,
n additional quantity of manure
The temporary fence or bar-
h moveable folds are constructed
mmonly wooden hurdles; but
when the fold is only to contain
mbs, netting stretched between
ade use of, there being a strong
to the lower parts of the post,
ground, to which the under edge
ing is attached, while its upper
ened to a rope stretched along
the same post. Netting is by
apest and neatest substance for
folds. (See Hurdles.) Mr. Chil-
ently advocated a system of shed-
our. Roy. Agr. Soc. vol. i. p. 40.),
s little doubt that sheep, in com-
ll live stock, suffer more from the
et and cold when feeding in ex-
tions, than is commonly supposed.

GARTH. A term formerly used
a farm-yard.

NG. The practice of confining
other animals upon land, by means
&c., for the purpose of feeding
nuring it. The practice of fold-
on naked fallows, with a view to
them, is still common in several
ngland; but the more improved
ers consider that it deteriorates
nd impedes *the fattening of the* sheep, by keeping them for the greater part of every night wholly without food. Others, however, assert that folding is not injurious to sheep, if they are kept in a good pasture during the day, and not folded too early in the evening, or kept in the fold too long in the morning. In some large arable land farms, in Hampshire and other counties, folding is still considered necessary, and large flocks of breeding ewes are kept specially for that purpose. Sheep are occasionally penned or folded on young wheat, but more commonly on turnips, a certain portion being enclosed sufficient for them to eat off in one or two days.

FOLD-YARD. The yard where cattle of different sorts are confined and fed during the winter season. Yards of this nature should be properly fitted up with convenient sheds and racks for the animals to eat their fodder from, and have suitable divisions for containing different denominations of cattle, or other live stock. See Farm-Yard.

FOLE-FOOT. A provincial name for the weed colt's-foot (*Tussilago farfara*), which see.

FOMENTATION. Local bathing with flannels wrung out of hot or cold water, or medicated decoctions. Hot fomentations increase the warmth of the skin, open the pores of it, and promote perspiration, and so lessen the tension and abate the swelling of an inflamed part, assuage pain, and relieve the inflammation. Fomentations, to be useful, should be long and frequently employed, and at as great a degree of heat as can be used without giving the animal pain. Poultices are nothing but a modification of fomentations, more permanent or longer continued than common fomentations. Poultices are made of bread, or oatmeal, or linseed meal, or any substance which is soft and calculated to retain heat. It is often very difficult to decide when a cold or a hot application is to be used, and no general rule can be laid down, except that in cases of superficial inflammation, and in the early stage, cold lotions will be preferable; but when the inflammation is deeper seated, or fully established, warm fomentations or poultices may be most serviceable. Fomentations are best applied by means of flannel frequently dipped in the hot water, or on which the water is poured, and the heat should be as great as the hand will bear. When it is intended to produce a sudden effect, but not a permanent one, the flannels should be black, or of some dark colour; when the heat is wished to be gradually applied, but more permanent, they should *be white*. In the first, the heat is rapidly *radiated*, and the flannels soon cool; in the second, it is slowly given out, and the flannels remain long warm. (*The Horse*, pp. 176. 392.)

FOOD. (Sax. foð.) All substances susceptible of digestion and assimilation may come under the denomination of *food;* but the proximate principles of organic bodies on which their nutritive powers depend are comparatively few, although the articles employed in different countries for the support of animal life are almost infinitely various, their sustaining powers may be referred to certain substances capable of being separated and identified by chemical analyses and tests. Amongst the proximate elements of vegetable food, gluten and its modifications, starch, gum, sugar, and lignin or woody fibre, are by far the most important; and amongst those of animal food, fibrin, albumen, gelatin, and their modifications, together with fats and oils, which are common to both kingdoms of nature. To illustrate the actual simplicity of our food, as compared with its apparent multifariousness and complexity, it may suffice to state that wheat, and almost all the esculent grains, consist principally of starch and gluten; that the same ingredients are found in many fruits and roots; that sugar, gum, or a relation of gum, which is called vegetable jelly, together with minute traces of aromatic principles which give flavour, and more or less abundance of water, and of vegetable acids, are the chief component parts of apples, peaches, currants, &c., and all pulpous and juicy fruits; a very few also contain oil. Then, as regards *animal* food, the muscular fibres of various animals closely resemble each other in composition and nutritive power; in some cases texture merely, and in others minute additions of foreign matters, confer upon them their relative digestibilities, and their different aspects and flavours. Albumen or fibrine and gelatin, small proportions of saline bodies, and a large quantity of water, are found in them all.

It often happens that the truly nutritious part of food is so combined with or protected by indigestible matters, as to escape the solvent powers of the stomach, unless previously prepared and modified by various chemical and mechanical agents. Indurated woody fibre, for instance, or *lignin*, as chemists call it, will often resist the joint action of the stomach and bowels, and pass through the alimentary canal with scarcely any alteration. The husks of many seeds and fruits are composed almost exclusively of this material. This is the case with the kernels of the apple, pear, &c.; the seeds of the currant, gooseberry, melon, and so on; the skin or husk of peas, beans, &c.;
and of wheat, barley, and oats: s
less the woody part is either bro
by the teeth, or previously rem
food which it envelopes is protect
degree from the solvent action of
tions of the stomach. This is a
curious provision in nature, for
this way become the carriers of se
pass through them not only undig
even retaining their vegetative po
in this way uninhabited and steril
of the globe may gradually becom
with verdure, and shrubs and tre
the advantage derived from br
corn given to live stock. Bones
nutritive, but unless broken into
fragments by the masticatory pow
animals which eat them, they, t
elude digestion.

There is another important poi
history of food, which is, its ultin
position. Four elements only
cipally concerned in the producti
food of animals; these are carbon,
oxygen, and nitrogen. Among
substances gluten (including veg
bumen), is the only one which a
nitrogen; gum, sugar, starch, an
are constituted of carbon, hydr
oxygen only. There are two ver
points in reference to the chemic
of food: the one is, that no animal
sist for any length of time upon f
is destitute of nitrogen; and the o
a certain mixture of different fo
solutely essential. Habit, as is we
will do much in accustoming the
to particular descriptions of foo
persons live exclusively, or alm
vegetables, others on animal mat
particular kinds of diet are forc
inhabitants of many regions of t
but as far as we are concerned, a
ture of vegetable and animal mat
only most palatable, but most
to health. Nothing is fit for fo
has not already undergone org
and water, though an essential p
food of all animals, is obviously n
nutritious, though it performs the
important function of dissolving
matter, so as to render it conv
the lacteals and other absorbent
blood.

The following table represent
lative proportion of solid digesti
contained in 1000 parts of the
articles of food which are e
Upon an average the nutritive m
pound of meat is not more than fo
This, however, applies only to r
for when dressed a considerable
its constituent water is dissipated

showing the average Quantity of itive Matter in 1000 Parts of several ties of Animal Food.

s	510	Veal	250
m	290	Pork	240
-	260	Blood	215
en	270	Cod and sole	210
Brain	200	White of egg	140
Haddock	180	Milk	72

The next table will serve to show the comparative value of the principal cereal and other grasses, legumes, roots, &c. (*Davy, Elem. Ag. Chem.* 150.)

le of the Quantities of Soluble or Nutritive Matters afforded by 1000 *Parts of different Vegetable Substances examined in their green state.*

VEGETABLE SUBSTANCES.	Whole Quantity of Soluble or Nutritive Matter.	Mucilage or Starch.	Saccharine Matter or Sugar.	Gluten or Albumen.	Extract, or matter rendered insoluble during evaporation.
sex wheat, average crop	955	765	- -	190	
wheat	940	700	- -	240	
ed wheat of 1806	210	178	- -	32	
d wheat of 1804	650	520	- -	130	
skinned Sicilian wheat (1810)	955	725	- -	236	
kinned Sicilian wheat (1810)	961	722	- -	239	
from Poland	950	750	- -	206	
American wheat	955	730	- -	225	
k barley	920	790	70	66	
rom Scotland	743	641	15	87	
om Yorkshire	792	645	38	109	
n bean	570	426	- -	103	
as	574	501	22	35	41
es	260 to 200	200 to 155	20 to 15	40 to 30	
d cake	151	123	11	17	
et	148	14	121	14	
beet	136	13	119	4	
ps	99	9	90		
s	98	3	95		
ge	73	41	24	8	
h turnip	64	9	51	2	2
on turnip	42	7	34	1	
-leaved clover	39	31	3	2	3
rooted clover	39	30	4	3	2
clover	32	29	1	3	5
in	39	28	2	3	6
n	23	18	1	- -	4
w fox-tail grass	33	24	3	- -	6
nial rye grass	39	26	4	- -	5
meadow-grass	78	65	6	- -	7
ish meadow-grass	39	29	5	- -	6
d dog's-tail grass	35	28	3	- -	4
l fescue grass	19	15	2	- -	2
-scented soft grass	82	72	4	- -	6
l grass	50	43	4	- -	3
	54	46	5	1	2

ery interesting report on the nutritive ties of food was recently presented to rench Minister of the Interior, by ercy and Vauquelin, two members Institute. The result of their expe- is as follows: —

read, every hundred pounds weight und to contain 80 lbs. of nutritious . Butchers' meat, averaging the va- rts, contain only 35 lbs. in 100. beans (in the grain), 92 lbs. in 100; beans, 89; peas, 93; lentilles, 94 in Greens and turnips, which are the most aqueous of all vegetables used for domestic purposes, furnish only 8 lbs. of solid nutritious substance in 100. Carrots, 14 lbs.; and what is very remarkable, as being in opposition to the hitherto acknowledged theory, 100 lbs. of potatoes only yield 25 lbs. of substance valuable as nutritious. 1 lb. of good bread is equal to 2½ lbs. or 3 lbs. of the best potatoes; and 75 lbs. of bread and 30 of meat are equal to 300 lbs. of potatoes: or, to go more into detail, ¾ of a pound of bread and 5 oz. of meat are equal to 3 lbs. of potatoes. 1 lb. of potatoes is equal to 4 lbs. of cabbage and 3 lbs. of turnips; but 1 lb. of rice, broad beans, or French beans (in grain), is equal to 3 lbs. of potatoes.

In the esculent roots, such as carrots, &c., but especially turnips, sugar is the leading nutritive matter; and the common fruits contain sugar, gum, albuminous matter, and acids, together with a highly attenuated form of woody fibre or lignin, which, in that state, is probably digestible. The comparative nutritive properties of the most common fruits will be seen by a reference to the annexed table.

III. *Table showing the average Quantity of Nutritive Matter in* 1000 *Parts of several varieties of Vegetable Food.*

Morels	896	Peaches	200
Almonds	650	Gooseberries	190
Tamarinds	340	Apples	170
Plums	290	Pears	160
Grapes	270	Strawberries	100
Apricots	260	Melon	30
Cherries	250		

On fattening Animals. — There is a very great difference in the quantity of food which animals require, and in the time which they can pass without it. In general those animals which are the most active require most, and those which are most indolent require least food. The cause of this is pretty obvious; the bodies of animals do not remain stationary, they are constantly wasting; and the waste is proportional to the activity of the animal; hence the body must receive, from time to time, new supplies in place of what has been carried off. The use of food answers this purpose. Almost all the inferior animals have particular substances on which they feed exclusively. Some are herbivorous, some are granivorous, and others again are carnivorous.

From various experiments, we have the following result: —

A horse will consume as much food, besides corn, as	8 sheep
A cow	12
A fattening ox	10
A three year old heifer	8
A two year old heifer	6
A one year old heifer	4
A calf	2

There are some rules which may be advantageously adopted in feeding animals, which, however obvious they may be, are too often neglected. 1. Food should be so prepared that its nutritive properties may be all made available to the use of the animal; and not only so, but appropriated with the least possible expenditure of muscular energy. The ox that is obliged to wander over an acre to get the food he
should find in two or three square
horse that is two or three hours
coarse food he would swallow
minutes if the grain were ground,
cut as it should be — the sheep t
hours in making its way into a tu
if it were sliced it would eat it i
minutes — the pig that eats raw p
whole corn, when either cooked
eaten in one quarter of the tim
deed fatten, but much less rapi
their food were given them in a pr
ner. All food should be given
state, to fattening animals, tha
time as possible, on the part of t
shall be required in eating.

2. From the time the fattenin
commences, until the animal is sl
he should never be without foo
and appetite are best promoted
of diet rather than by limiting th
The animal that is stuffed and
turns may have streaked meat, bu
made too slowly for the pleasu
profit of the good farmer.

3. The food should be given
This is one of the most essential
feeding animals. If given irreg
animal will consume his food, bu
acquires a restless disposition, is
at every appearance of his fee
never in that quiet state so ne
take on fat. It is surprising h
any animal acquires habits of re
feeding, and how soon the influen
is felt in the improvement of his
When at the regular hour th
had his pudding, or the sheep hi
they compose themselves to rest,
gestion is not unseasonably dis
their quiet broken by unwonted
to eat.

4. The animal should not be
intruded upon during the hours
All animals fatten much faster in
than in the light, a fact only to be
for by their greater quiet. Som
creatures that are the most irri
impatient of restraint while feed
as turkeys and geese, are found t
fat rapidly when confined in da
and only fed at stated hours
There is no surer proof that a pi
well, than to see him eat his mea
and then retire to his bed till th
feeding returns. Animals, while
should never be alarmed, neve
driven, never be fed at unseasona
and, above all things, never be
want for food.

The following table will show
mate composition of those proxim
ciples which have been already

onstituting the nutritive part of

le showing the ultimate elementary osition of 1000 *parts of the follow- oximate Principles of Animal and able Food.*

	Carbon.	Hydrogen.	Oxygen.	Nitrogen.
en	516	76	258	150
	483	80	276	161
	780	122	98	
f milk	609	73	116	203
f milk	454	61	485	
	557	78	220	145
	438	62	500	
	419	68	513	
	444	62	494	
	500	56	444	

lso the heads Cattle, Fodder, wine, Horses, &c. (*Brande's Dict. e; Willich's Dom. Encyclo.; Thom- m.* vol. iv.; *Davy's Ag. Chem.*)

it is scarcely necessary to say, all the external characters of ds. Without adverting to the appearance of an ill-fed beast and h has an abundant supply of whole- d, we may remark, that the form oung animal that suffers a depri- ither in the quantity or the quality od, never becomes perfectly de- either in its bulk or proportions. guments never present the gloss , neither is the constitution at g free from disease; internal con- take place, and the mesenteric equently become scirrhous: on the , in proportion as the supply, within means, is liberal, so is the growth , and the form reaches to the of the parent. It often also ex- e parent stock from the excess tive stimulus applied; and thus xen, and sheep, brought up in low, lands, where the herbage is luxu- tain to a monstrous size. Horses, ular, when bred and pastured in the lands of Lincolnshire, become ex- n bulk; and it is from such sources carriage and heavy troop horses lied. To what a degree of mon- ay not our bacon hogs and our n be fed! They exhibit the extra- powers of food when forced on an y increasing the supply and re- the expenditure. It is from our mode of feeding cattle that our are now furnished with veal all the nd, and lamb is common some efore it appeared on the tables of thers. Stimulating food produces the sexual appetite at almost any time the owner may desire; and as man by domestication has provided artificial sustenance and housing for the young animals thus unseasonably produced, nature does not interfere in this breach of her ordinary laws.

FOOD OF PLANTS. See Earths, Gases, Salts, Water, and Manures, their uses to Vegetation. Plants absorb their nutriment from the air and from the soil; they assimilate inorganic as well as organic matter; they become the food of the gramniverous tribes, and from these man derives the great bulk of his animal sustenance.

FOOL'S PARSLEY. Common Lesser Hemlock (*Æthusa cynapium.*) An umbelliferous plant, common in gardens, waste grounds, and cultivated fields, and so called from its resembling parsley enough in appearance to deceive ignorant persons. It is an annual weed, with a tapering whitish root; stem round, often purplish, a foot high; flowers pearl white; the herbage of a dark livid green, and fetid. The plant is poisonous, acting like hemlock upon the human system, and is easily known by the involucels having each three linear leaflets, which are placed next the circumference of the umbel. It is eaten by cattle and sheep, but is pernicious to the latter. (*Eng. Flor.* vol. ii. p. 64.)

FOOL'S STONES. (*Orchis morio.*) See Twayblade.

FOOT. (Sax. ꝼoꞇ. Germ. *fuss;* Dutch *fute.*) A linear measure, which, since the term is employed in almost all languages, has doubtless been derived from the length of the human foot. Though the denomination is the same, the measure itself varies considerably in different European countries. In all of them, however, it is divided, like the English foot, into twelve equal parts, or inches. See Weights and Measures.

Foot is also the lower part of the limbs of an animal which afford support, and enable it to move with ease and convenience from place to place. An excellent article on the anatomy and diseases of the foot of the horse, by Mr. Dick, will be found in the second volume of the *Quart. Journ. of Agr.* p. 214. The best and most natural form of the foot of the horse is that where the bottom approaches to a circle: it is most complicated in its structure, and liable to a variety of diseases. See the heads Canker, Corns, Cracks, Shoeing, and Diseases of the Horse.

FOOT-ROT. See Sheep, Diseases of.

FOOT-TRENCHES. A term signifying small superficial drains, about a foot wide.

FORCING. In Horticulture, the art of

accelerating the growth of plants so as to obtain fruit, vegetables, or flowers at seasons when they are not produced naturally in the open air. The practice appears to be as old as the time of the Romans. In England forcing seems to have been practised from a very early period. At the present time forcing is carried on in Britain, and in analogous climates throughout Europe and North America, chiefly under glass roofs. Structures for forcing are known, as frames, pits and houses, all of which have glass roofs: but there are also structures for forcing without glass roofs, such as cellars and sheds for growing mushrooms in the winter season; and also sea-kale, rhubarb, blanched succory, and such other stalks or leaves of plants as are eaten in a blanched state, and consequently do not require much light.

FORCING PITS. Instead of forming hotbeds with open sides, pits of brick-work and other materials are very generally constructed for containing the fermenting mass of dung necessary for forcing.

Mr. Flanagan, gardener to Sir T. Hare of Stow Hall, Norfolk, and Mr. West, who holds the same situation under the Marquis of Northampton, at Castle Ashby, have each proposed plans of pits, of which that of the first horticulturist is the least expensive; that of the latter more economical in other respects, not only as preventing the waste of heat, but the best mode of applying it. The plan of Mr. Smith, which will be given under the head Melon, appears to be superior to either. It may be laid down as a fundamental principle, that, in applying heat, it should always be brought to the bottom of the body to be heated.

Mr. Flanagan only allows the heat of fermenting dung to be employed, the steam being prevented entering the frame. One advantage arising from this he states to be, that fresh-made dung may be employed, and, consequently, the loss sustained by any preparation is prevented. If, however, it be a fact that the steam of dung is rather beneficial than otherwise, fresh fermenting dung can be used, without any detriment that I am aware of, in other pits of which we have plans. Mr. F. describes his pit as follows: — It is four feet deep within; the lowest ten inches of solid brick-work sunk in the earth; the remainder is a flue, three inches wide in the clear, carried entirely round the pit; the inner wall of which, forming the sides of the pit, is four-inch work, well bedded in mortar, and pointed, to prevent the steam penetrating; the outer wall of the flue is also four-inch, but open-work, to admit the steam and that of dung-coatings into the flue, the top of which is
rendered tight by a covering of t
The frame rests on the external wa
flue. The cavity of the pit, which
dry by means of drains, is nine
inches long, two feet eight inches
four feet deep. It is filled with
bricks, to within eighteen inches of
then a foot of short cold dung, six
very rotten dung, trod down so as
half an inch depth of coal-ashes,
venting the intrusion of any wo
may be in the dung, complete the
(*Trans. Hort. Soc. Lond.* vol. iv.
G. W. Johnson's Kitchen Garden.)

FOREHAND. In horsemans
part of the animal which is before

FOREHAND RENT. A cer
portion of rent that is paid in some
before entering upon, or derivi
from the farm.

FOREST. (Germ. *forst;* Fr. *f*
foresta.) Strictly an extensive s
vered naturally by trees and und
as opposed to a plantation which
made by art, but indiscriminately
any very extensive tract covered
The utility of timber plantations
mercial nation is very great, as
quantity of timber they afford, a
able expense may be saved wh
otherwise be incurred by the im
of materials for ship-building. (Se
ATION.) In former times the gr
of every country in the temperate
Europe was undoubtedly covered
rests; and these, by harbouring
rishing wild animals of every de
particularly wild swine, afforded a
part of the food of man. With ci
however, they gradually disappear
the increase of pasture or arable l
every country a large portion of th
belonged to the government, and
main source of its revenue. Th
the case in France and Germany,
lately, it was also the case to a cer
tent in Britain. Hence extensive
England still bear the name of fores
they are now in a state of cultivat
in a great measure without trees.
tal estimates the forests or wood
France to occupy about 16,904,0
or about one seventh of the whole
tive land of that kingdom. (*Jo*
Forêts, tome premier. Paris, 182

According to M. Herbin de Hal
are of forest lands belonging to

The State - - -
Crown - - - -
Princes of the Royal Family -
Public bodies - - -
Private individuals - -

is estimated at 5,347,000*l.*
out from 6*s.* 4*d.* to 7*s.* 4*d.*
royal forests of Britain oc-
,000 acres of land (see the
; but of these the greater
bject to claims of various
on of pasture, turbary, &c.
68 acres of forest land in-

closed and planted, principally with oak, and with other trees where the soil is not adapted to oak. There are 6211 acres of other freehold land belonging to the crown, which are also appropriated to the growth of timber, making in all 38,979 acres, the whole of which have been inclosed and planted within the last twenty years.

*ing the Number of Acres in each of the Royal Forests, distinguishing the
ble Lands, and the Lands appropriated to the Growth of Timber in each
the Number of Acres of other Lands, the Property of the Crown, appro-
like Purpose.*

he Forest.	Contents.	Open commonable Lands.	Lands appropriated for the growth of Timber.	Remarks.
	Acres.	Acres.	Acres.	
the county of n	66,678	60,678	6,000	Subject to rights of common; the inclosed lands to be thrown open when the trees are past danger of deer or cattle, when an equal quantity of land may be inclosed out of the waste in lieu of what shall be restored to common.
n the county of ire	21,473	10,473	11,000	
st, in the county ton	5,949	4,249	1,700	
st, in the county	3,278	3,278		Subject to rights of common.
est, in the county n	1,892	- -	1,892	The property of the Crown in fee.
the same county	1,417	- -	1,417	
Northampton	1,285	- -	1,285	
st, Berks	4,402	- -	4,402	
est, Chester	4,641	- -	4,641	
est, in the county pton	900	- -	900	
Forest, in the orthampton	4,500	1,122	3,378	517 *a.* 3 *r.* 31 *p.*, in *Whittlewood Forest*, the property of the Crown in fee remainder, subject to rights of common; the inclosed lands in this and Whichwood Forest consist partly of coppices, which are by law thrown open to deer and cattle at the end of 7 or 9 years from the time when first inclosed, and at which period the young trees are not past danger of deer and cattle, and are, in consequence, in a great measure destroyed.
orest, Oxford	3,709	1,808	1,841	*Whichwood Forest, Oxford*,—Subject to rights of common.
appropriated to Navy Timber.				
ds in New Fo- mpton	- -	- -	974	
adjoining Dean	- -	- -	3,708	
Woolmer Forest, n	- -	- -	183	
Bere Forest, n	- -	- -	132	
t Eltham, Gil- c., Kent	- -	- -	1,000	
Gour Estate at Durham	- -	- -	896	
lands, arising om inclosures en, and partly of spontaneous ich are so stocked as to be reckoned tity of productive imated at about	- -	- -	7,500	
appropriated for of timber	- -	- -	52,850	

In New and Dean Forests, Hainault Forest, Whittlewood Forest, and Wychwood Forest, there are open woods or coppices of considerable extent, containing trees of all descriptions, from ship timber down to saplings; but the number of acres so covered, or the number of trees occupying the surface, appears to be unknown. Many ancient laws and customs are recorded in books respecting the forests of the crown; but at present, as there are only three or four government forests in Great Britain, these laws and customs are of very little consequence, excepting to those living in their immediate neighbourhood. Many of the spots which in England bear the name of forests have no appearance of having been covered with trees at any period since Britain became inhabited. The English forests (with the exception of the New Forest, of which the history is well known) are, however, so ancient that we possess no record of their origin. Their number has been reckoned at 68: another enumeration extends them to 76; but some of these are probably only parts of the same forest with different names. A forest is created by the king by a commission issued out of the Court of Chancery; and when its laws and ordinances have been framed, and officers appointed, it becomes a forest by matter of record. Forests are grantable to subjects; but Savernake Forest in Wiltshire, held by the Marquis of Ailesbury, is, I believe, at present the only instance. For an account of the existing forests of this country, see "Statistics of the British Empire." (*Brit. Husb.* vol. iii. article "Plantations," pp. 83. 85.; *Brande's Dict. of Science.*)

FORGET-ME-NOT. See Scorpion Grass.

FORKS. There are several kinds of forks in use for agricultural purposes, among which are the large three-pronged fork used for the lifting of dung into carts and the like, and a smaller fork, chiefly for spreading dung. Long and short two-pronged forks are used for forking straw, sheaves of corn, &c., into carts or waggons, or on to stacks, &c., and for stable and other purposes, &c. (*Low's Elem. of Agr.* p. 143.)

FORSYTH, WILLIAM, F.A.S. &c., was born at Old Meldrum, Aberdeenshire, in 1737. He came to England in 1763, and was for some time a pupil of Philip Miller at Chelsea Garden, whom he was appointed in 1769 to succeed as curator of the Botanic Garden at Chelsea. Forsyth retained this situation until 1784, when he was appointed royal gardener at Kensington and St. James's. For his improvements in the cultivation of fruit trees, for his mode of renovating those which were de-
cayed, and for the composition he a
to their wounds, he received a pecu
grant from parliament, who considere
national improvement. He died in
His published writings are —

1. Observations on the Diseases, Defects, and
in all kinds of Fruit and Forest Trees; with an
of a particular Method of Cure invented and prac
the Author. London. 1791. 8vo. 2. A Treatise
Culture and Management of Fruit Trees, in whic
Method of Training and Pruning is fully de
Plates, London. 1802. 4to. The 4th edition is dat
8vo.; the 7th, in 8vo., 1824.

FOSSE. A large ditch or moat;
waterfall.

FOSTAL. A way leading fro
main road to a farm-house.

FOULMART. A term sometime
plied to the polecat.

FOWL. Cock and hen. (*Phasian*
lus.) Fowls were originally natives of
and India. They are most valuable
farmer as yielding profit in eggs, b
and feathers. The varieties of the co
fowl in this country are very num
and are distinguished from one anot
their size, colour, and fecundity.
should be kept very clean and dry
hen-house, and particular care mu
taken to furnish them with clean
water; foul water produces that fat
order among chickens called roup, or
which is known by the chick gaspi
breath, and dying in a few hours.
medy has yet been discovered for
disorder; therefore care and clean
should prevent it. Foul water,
scarcity of water, are also causes of th
in hens, and originate all their di
Poultry of all sorts should have clean
houses to retire into during the night,
in seasons of wet. Warmth is necess
the comfort and well-doing of poultry.
hens are kept with care, and have
quiet places to deposit themselves in,
will lay regularly, and repay all tro
One cock is sufficient for ten hens.
should be chosen with care. A good
should be well-sized, carrying his
high; he should have a quick, anim
look, a strong shrill voice, the comb
fine red, broad breast, strong wings,
thick, and his bill thick and short. (M
Domestic Poultry, p. 230.) The vigo
the cock lasts three years; he must
be superseded, and a fine spirited you
successor installed in his room. A co
at full age at three months old.
sorts of hen are useful. The comm
whose proper signs should be in ha
large head, bluish feet, sharp eyes, and
dant comb. The *tufted hen*, for eating,
does not lay much, therefore fattens wel
the *large white Dorking breed*, which
fetches a higher price in the market.

fowls are distinguished by having
s on each foot. Equal to the
in estimation (says Professor Low)
oland fowls. Their colour is black,
ds flat, and surmounted with a
feathers. They are a very useful
prolific of eggs, but less inclined
n those of any other breed. All
e kept more for show than for use.
am is a little Indian breed, very
o eat, but, from the smallness of
ot of any economical importance.
hitagong, or Malay fowl, is the
eed that has yet been brought to
try, but the flesh is regarded as
that of the Dorking and Poland.
. *Agr.* p. 615.) Fowls should not
d to wander much: they lay bet-
nore regularly when confined to
yard. Their food should be given
t regularity at sun-rise and sun-
they should be fed under cover
in or high winds. During har-
portion of food is always dimi-
All sorts of pot-herbs, boiled in
ngs of dishes, mixed with bran,
drained, is excellent; the paste
p as required, while sweet. Well
aly potatoes, buck-wheat, barley,
ground, refuse of fruit, bread,
the kitchen, &c., is taken greedily.
eir food be fresh of its kind.
ing time begins about February.
es notice of her intention by being
restless, and *talking to herself* for
, and her comb becomes very red.
ling soon gives notice that the
one. Let her have a dark quiet
in. The moulting season begins
n, when the hen ceases to lay for
: the whole feathered tribe are
ping and dull, till the new feathers
ced the old ones. A hen is old
ars of age: for three years she is
and in her fourth year she must
for younger birds. A hen sits
ks; her disposition to sit is soon
, by her placing herself upon any
can find, and remaining thereon
roosting. She should be placed
h eggs, unless allowed to sit as
ects upon her own natural num-
h rarely exceeds eighteen; but if
ne is allowed to remain in the nest
ontinue to lay many more before
, to sit. If the brood is hatched
, the firstlings should be kept in
ar a fire all day, till the others
, but they should be returned to
er at night. The hen and her
ld be kept warm, and be cooped
s only in dry fine weather. They
fed for some days on bread crumbs, with some finely chopped leeks, and be carefully supplied with clear clean water daily. Boiled barley, and boiled rice, &c. succeeds, till in about three weeks they are sufficiently strong to be turned into the poultry-yard. When the young chickens get their head feathers, they are out of danger of all infantine disorders. Nothing is so requisite for all poultry as warmth, cleanliness, and good water. Fowls fattened for the table should be put into coops for a fortnight or three weeks, and fed upon good barley-meal, moistened with milk or water, and lard. Give it four or five times per day, sufficiently moist to require no drink with the food.

Eggs are preserved any length of time, by greasing them well over with butter or lard, when warm from the nest. It keeps out the air. Fresh laid eggs are easily known by holding them up to the light of a candle. If the inside appears transparent and fluid, and the yolk in the centre, it is a fresh egg. If it looks turbid, it is a stale one. If, also, an egg held up against a candle shows a small vacancy at the *top* of it within, it will produce a male bird: if the little vacancy is observed at the *side* of the egg, it will prove a female. (*Main's Dom. Poultry*, p. 253.; See EGGS.) Every poultry yard should have a bed of ashes deposited in a corner: the fowls delight in a dunghill and an ash-hole; the former produces seeds and insects, and the latter calcareous matter, and destroys their vermin by its sharpness, as they revel in its rough particles.

FOWL, GUINEA, or PINTADO. (*Numida meleagris.*) These birds are very wild and restless in their nature, owing to their native habits. They are shy, and love to make their nests in dark obscure places far from home; for which reason their eggs are generally placed under a common hen to be hatched and fostered. They give no notice of laying or setting. A brood of Guinea fowls is an excellent guard. They love roosting in trees; and at night, if any footstep disturb them, their loud cries are sure to give notice to the farmer that a trespass is committing. The Guinea fowl is delicate eating, and is in fine season about Lent. The young chickens must be treated in the same manner and with the same food as young turkeys, and they must be kept warm and dry. In fatting, they should be shut up in a house for a fortnight, and fed four or five times a day with sweet barley-meal, moistened with milk or good lard. They pine if confined any length of time. The great drawbacks to the rearing of Guinea fowls are the vigilance required to watch for their nest, and the harsh screaming of their cry.

FOWL, PEA. (*Phasianus Io.*) Native of India, tender in infancy, but soon inured to our climate, as they become older. From their native wild habits, they love to lay their eggs in woods or coppices far from home. As the hen covers her eggs over with dead leaves after laying them, and generally deposits them under a bush, without the ceremony of making a nest, she must be closely watched, and each day her fresh egg should be withdrawn, and an egg cut in chalk substituted, and covered over again with the leaves. The eggs should be placed under a common hen for safety, both on account of the fox, and because the pea-hen would lead the young ones to ramble as soon as they had escaped from the shell. The best food for pea-chicks is barley-meal made into a paste, and mixed with sweet curd, and finely chopped hard boiled eggs. They are also exceedingly fond of the large horse ant and its eggs, which are found in woods, deposited in little hillocks of small leaves and twigs. The eggs form the centre of these hillocks, and they should be dug out and thrown upon a cloth to be twisted up, and carried to the pea-fowl. All the tribes of wild birds, such as pea-fowl, turkeys, pheasants, &c. love ants: it is their natural food. Two or three handfuls of their eggs twice a day, makes a good variety with their usual food. Keep the young pea-fowls well housed while under the mother's care: when they grow up, they prefer roosting in trees or on buildings. If a pea-hen is allowed to brood her own chickens, she should be kept under a coop for three weeks at least, to prevent her rambling. Pea-fowl will feed well on any kind of corn. They are exceedingly destructive in a garden. Our ancestors considered them very delicate eating.

FOWL'S DUNG. See GUANO and PIGEON'S DUNG.

FOX. (*Canis vulpes.*) The geographical distribution of the fox is very general. He is common throughout Europe, the cold and temperate parts of Asia, as well as some portions of Africa, where the heat is not intense; and he abounds in North America. In each of these countries he presents himself under somewhat different aspects, but his principal diversities arise from variety in colours and markings, and in all he sleeps round like a dog. The generic characters of this member of the canine group have already been given in our history of the dog. His specific characters are derived from his linear pupils, his long bushy tail, and his mephitic odour. The English fox is accurately described by Shaw, as having a broad head, sharp snout, flat forehead, orbitary fossæ oblique, giving
a visual aspect which differs fr
the dog; the tail is straight and
colour is a yellowish-red, or yel
mixed on the breast, belly, sho
back with a little white or ash-c
turalists describe three variet
British fox,—the greyhound fo
tiff fox, and the cur fox. Bu
probable that these vulpine an
rather the result of the extern
of locality, temperature, &c.,
varieties. The food of the fox
Though structurally carnivorou
degree, yet he is able to subs
reptiles of all kinds, fruit, and
In some districts the fox is
partial to grapes. His ravages
among game and domestic p
Scotland the fox, or *tod* (as
called), is of great service by
tion of the moor mouse, which s
bred in such immense multit
destroy the vegetation of the m
extreme loss of the shepherd.

The bitch fox breeds once
has from three to six cubs at a

Fox hunting is one of the p
most manly of the field sports o
try, and it has been practised fo
turies. It is not without its
among which are the improve
breed of saddle-horses calculat
ers, and the bringing together t
ranks of society, who meet o
footing in the chace. The
maintaining a pack of foxhou
great, amounting to several thou
annually; which is somewhat
the time of Edward I., when
formed the entire charge of a pa
only amounted to 23*l*. 7*s*. 1*d*.
Encyclo. of Rural Sports.)

FOX-EVIL. A disease in wh
falls off.

FOXGLOVE, COMMON.
purpurea.) A very handsome bi
blowing purplish-crimson, or
white flowers, from June to Sept
found wild in pastures and abou
banks, on a gravelly, sandy, or ch
gardens it is easily propagated
managed like the Campanula.
are alternate, ovate-lanceolat
downy, veiny, and of a dark gr
The raceme is terminal, erect
flowers pendulous on one side
leaves on the other. The flowe
ted, and hairy within.

The lesser yellow fox glove(*D*
is a native of Italy, and peren
three feet high, blooming yello
June and July. It may be prop
seed.

› be warned against chewing
ıot qualified to practise me-
nture to prescribe foxglove.
D. The modern foxhound
ariety gained from the ori-
ıgs of Great Britain. As it
ıce in a work of this nature
l of the various sporting
ld refer those desirous of
o the height, figure, qua-
. of the foxhound to that
mecum for the sportsman,
lopædia of Rural Sports,
ind the most detailed and
ıation.

GRASSES. See ALOPE-

n horticulture, wooden en-
rearing and protection of
vegetables, &c. Frames
oportions. When made in
the back of the frame for
ıld be at least 3½ feet high,
ıches; but greater heights
n this shelter is employed
er growth. Those employed
common purposes are not
ıches high behind, sloping
The breadth in every in-
feet; the length according
of lights, each of which is
es wide. They ought not
l for more than three lights;
size, they become unwieldy.
are constructed of a larger
extraordinary height, they
with moveable joints, so as
for the convenience of re-
ight has suggested an im-
ment in the form of frames;

sheltering hand-glass crops, with great advantage. If employed alone throughout the growth of any forced crop, unremitted attention is necessary, and is seldom requited with good success. The best form is that of the pitched roof of a house. The wood-work should be firm and strong, but as light as possible; of varied size, but generally about 10 feet long, 4 feet wide at the bottom, and about 30 inches high to the pitch. On each side two pannels should open on hinges, within 2 feet of each end, each pannel 18 inches wide, for the convenience of admitting air, &c. A lattice-kind of work, with wide intervals of packthread, should be made over the frame, and fastened firmly to its wood-work, for the support of the paper during violent winds. The best sort of paper is a moderate kind of white printers' paper. Whited-brown paper is, however, generally employed; but whichever is used, it should be as stout as possible. This being pasted smoothly over the frame, and perfectly dry, must be treated lightly with linseed oil that has been boiled. These frames should be prepared a considerable time before they are wanted, that they may be completely dry, and free from the oily odour, which is very obnoxious to plants. (*G. W. Johnson's Kitchen Garden.*)

FRANCE, THE AGRICULTURE OF. Although the two kingdoms of Britain and France, are such near neighbours, and enjoy a soil so similar, yet the agriculture of each differs very materially. The chief features in the farming system of France which strike an Englishman are the almost total absence of hedges, and the smallness of the farms or plots; the minute divisions of landed property having been long encouraged by the live stock kept on them inferior; the rotation of crops bad, and agricultural improvements of all kinds but slowly adopted. The government of France, it is true, in the absence of large landed proprietors, and opulent, enterprising, and scientific farmers, does all it can, by expensive state agricultural institutions, to supply their place; but these are not attended with the general advantages which are derived in other countries from the exertions of private individuals. Of these small farms Mr. Denison has given the following graphic description (*Jour. Roy. Agr. Soc.* vol. i. p. 263.):— "In comparison with the English system of enclosures, France may be called one vast open field; you may travel from Calais to Paris, from Paris to the German frontier, to the Alps, to the Pyrenees, and scarcely see a hedge or a partition fence of any sort. This vast open field (unlike the open districts of England, where the operations of farming are generally conducted on the largest scale) is cut up into the smallest conceivable plots of every variety of produce. As far as the eye can reach, over vast plains bounded by sloping hills, you see the surface varied by every description of crop; none, perhaps, above an acre or two in size, the larger portion not more than the fourth or the eighth of an acre. Here a vineyard 100 yards by 20; there a strip of wheat, lucerne, barley, oats, potatoes, clover, and vetches. Few roads intersect this extensive garden, which, from the nature of the cultivation, must be traversed every day in all directions by the proprietors and cultivators of the various lots. The residences of these proprietors are almost invariably congregated into villages or towns, and lie, therefore, for the most part, wide of their respective allotments." The advocates of such a general system of cultivation will hence see that this mode of tillage is attended with sundry insuperable disadvantages. The public agricultural establishments maintained entirely by the French government are — 1. Sheep farms; 2. Model farms; 3. Veterinary schools; 4. Haras, or studs. And it assists, by its patronage and with funds — 1. Public lectures; 2. Agricultural societies; 3. Local associations: 4. Departmental model farms.

There are three public sheep farms; viz. at Rambouillet, Perpignan, and La Hayevaux. At these sheep are bred, and experiments in crossing tried. The chief breeds are the merino, the naz, a race with small frames and fine wool, and the English long-woolled sheep.

Of the model farms, Grignon, founded in 1829, and containing 1100 acres of land of different qualities, is the chief. It consists of arable, pasture, meado meadow, and wood. Pupils are ta who pay in the house from 30*l.* t annum, or, if they only attend th of instruction, from 8*l.* to 20*l.*: th course occupies two years; and tending this period, and passing examination, the pupil may rece ploma, taking rank as a sort of arts of Grignon.

The chief veterinary schools are near Paris, Toulouse, and Lyo three chief haras, or breeding stu Dupin in Normandy (English bloo at Rozières (a mixed breed c "race ducale"), and at Pompad and Persian). These contain toget 1300 horses. Of thorough-bred 1840, they had 167 stallions, 98 n 121 colts and fillies; for the use partments 870 stallions are kept ent stations. These are allowed t ing amount of forage at three stations: —

	Oats.	Hay.	
	Pints.	lbs.	oz.
Abbeville	16	6	11
Angers	14	11	0
Aurillac	14	11	0

These various public objects government 119,452*l.*; viz., she 20,303*l.*; veterinary schools, 11,26 or studs, 70,526*l.*: other items of 32,000*l.*; department of governme

Sir Charles Lemon has given of the returns of the agricultural 21 out of the 84 departments o comprehending the whole of th eastern portion of the kingdom, or or the greater part of the old pr Flanders, Artois, Picardie, Isle d Champagne, Lorraine, and Alsace a surface of 31,720,000 acres, or area of all England. (*Jour. of Soc.* vol. i. p. 415.)

The following table shews the English acres tilled with each sort the produce, and the seed sown, departments before alluded to: —

	Acres.	Produce in Bushels.
Wheat - -	3,913,789	[illegible]
Barley - -	1,115,916	[illegible]
Oats - -	3,129,359	[illegible]
Meteil (mixture of wheat and rye	630,321	[illegible]
Rye - -	1,124,909	[illegible]
Potatoes - -	645,233	[illegible]

Total grown - 19,205,914 qu
Seed - - 3,082,702

The average produce per acre departments, is as follows: —

Average Produce per Acre in Bushels.	Highest Depart-mental Average.	Lowest Depart-mental Average.	Seed.
15	23	10·5	2·6
17	35	8	2·6
18½	44½	11	2·8
13½	22½	8	2·5
13	20½	8	2·6
127	257	67	

e departments were contained—

e - -	- 2,628,924
- -	- 6,764,107
and Goats	- 1,399,599
es - -	- 974,918
s and Asses -	- 99,660

od of the small French farmers, in Normandy, is very poor (says a writer, in the *Quart. Jour.* ol. xii. p. 2.), like the common la- live upon a few apples or pears, of bread, without the formality of wn to a table, and are content ink of their own home-made miser- r." The breed of sheep is very Although many of the sheep are ocks, yet there is little or no free them; they are usually kept in of three or four, or half-a-dozen, ally tied together by the legs. The rice of mutton is 3½*d.* per pound. cattle, the Alderney blood seems minate. Bullocks are worked to rable extent, both in the plough e waggon. "Some centuries ago, y was the source whence our Hen- Edwards, and the flower of Eu- hivalry, obtained their chargers; re then a breed of large, powerful, rses, able to bear the weight of an night, with sufficient speed for the of war. That breed has long since ted into an active and hardy horse, ly devoid of those qualifications as nd general appearance which we ink essential in a charger even for n soldier: they seldom attain 15 height, and are very short-necked; rather large in the head, have good but are frequently imperfect in ones, being too long from the hock of, and they are often diseased in bs from curb or spavine, and de- width and muscle in the thigh. e generally, however, good shoul- k, and loins, many of them possess- useful and short actions in the l considered generally as a breed, able to go faster, and do more n their appearance at first indi- ey are commonly worked at two ge." With regard to the rotation here is little worthy of observation. andy, a very common rotation is a three-shift of wheat—barley, clover, wheat; in others, a four-shift of potatoes—barley, clover, wheat. Their agricultural implements are few and defective. Dombasle's plough, modelled from that of our Small's plough, is the favourite plough in France; it has commonly, however, wheels added.—The spade is employed to a considerable extent in the field culture of this great country, and the greatest portion of the country partakes of the nature of garden husbandry. The consumption of vegetables of all kinds is much greater in France than in this country; and the same remark applies to bread, the price of which in Paris is regulated by the public authorities.

The care which is taken in France, by the government, to husband every particle of organic manure, is well worthy of the consideration of the public authorities in England, for nowhere is there a greater waste of the richest fertilising matters than from the large cities and towns of England; a great and public loss, to which Dr. Granoitte, in his report to the Thames Improvement Company, thus alludes: "In no part of France, Wurtemberg, Bavaria, Bohemia, Prussia, Saxony, the Confederated States of Germany, Holland, and Belgium, is there a city in which, as in London, the general mass of filth, of every description, created by a vast population, is first allowed to enter the river which may happen to traverse that city, and is then returned, diluted with the water of that river, to the houses of the inhabitants, to be used either for domestic or culinary purposes: although, by avoiding the latter disgusting alternative, foreign cities are less free from unpleasant smells than London is. In this respect it may be truly said, that foreigners smell the filth of their cities, but do not swallow it; whereas the Londoner swallows it, but seldom smells it.

"In no large city of that part of Europe which I have recently visited, possessing a river, is any portion of the contents of closets and cesspools suffered to find its way or to be emptied into it; except at Amsterdam, Antwerp, Brussels, Stuttgard, and Leipzig; and even there, only in a partial manner. In Paris the Seine is contaminated by one large drain only, conveying the urine from the large reservoirs of night-soil at Montfaucon, and by two smaller ones proceeding from cesspools. To convey generally, or to empty, even partially, any such matter into the river, is a practice against which the laws have provided by heavy fines and incarceration; and such is the present feeling of all the governments on that subject, even in the great cities I have just enumerated as exceptions, that the authorities are seriously engaged in devising plans for preventing, in future, every possible infraction of those laws; not because it is desirable to preserve pure the water of such rivers (since no domestic use is made of it); but on account of the loss of a material, deemed most valuable, which such infractions must necessarily entail.

"In Paris, extensive improvements in regard to drainage are now in progress, at the conclusion of which, that capital will have subterraneous drains and sewers in as complete a state as those of London, and something better. More than two fifths of that city are now so drained. When this great undertaking was in agitation, it was suggested that all the *latrines*, public as well as private, should, as in London, communicate, by proper drains, with the great sewers, which are intended to be emptied into the Seine. As the project of supplying pure water, direct to the houses, is simultaneously to be carried into effect, and as the water for that purpose is to be derived from other sources than the river, there could have been no objection, on that score, to the adoption of so general and so complete a drainage. But when scientific men, agriculturists, and political economists were consulted, it was agreed that by adopting the London system the city would lose a revenue of nearly 800,000 francs, and agriculture the means of producing four times as much. The government, therefore, came to the resolution of not suffering any portion of the contents of the *latrines* to enter the common sewers; but, alive to the great importance of saving them, enacted a police regulation strictly enjoining that every house should have its cesspool (whether new or old, and within a given time) made *water-tight*, in order that none of those contents should be wasted. In consequence of this regulation, all cesspools must be emptied once in four years."

FRAXINELLA, or White Dittany. (*Dictamnus albus.*) A perennial. Native of the South of France. It grows two feet high, blowing white or purple flowers in June and July. It loves a good soil, and should be covered in winter with a little litter. It may be propagated by parting the roots, or from seed, which should be sown in pots as soon as it ripens. The flowers produced by seed do not bloom *well* till the fifth year. See Dittany.

FRENCH BEANS. *See* Beans.

FREE-MARTIN. A name given by breeders to a twin cow calf born with a bull calf, which generally proves an hermaphrodite, and therefore barren; but in some cases, there not being this admixture of the organs of different sexes, or those of the

female prevailing, she is capable o
ing. (*Youatt on Cattle*, p. 539.)

FRET. In farriery, a name so
applied to gripes or colic in horses
cattle. See Diseases of Cattle and

FRINGILLA. (Chaffinch tri
Linnæan genus of Passerine birds
terised by a broad-based, sharp
strong conical bill; now raised to
of a family (*Fringillidæ*), inclu
buntings, the crossbills, the grosb
linnets, canary birds, finches, and
otic subgenera of hard-billed or
grain eating conirostral birds.

FRITILLARY. (*Fritillaria.*)
mentions nine species of this genus
the "early purple chequered tu
"chequered tulip with an obscu
flower," the "black chequered t
"largest yellow Italian fritilla
"fritillary with flowers in um
"Persian lily," the "smaller Per
the "crown imperial," and th
crown." These tuberous plants
pagated by seed, or by offsets fro
root. The seed produces many
The seed of the best flowers
saved, and sown in August in shall
punctured with holes to drain
moisture. The earth should be
fresh, and the seed sown broa
covered with fine sifted earth a
an inch thick. The seedlings s
flowers in three years. There ar
ing to Miller, twelve varieties of
imperial, of which the sort wi
flowers, that bearing double flo
the sort producing large flowers
most valuable. The crown impe
ling does not flower for seven ye
fore it is more quickly multiplied
every third year from the parent
roots should be taken up in Jul
planted in September. The offse
be immediately planted, as they
bear being long out of the grou
Crown Imperial.

FRITILLARY, COMMON. C
Daffodil or Lily, or Snake's-he
tillaria meleagris.) This indigeno
is found wild in moist meadows
tures, chiefly in the southern part
land. It blooms in April and M
inodorous flower, regularly chequ
pale and dark purple; sometimes
still chequered. There are near
varieties, with red, white, purp
striped double flowers. The stem
high or more, with linear leaves
or more terminal pendulous flow
root is furnished with a small so
about the size of a nut. (*Eng. Fl*
p. 140.; *Loudon's Ency. of Gard*

BIT. (*Hydrocharis Marsus ranæ.*)
pretty native perennial aquatic,
mmon in England floating on
, in ditches, ponds, and slow
ut rare in Scotland. It derives
ame from *hydor* water, and *charis*
he root consists of many long
ped fibres. Leaves heart or kidney
rplish underneath, floating, not
s abroad. Flowers numerous,
ry delicate, white, with a yellow
in. This little plant is one of
t ornaments of our still waters;
y pretty grown in a tub or cis-
ter, and is readily increased by
ating runners, which root at the
ng. *Flor.* vol. iv. p. 250. *Pax-*
Dict. p. 163.)
OF A HORSE. In farriery, is
ar portion of horn projecting
ole almost on a level with the
lefending a soft and elastic sub-
d the *sensible frog*. The sensible
es the whole of the back part of
ove the horny frog and between
es. See Shoeing.
(*Rana* Linn.) A genus of am-
eptiles, consisting of seventeen
two only require to be here

Common Frog (*R. temporaria*),
well known to need description.
s properties are very singular,
its powers of leaping and swim-
body is naked, and without any
re limbs are very lightly made,
ind legs and thighs are remark-
nd furnished with strong muscles.
the spawn is vivified, the future
es a tadpole, in which state it is
ter animal, breathing by bronchia
fish; but as soon as it is changed
and attains its proper shape, it
ngs, by which it breathes, and
liately migrates to the shore.
Gibbous, Green, or Edible frog
ta), which differs from the for-
only in having a high protu-
the middle of the back, which
cute angle. Its colours likewise
ivid, and its marks more distinct,
colour being a pale or yellowish
ked with rows of black spots from
o the rump. The flesh of the
is used as a restorative food.
f the Surinam frog (*R. paradoxa*)
d as food. Frogs are recom-
Walton as bait for pike, but
ate by feeding on the spawn and
of fish in ponds and rivers.
). A combination of stem and
organ, as in ferns, *Marchantia*,
ke plants.

FROST. In meteorology is the cause of the congelation of water or the vapours of the atmosphere. Water begins to freeze when the temperature of the air is such that Fahrenheit's thermometer stands at 32° At this temperature ice begins to appear, unless some circumstance, for example the agitation of the water, prevents its formation. As the cold increases the frost becomes more intense, and liquids which resist the degree of cold required to congeal water at length pass into the solid state. When water remains at complete rest it may be cooled down to 28° Fahrenheit without freezing; but the moment it is agitated, the thermometer rises to 32° and the water freezes. In this case the insensible heat of the water is retained when the fluid is at rest. No experiments have hitherto ascertained to what depth frost will extend, either in earth or water, but its effects will of course vary according to the degree of coldness in the air, the longer or shorter duration of the frost, the texture of the earth, the nature of the fluids with which the ground is impregnated, &c. In England the frost rarely extends in the ground below eighteen inches from the surface. Frost is peculiarly destructive to vegetation. During severe frost almost all vegetables fall into a state of decay, and even a moderate degree of frost is sufficient to destroy many of the more tender kinds. The injury which vegetables sustain from frost is greatest when it is preceded by a thaw or copious rains; for the plants are then turgid with moisture, which, expanding in bulk as it passes into the solid state, produces the rupture of the vegetable fibres. Therefore it is that a sharp north wind, or any thing which dries the sap or juices of vegetables previous to frost, tends to their preservation. The great power of frost on vegetables is well known. Trees are sometimes destroyed by it as if by fire, and split with a noise resembling the explosion of artillery, since the juices of the tree expand with great force, as they are converted into ice. In winter, however, trees generally have neither leaves nor flowers, and their buds are so hard as to withstand the effects of congelation; but hard frosts late in spring are often very injurious, as the buds are then appearing. Fruits are in like manner destroyed by frost. Their watery portion being changed into crystals of ice, occupying a greater space than the fluid from which they were produced, burst the small vessels in which they are formed; hence the fruit is deprived of its flavour, and when thawed putrefies.

The *hoar-frost* or *white frost*, which appears in the mornings chiefly in autumn and spring, is merely frozen dew. It is geneporation on the phenomenon is obvious from this, that the moisture which appears in the form of dew before sunrise is often changed into *rime*, or hoar-frost, on the appearance of that luminary. The reason is, that as the atmosphere begins to be warmed by the sun's rays, the evaporation is accelerated, and consequently the cold at the wet surface of the ground augmented; hence, we see one reason why frosty nights are so much more prejudicial to the tender shoots of plants when they are succeeded by very bright mornings. Hence, also, hoar-frost is found on grass or plants, when the thermometer, placed a few feet above the ground, indicates a temperature three or four degrees above the freezing point.

In late autumnal frost, the effect of evaporation by the heat of the sun is often exemplified on the stems of potatoes. If a hoar-frost be immediately succeeded by the influence of the sun, the dew liquifies, and by the process of evaporation *the stalks lose their vitality;* for although plants, as well as animals, have an inherent power of resisting cold, yet it is in the former only to a very limited degree. If the hoar-frost be brushed off (and this can easily be done by two men moving along the beds or drills with a rope between them, very early in the morning before the evaporation takes place), the stalks will sustain no injury. The destructive power of evaporation appears to be proportioned to the degree of humidity in the body on which it acts.

The following is recommended as a simple and easy method of securing fruit trees from the effects of frost:—

If a thick rope be intermixed among the branches of a fruit tree in blossom, the end

fects of the morning frosts on ve
spring; but, unfortunately, it is
very limited scale that any me
adopted for the purpose. Wha
vents the formation of dew w
plants; hence a covering of n
gauze will often preserve the b
wall-fruit. But the most effect
is to check the radiation, by sc
plant from the chilling aspect o
sky. (See DEW.) Every farm
that frost in winter is serviceable
by breaking down and pulver
and that a failure of crops frequ
place after a winter of extrem
The principle is this:—in the pro
gelation, the water as it freeze
and, therefore, necessarily sep
particles of earth in which it is
thus operates better than any
of human construction, for its act
to the minutest particles, and th
them friable. In dry earth it h
no effect in this way, but is b
destroying grubs and insects.
makes no impression. On plou
land frost has the most benef
Therefore, where the soil is clo
of an obstinate clayey nature, it
turned up in ridges in the autum
beginning of winter, which tend
separate its particles, and rend
fine and mellow.

Hard winters seldom injure
respect, especially where the lan
thoroughly drained, and is cov
with snow. By leaving the eart
and finely divided state, frost
better for the extension of the
warmth of spring approaches, s

condition. But in horticul-
fruit is restricted to the pulpy
s of trees and shrubs, &c., as
peach, the currant, &c.

of vegetables are equally
the seeds. They almost all
id; and this acid is usually
aric, the oxalic, the citric, or
a mixture of two or more of
r any other, except perhaps
hitherto been found in fruits.
ontain likewise a portion of
my matter, sometimes starch;
fruits contain also a fibrous
accurately examined. The
ers of fruits, especially the
freely both in water and
ery speedily decay when ex-
the action of the sun and
ce they cannot be used as
n's Chem. vol. iv. p. 274.)

of fruit-trees are various,
must refer the reader to the
of Blight, Canker, Mildew,
lture and propagation of the
are also treated of in separate
suffice in this place to enu-
of the principal works which
ed with advantage for fuller
he limits of this work will
re; among these are *Phillips's*
Rogers's Fruit Cult.; *Hoare*
Abercrombie's Fruit Gard.;
e to the Orchard and Kitchen
n's Encyc. of Gard. &c.;
rower's Instructor.

E. A dry measure of two
bushel.

(named in honour of the
man botanist Leonard Fuchs,
Stirpium in 1542). A most
well-known genus of plants,
place in every garden, espe-
ns, a recently introduced
d to be "probably the most
t of the temperate flora of
scarlet pendent flowers of
rich ornament to a garden
. If carefully treated, cut
n, and covered up from frost
t of them will thrive out of
ture of loam and peat suits
they will also thrive in any
and young cuttings will root
under a glass. (*Paxton's*

rFOTHER (from the Germ.
d). In the North of Eng-
load, or large quantity. A
s still a term for a certain
8 pigs or 16 cwt., as much as
rry.

orm. Fr. *fuayle.*) Any combustible substance which is used for the production of heat constitutes a species of fuel; but the term is more properly limited to coal, coke, charcoal, wood, and a few other substances.

In this country, coal, from its abundance and cheapness, is the commonly employed fuel; but where wood is abundant, or where its value is little more than that of felling it, it is used either in its original state, or in the form of charcoal. It is essential to good and profitable fuel that it should be free from moisture; for unless it be dry, much of the heat which it generates is consumed in converting its moisture into vapour; hence the superior value of old dense and dry wood, to that which is porous and damp. A pound of dry wood will, for instance, heat thirty-five pounds of water from 32° to 212°, and a pound of the same wood in a moist or fresh state will not heat more than twenty-five pounds from the same to the same temperature; the value, therefore, of different woods for fuel is nearly inversely as their moisture, and this may be roughly ascertained by finding how much a given weight of their shavings loses by drying them at 212°.

The following table exhibits at one view the power of various species of wood in producing heat.

The number indicates the quantity of timber in pounds, required to raise the temperature of a cubic foot of water from 52° to 212°.

	lbs.
Oak chips - -	4·20
Elm - - -	3·52
Fir - - -	3·52
Ash - - -	3·50
Hornbeam - -	3·37
Cherry-tree - -	3·20
Beech - - -	3·16
Lime-tree - -	3·10
Poplar - - -	3·10
Maple - - -	3·00
Service-tree - -	3·00

The value of turf and peat, as fuel, is liable to much variation, and depends partly upon their density, and partly upon their freedom from earthy impurities. A pound of turf will heat about 26 pounds of water from 32° to 212°, and a pound of dense peat about 30 lbs.: by compressing and drying peat its value as a fuel is greatly increased. Dr. M'Culloch has divided peat into five classes: — mountain peat, marsh peat, lake peat, forest peat, and marine peat; the names implying the locality of their production. Of these the mountain peat, from its loose spongy texture, is the least productive of heat, although it soonest inflames. The reader is referred to an excellent essay "on economising Fuel and Lighting," &c., by the Rev. P. Bell, in the *Trans. of High Soc.* vol. iv. p. 149. See CHARCOAL and PEAT. (*Brande's Dict. of Science; Willich's Dom. Encyc.*)

FULLER. A scourer of cloth. The branch of industry which gives origin to this name is of early origin. The Romans, who generally wore woollen dresses, often required them to be purified: hence the performance of this became a distinct trade. Some paintings on the walls of a *fullonica* at Pompeii have transmitted to us the manner in which fulling was done. The clothes were first washed, by being trodden upon in tubs by the feet of the fullones, or fullers: alkali and urine were used instead of soap. After the clothes were dried, the surface was carded, to raise the nap, sometimes with the skin of a hedgehog, sometimes with the *Dipsacus*, or fuller's thistle, which thus received its specific name *fullonum*. After this the clothes were spread on basket work, under which sulphur was burnt to whiten them, and at the same time Cimolian earth was rubbed upon them. This trade was so necessary to the comfort of the ancients, that the Censors, C. Flaminius and L. Æmillius, prescribed the manner in which dresses were to be washed (Pliny, H. N. xxxv. 57.) The Greeks, also, employed fullers. In the country the farmer may take advantage of this ancient custom, and have woollen clothes cleaned in the same manner, using the fuller's earth instead of the Cimolian.

FULLER'S THISTLE (*Dipsacus fullonum.*) A name sometimes applied to a plant used by the makers of cloth. See TEASEL.

FULLER'S EARTH. A native saponaceous mineral of the aluminous kind, found in many parts, but the best comes from the south of England and Saxony. It is much used by fullers in cleaning and scouring their cloth, from its property of absorbing grease. It is of a very soft unctuous nature, falls to pieces in water, and appears to be capable of promoting the growth of plants in a high degree; consequently may be used with advantage as manure, on some of the lighter sorts of land. Its constituents, according to Klaproth, are as follows: —

	Specimen from Reigate, Surrey.	Specimen from Nimptch in Silesia.
Silica	53·0	48·5
Alumina	10·0	15·5
Lime	0·5	—
Magnesia	1·25	1·5
Oxide of iron	9·75	7·0
Common salt	0·1	—
Water	24·	25·5
Loss	1·4	2·0
	100	100

FUMITORY. (*Fumaria*, fro
smoke, alluding to the disagreeabl
the plant. Our English word fu
derived from the French name of
Fumeterre.) There are six indigeno
of fumitory.

1. The solid bulbous Fumitory (
rather a doubtful native perenni
grows in groves and thickets, but
mon.

2. The yellow Fumitory (*F. lut*
rennial, found on old walls, with
root; stem erect, a foot high, and,
footstalks, triangular, juicy, red
shining. Leaves thrice ternate, o
rather glaucous green. Flowers in
terminal upright cluster, scentles
coloured, with deep yellow lips.

3. White climbing Fumitory (
lata), an annual growing in bushy
hilly situations, on a gravelly,
sandy soil. Stems one or more
and tender, flattened on one side,
leafy, from 1 to 4 ft. high, climb
other plants by means of bran
drils terminating the footstalks.
in June or July dense clusters
white flowers, variegated with
grey.

4. Common Fumitory (*F. offici*
annual very common in cultivate
and about hedges; root taperi
glaucous, stem much branche
mostly alternate, twice or thrice
Flowers in clusters, rose coloure
red. The leaves are succulent,
bitter. The plant is eaten by
sheep; goats dislike it, except t
shoots, and horses totally refuse it

5. Small-flowered Fumitory (
flora), an annual blowing pale
sionally white flowers; herb
smaller than the last.

6. Ramping Fumitory (*F. ca*
This species is much like the
fumitory, but larger in every
leaves less glaucous; their tendri
round other plants, by which the
stem climbs to the height of 3
The flowers are on the whole pale
plant also less common.

This species and the white climb
tory are the only ones worthy of
culture. They do best sown unde
to which they will attach thems
make a beautiful appearance. (*E*
vol. iii. p. 252—257.; *Paxton's B*

FUNGI. (Lat.) A large na
of plants of a very low organisa
sisting chiefly of cellular tissue,
intermixed with flocculent ma
very rarely furnished with spir
They form, as it were, a link be

egetable kingdoms. They in-
id decaying organic bodies, and
ommon pest to living plants,
they are parasites, and prey in
nner as vermin and intestinal
animals. A vast number of
escribed by writers upon fungi,
often of great importance to
r their use or their mischievous
common mushroom (*Agaricus*
he truffle (*Tuber cibarium*), and
ella esculenta), (see these heads,)
well known at table. Not less
ree species of fungi are eaten in
t, one of the tribe, is valuable in
ctice as a uterine stimulant;
f the species are dangerous
ight, mildew, rust, &c. (see
) are diseases caused by the ra-
oscopic fungi; and, finally, the
ffects of dry-rot are owing to
of *Merulius lachrymans*, and
pecies. The best general work
Fries's Systema Micologicum.
pecies are figured in the works
Bulliard, Sowerby, Corda, and
senbeck. (See Fairy Rings.)
n gives the following general
r distinguishing the esculent
onous varieties. "It appears
ngi which have a warty cap,
ly fragments of membrane ad-
ir upper surface, are poisonous.
, which have an unpleasant
lly if they emerge from a vulva
lso generally hurtful. Those
in woods and shady places are
t, but most are unwholesome;
re moist on the surface they
oided. All those which grow
clusters from the trunks or
s ought likewise to be shunned.
of a poisonous fungus is an
yptic taste, and perhaps also a
but certainly a pungent odour.
bstance of which becomes blue,
ng cut, are invariably poisonous.
n orange or rose-red colour,
hich are coriaceous or corky in
hich have a membranous collar
m, are also unsafe. These rules
deleterious fungi seem to rest
experience; but they will not
llector to recognise every poi-
s." The general rules laid down
hing wholesome fungi are not
led, but the most simple and
f testing the quality of field
troduce a silver spoon or piece
at metal, or an onion, into the
ch mushrooms are seething: if
her of them out, they assume a
or dark discoloured appearance,
there are certainly some dangerous fungi among them; if, on the other hand, the metal or onion on being withdrawn from the liquor wears its natural appearance, the fungi may be considered wholesome and innoxious. The symptoms indicating poisoning by fungi are nausea, vomiting, purging, and colic, in general accompanied with great depression of the pulse, cold extremities, clammy sweats, stupor, delirium, convulsions, sometimes paralysis. In such cases immediate means should be taken to clear the stomach, and a medical practitioner sent for, as the subsequent treatment must vary according to the symptoms in each individual instance. (*Christison on Poisons; Brande's Dict. of Science; Willich's Dom. Encyc.*)

FUNGUS. In farriery, a spongy excrescence which arises in wounds and ulcers, commonly known by the name of *proud flesh*. It may be destroyed and removed by caustic applications, such as nitrate of silver, or sulphate of copper, blue vitriol, and the use of tight bandages.

FURBER, ROBERT, was the founder of the Kensington Nursery, now held by Messrs. Malcolm. He published the two following works:—

1. Fruits for every Month in the Year. 12 Plates. Fol. 1732. These are prints of the best kind of fruits then grown in this country. 2. An Introduction to Gardening, or a Guide to Gentlemen and Ladies in furnishing their Gardens, being several useful Catalogues of Fruits and Flowers. London. 1733. 8vo.

FURLONG. (Sax. ꝼuꞃlanᵹ.) An English measure of length containing forty poles, the eighth part of a mile.

FURMENTY, or FRUMENTY. (From *frumentum*, corn.) A kind of country pottage prepared of wheat, which is first wetted, and beaten to deprive it of its husks, and afterwards boiled. When boiled up with milk, sugar, and a little spice, it forms a wholesome and agreeable food. This preparation was well known to the Roman farmers. Cato, the earliest of the agricultural writers whose works have escaped to us, gives (lib. lxxxvi.) the modern mode of making it under the name of wheat frumenty.

FURRIER'S REFUSE, or CLIPPINGS; are sometimes applied as a fertiliser to light chalks and gravelly soils, either ploughed in or laid upon the surface, in the proportion of twenty-four to thirty bushels to the acre. They are usually sold by the quarter, which commonly contains as much as two five-bushel sacks will hold when closely pressed. The price is said to be about 14*s*. to 16*s*. per quarter. (*Brit. Husb.* vol. i. p. 426.)

FURROW. (Sax. ꝼuꞃh; Dan. *fur*; Lat. *forus*.) In agriculture, a term not very properly defined, as it has three or four distinct significations; viz. 1. The soil turned up by the plough; 2. The trench left by this operation; 3. The interval between two ridges; and 4. The cross drain which receives the rain water collected by these intervals. Dr Johnson adds a *fifth;* but he obviously mistakes furrow for *drill.* According to Mr. Marshall there are three ideas which lay claim to the word furrow. 1. The trench made by the plough, which may be called a *plough furrow;* 2. The collateral drains, or an *inter-furrow;* and 3. The transverse drains, or the *cross furrow.* See PLOUGHING and FURROW, WATER.

FURROW-SLICE. The narrow slice or slip of earth turned up by the plough. By the Scotch writers on husbandry, it is mostly termed *fur-slice.*

FURROW, WATER-. That kind of deep open furrow which is made by the plough in tillage-lands, for the purpose of drawing off and draining them, in order to favour the healthy growth of the crops. Furrows of this kind should always be drawn in such directions as will the most readily take off the water, and be kept open during the winter months, especially on the wheat-grounds. The making of these furrow-drains should be performed immediately after the ploughing and sowing have been finished; and this is particularly necessary on all the more stiff and retentive kinds of soil.

FURS. The skins of different animals, covered for the most part with thick fine hair, the inner side being converted by a peculiar process into a sort of leather. Beaver fur, from its extensive use in the hat manufacture, is a very important commercial article. Hare's fur, as already mentioned, is one of the worst conductors of heat yet known, consequently admirably adapted for body clothing in winter. See HAIR and WOOL.

FURZE, COMMON; GORSE, or WHIN. (*Ulex Europæus.*) This hardy evergreen shrub is indigenous to most parts of Great Britain, and grows abundantly on sandy or gravelly heaths and commons; and when viewed in the light of a weed it is one of the most determined growers, and most difficult to get rid of that the agriculturist can meet with. The stem of the furze varies from two to five feet high; but in Cornwall and Durham it sometimes grows to the height of eight or nine feet. It bears innumerable dense, roughish, green, furrowed or ribbed branches spinous at the ends, and beset with large compound, striated, permanent thorns. The leaves are few, scattered, small, awl-shaped, deciduous. Flowers large, solitary or in pairs, of a bright golden yellow, with a very peculiar oppressive scent. One of our poets
has well described the beautiful
of this shrub in blossom —

> "And what more noble than the vernal
> With golden baskets hung? Approach
> For every blossom has a troop of sword
> Drawn to defend it."

The legumes are downy, burs
tically in dry hot weather with a
noise, and scattering their seeds e
The wood of furze is very hard.
chiefly used for fences, as food
and for fuel. Its preference for
has caused it to be extensively em
fences in such land, and as a cover
and shelter for young plantatio
common care furze fences last
long period, but they require pe
nagement to prevent the roots
exposed. Sowing in three tiers o
perhaps the best mode, as it allo
tier to be kept low by the shears
second of higher growth, and t
attain its natural stature.

There are generally two obje
vanced against the adoption of w
The first is, that the wall or moun
for raising the whin is of such dim
to occasion a great waste of gro
the second is, that the whins ha
tendency to spread over and inju
joining grounds. But with a sl
trimmed wall-fence of furze these
may easily be obviated.

The formation and managemen
fences have been treated of by
of agricultural and botanical
Lord Kames, Dr. Anderson, Mar
lington in his work *On Planting*, I
his *Modern Husb.*, and others; th
an essay on this subject in the *Tr*
High. Soc. vol. v. p. 466., by M
and it is noticed in a number of t
Reports.

Furze has long been known
highly nutritious as food for hor
and cattle, and has only been
from the supposed difficulty of
it into a state fit to be comfortabl
domestic animals; the process
gathering, and bruising the you
when taken from the old stunte
being both laborious and expensi
difficulties are, however, com
easily overcome when gorse is al
privilege of a cultivated spot, and
worthless part of the farm is goo
for it to vegetate upon.

Respecting the merits of furze a
a good deal has been written, as by
in France, Evelyn in England, an
derson in Scotland; and it is n
sively cultivated for this purpo
Attwood of Birmingham, who ha

red acres to French furze; (*U. pro-*
, which is nearly allied to the com-
ze), these are regularly mown with
e for a corresponding number of
ws, and bruised in a mill: mixed
pped straw or hay, this constitutes
e food of his cows. Bruised furze
an excellent substitute for hay for
nd it is even asserted that they pre-
corn; but they should at the same
e oats and beans to counteract the
properties of the gorse. Dr. An-
says that when properly bruised,
e very fond of it, and increase in
s fast as on turnips. Cows yield as
ilk as when fed on grass, without
taste, and the butter made on such
very superior. The small holder
the furze for his solitary cow or
horses, in a trough, with a wooden
, furnished at the lower end with a
ece of iron. The farmer on a large
ould have a mill worked by horses
ater-power. In 1802 and 1803, the
Richmond fed his deer, sheep, and
xtensively on whins. In the Penin-
r the forage consumed by the horses
British army was principally furze.
Tytler, in an account of experiments
e made on feeding horses, between
s 1812 and 1815 (*Trans. High. Soc.*
states, that one of the chief kinds
he used was furze. But the prin-
e of furze is for the purpose of
many parts of the kingdom it forms
in dependence for the supply of
for the poor man's hearth and the
oven. The common furze generally
its full size in four years, and it
ot to be cut more frequently. An
land sown with the French furze
ld between four and five thousand
, which are chiefly consumed in the
of ovens. The fresh and dried
of this plant afford in dyeing a fine
colour. The medicinal qualities of
re attenuant, diuretic, determining
kin, and occasioning nausea.

e may be propagated by seed sown
ebruary to May. Young plants or
ps planted in spring or October will
eadily. It should be cut the year
owing, beginning in September or
r; it will grow again until Christmas,
fit for use till March. Besides the
n furze there are two other species:
he dwarf whin or furze (*U. nanus*)
is less common than the preceding,
ly grows to half the size. It blossoms
in autumn, has the leaves or spines
and closer, and the branches decum-
he flowering ones more cylindrical
ngated; and the flowers are paler.

These points of structure distinguish this species from the others at first sight. Its value is estimated in comparison to that of the common, as two to one inferior.

2. The French or Provence furze (*U. provincialis*) is a native of the South of Europe. It closely resembles the common furze. In Devonshire the common furze, and in some other parts the dwarf furze, are frequently called French furze. (*Phillips's Syl. Flor.* vol. i. p. 247.; *Brit. Husb.* vol. iii., On Planting, p. 100.; *Eng. Flora*, vol. iii. p. 265.; *Quart. Journ. of Agr.* vol. ii. p. 731., vol. viii. p. 591.; *Willich's Dom. Encyc.*)

FUZZBULL. The local name for a kind of fungus filled with a brown powder.

FUZZEN. A provincial term used sometimes to signify the natural juice or nourishment of a substance, or the strength of it. It is sometimes written *fuzen*.

G.

GAD-FLY, or BREEZE. (*Œstrus equi et bovis*, Lin.) Insects with spotted wings and a yellow breast, which have a long proboscis, with a sharp dart. These flies are particularly troublesome to cattle by their sting or dart. The horse-bot (*Œstrus equi*) deposits its eggs on such parts of the horse as the animal can reach with his tongue. They are thus licked up, and introduced into the stomach; are there hatched and form bots. Another more tormenting fly of the same genus is the fundament-bot (*Œ. hæmorrhoidalis*), which lays its eggs on the lips of the horse, causing so much irritation to the animal, as to induce him to gallop and seek refuge in the water. In Sweden, the grooms are accustomed to clean the mouths and throats of the horses daily with a peculiar kind of brush, which prevents the larvæ of this insect getting into the stomach of the animal. The ox-warble (*Œ. bovis*) deposits its eggs on the back of oxen, causing great torture to the animal, and much agitation to the herd, if many are attacked at once. The ovipositor of the insect pierces the skin on the back of the ox, and there drops the eggs. At the season when the gad-fly infests them, the harness should be so managed as to allow the animals to be easily let loose. The ovipositor of the *Œ. bovis* is furnished with teeth, and acts like an auger or gimlet; and when this comes in contact with a nerve of sensation, the oxen seem to be driven almost to a state of madness; the tail is stretched out, and they gallop about the pasture, lowing and seeking for water, into which they instinctively enter. Hence Virgil, describing this, says:—

"The universal herds in terror fly,
Their lowings shake the woods, and shake the sky."

Humboldt mentions a species of Œstrus which is found in the low regions of the torrid zone, and has been named *Œstrus hominis*, from its attacking man, and depositing its eggs in his skin, causing there painful tumours. (*La Géog. des Plantes*, p. 186.) See Bots.

GALE. A term applied to a castrated bull.

GALINGALE. See Cyperus.

GALLIC ACID. An acid obtained from galls and several other vegetable astringents, chiefly from the bark. The following table will serve to show the proportions of this acid in different plants:—

	Parts.
Willow trunk	9
Oak, cut in winter Willow (boughs) Plum tree Cherry tree Sallow Mountain ash Poplar	each 8
Elm Beech	each 7
Sycamore	6
Birch Elder	each 4

(*Thomson's Chem.* vol. iv. p. 8.) But although the above-named barks yield the quantities of gallic acid mentioned, yet it is uncertain whether they actually contain any ready formed. Gallic acid is procured by exposing the decoctions of galls, or of any astringent bark, to the air, until it becomes mouldy, and the tannic acid attracts the oxygen of the air, and is converted into the gallic acid. In this state the acid forms in crystals, mixed with crystals of another acid, the *ellagic*, which are easily separated from it, being insoluble in water.

Pure gallic acid has a weak, sour, astringent taste. It is soluble in 100 parts of cold water, and forms an ink with solution of green vitriol (sulphate of iron). It is distinguished from tannic acid, which is ready formed in astringent barks, by not precipitating solution of glue. It is a powerful astringent, and may be administered in doses of two or three grains in internal bleedings.

GALLINACEOUS FOWLS. One of the two divisions of domestic poultry reared in Europe, comprehending, among others, the common cock and hen, the turkey, the guinea-fowl, the peacock, and the pigeon.

GALL NUTS. (Fr. *gallis; It. galle.*) Excrescences produced by the *Cynips*, or *Diplolepsis gallæ tinctoriæ*, a small insect which deposits its eggs in the tender shoots
of the *Quercus infectoria*, a speci
abundant in Asia Minor, &c.
maggot is hatched, it feeds on th
excrescence formed by the irritat
deposited ovum on the surrounding
ultimately, when perfected as the
its way out of the nidus thus form
gall nuts are of a blueish green h
and break with a flinty fractur
they are white, light, with a h
side, they are useless. Gall nut
ployed in dyeing, and in medicine

GALLON. An English meas
pacity, containing four quarts.
parliament the imperial gallon is
10 lbs. avoirdupois of distilled wat
at the temperature of 62° of F
and the barometer standing at
This is equivalent to 277·274 cu
The old English gallon, wine mea
tained 231 cubic inches, and h
avoirdupois of pure water; ale
measure, 282 cubic inches, and h
3¼ oz. avoirdupois of water; and
for corn, meal, &c., 272 cubic in
taining 9 lbs. 13 oz. of pure wate
the imperial gallon is about ⅕ l
the old wine gallon, and about
the old ale gallon. See Wε
Measures.

GALLOP. In horsemanship
known pace to which horses are tr
of which many kinds are enume
two only are worthy of regard, n
hand gallop and the full gallop.
distinctions are founded on the di
grees of velocity in which the ani
pelled, rather than on any peculia
pace itself. In the gallop the h
with one fore-leg somewhat adv
not so much beyond the other,
in the canter; and, when he is u
utmost speed, his legs are almo
placed. The fleetest horses, when
carry their bodies perfectly in a
posture, and the fewer curves or
arches are described, the more
course is their progress.

In galloping the fore legs a
forward nearly simultaneously,
hind legs brought up quickly
together; it is, in fact, a successio
by far the greatest interval of tim
while the legs are extended afte
is taken. The canter is to the g
much what the walk is to the tr
probably a more artificial pace.
ertion is much less, the spring l
and the feet come to the groun
regular succession. (*The Horse*,

GALLOWAY. The usual n
poney or saddle-horse, between
fourteen hands in height. The o

a pure breed of small elegant the south of Scotland, said to be xtraction. See HORSE.

VAYS. See CATTLE.

VS OF A PLOUGH. A part gh-head, so named by farmers, nblance to the common gallows. three pieces of timber, of which l transversely over the heads of o. See PLOUGH.

In farriery, a term signifying or rubbing off of the skin, by saddle, &c. The little tumours om the pressure of the saddle arbles, and when they ulcerate tly become *sit-fasts*. For sad- re is no better application than nd water, mixed with a fourth ure of myrrh. The saddle and hen they are found to rub or be padded or chambered. (*The* 9.) A mixture of white-lead th milk is stated (*Quart. Journ.* ix. p. 299.) to be an excellent galled backs in the early stages d. It is a common American 'or the information of other tra- ay mention," says Mr. Keating, having tried many applications of horses, when galled, we have hat have succeeded so well as noistened with milk. When o be procured, oil may be sub- Vhenever the application was early stage of the wound, we it to be very effectual, and it is onvenient one, as two ounces l sufficed for the whole of our re than a month." (*Expedition River*, p. 190.)

In agriculture, a term signi- or bare places in a crop.

A term generally applied to r animals as are preserved, in taken at particular seasons by oting, hunting, netting, &c., by erly qualified, after taking out r the purpose. By the 1 & 2 s. 2., game is stated to be sants, partridges, grouse, heath ne, black game, and bustards." actments which passed during ration of Mr. Perceval, snipes, and rabbits were added to the if they were killed by the gun; in nets or springes, they were otherwise. Deer are also con- ; and by some ancient statutes, mallard, duck, teal, &c., were t are not considered so at pre-

ral birds and quadrupeds which the denomination of game, are usually objects of some importance to agriculturists, particularly to landed proprietors who may be possessed of extensive covers. There are, indeed, but few persons who do not occasionally hunt, or shoot, on their own estates; and even when such is not the case, ample compensation for any trouble or expense incurred in preserving the game, may generally be obtained by letting the range to some neighbouring gentleman or sportsman." (*Baxter's Lib. of Agr.*) As I have given all the important particulars relative to the habits, economy, and preservation, &c. of the different species of game, under their several heads, it will only be necessary here to notice the different points of law which are likely to arise on the subject.

The persons who were formerly by law entitled to kill game, were those who have, in lands and tenements, an annual income of 100*l*., either in their own right or in right of their wives for at least the term of their life; or persons having leaseholds of at least 99 years, of the annual value of 150*l*.; the sons and heirs apparent of squires, and others of superior degree; and the owners and keepers of parks, warrens, forests, and chases: but now any certificated person may kill game (1 & 2 W. 4. c. 32.). A qualified person cannot protect an unqualified person from the penalty imposed by the 5 Anne c. 14., for keeping and using a gun to kill game by going out with him (*Ex-parte Silvester*, 9 B. & C. 61.); but he may go out with a qualified owner of greyhounds to course, and beat bushes, &c. (*Lewis* v. *Taylor*, 16 East, 49.): in this case Lord Ellenborough (c. 7.) said, — "This is not a solitary amusement, and there is nothing to prevent a qualified person from taking others with him to aid him in the pursuit of the game, and he is the person using the dogs; the others have no other use of them than as his servants, and contemplating with them the pleasure of the chase. If, indeed, an unqualified person used his own greyhound for the purpose of sporting, though in the same company with a qualified person, the case would admit of a different consideration." So a servant of a qualified person may catch game in traps. (*Walker* v. *Mills*, 4 Moore, 343.) If a stag runs into a barn to escape from its pursuers, the hunters have no right to enter the barn in pursuit of him; if they do, they commit a trespass: neither can a person who starts game on his own land, justify pursuing it into the lands of another. (*Deane* v. *Clayton*, 7 Taunton, 489.) The owner of hounds is liable for the trespasses of his servants and friends, although he abstains from crossing forbidden ground himself. (*Baker* v. *Berkeley*, 3 C. & P. 32.) It is a trespass, also, by inflict grievous bodily harm upon a trespasser or other person coming in contact therewith." (7 & 8 G. 4. c. 18. s. 1.) And the Court of Common Pleas were divided in opinion as to the right of the owner of a cover to place spikes, whereby dogs might be killed. (*Deane* v. *Clayton*, 7 Taunt. 489.) But it is certainly illegal to place baited traps so near a highway or the premises of another, that dogs may be attracted into them. (*Townsend* v. *Wathen*, 9 East, 277.) Neither must the sportsman fire so near to a decoy pond, although on an open river or creek, as to disturb them. (*Carrington* v. *Taylor*, 11 East, 571.; *Keble* v. *Hickeringill*, 11 East, 574.) But, although an action will lie in this case, it will not lie for disturbing a rookery. (*Hannow* v. *Mockett*, 4 D & R. 518.)

By the statute 1 & 2 W. 4. c. 32., a penalty not exceeding *5l.* may be inflicted by any two justices, for killing any game on a Sunday or Christmas-day; or any partridge between February 1. and September 1.; or any pheasant between February 1. and October 1.; or any black game (except in Somerset, Devon, or the New Forest), between December 10. and September 1.; or any grouse between December 10. and August 12.; or any bustard between March 1. and September 1.; and a penalty of not exceeding 10*l.* for laying poison to destroy game.

Keeping Sporting Dogs.—A sporting dog may be kept as a house dog. (*Briarly* v. *Apthorpe*, 5 B. & A. 320.; *Read* v. *Phelps*, 15 East, 271.) A magistrate may order an unqualified person's dog to be destroyed. (*Ringsworth* v. *Bretton*, 5 Taunton, 416.)

Landlord and Tenant. — A tenant has a right to kill game on his land, in the absence

Offences relating to Game.—"
c. 69. s. 4. enacts, That the prose
every offence punishable upon sum
viction, by virtue of this act, sha
menced within six calendar month
commission of the offence; and
cution for every offence punish
indictment, or otherwise than u
mary conviction, by virtue of thi
be commenced within twelve
months after the commission of su

"Sect. 8. enacts, That, on every
under this act for the first or seco
the convicting justices shall retur
to the next quarter sessions for t
riding, division, city, or place wh
offence shall have been committed
record of such conviction, or
thereof, shall be evidence in any p
to be instituted against the part
convicted for a second or third off
the clerk of the peace shall, imme
such return, make, or cause to b
memorandum of such conviction
gister to be kept by him of the
places of abode of the persons so
and shall state whether such con
the first or second conviction of the
party.

"Sect. 12. provides and enacts,
the purposes of this act, the nigh
considered and is hereby declare
mence at the expiration of the
after sunset, and to conclude a
ginning of the last hour before su

"Sect. 13. enacts, That, for th
of this act, the word 'game'
deemed to include hares, pheas
tridges, grouse, heath or moor g
game, and bustards."

Taking Game after two previo

e first offence to the common gaol or of correction, for any period not ex- ıg three calendar months, there to be o hard labour, and at the expiration h period shall find sureties by recog- ce, or in Scotland by bond of caution, lf in ten pounds, and two sureties in ounds each, or one surety in ten ls, for his not so offending again for ace of one year next following; and e of not finding such sureties, shall be r imprisoned and kept to hard labour e space of six calendar months, unless ureties are sooner found; and in case erson shall so offend a second time, hall be thereof convicted before two es of the peace, he shall be committed common gaol or house of correction for riod not exceeding six calendar months, to be kept to hard labour, and at the tion of such period shall find sureties, cognizance or bond, as aforesaid, lf in twenty pounds, and two sureties pounds each, or one surety in twenty ls, for his not so offending again for ace of two years next following; and e of not finding such sureties, shall be r imprisoned and kept to hard labour space of one year, unless such sureties oner found; and in case such person so offend a third time, he shall be of a misdemeanor, and, being con- thereof, shall be liable, at the discre- f the court, to be transported beyond as for seven years, or to be imprisoned ept to hard labour in the common r house of correction for any term not ding two years; and in Scotland, if erson shall so offend a first, second, rd time, he shall be liable to be pun- in like manner as is hereby provided h case." (*Archbold's Crim. Law.*)

MEKEEPER. The well-appointed keeper ought to be a man of varied in- tion and a general observer of nature. to use the words of Mr. Daniel, "A man does not require that his keeper d be the best shot in the district; it is r the purposes of slaughter, but protec- that he employs him; and to afford that ction, he should be well versed in the e of every sort of vermin, with their ts, and their mode of preying upon the ; and not only know, but be inde- ble in catching the most subtle and of them. He should be able to kill rmin, from a mouse to an otter, and an eagle to a sparrow. If with this e can shoot well enough to kill a dog hawk, his master will have a greater ect of a stock of game, than if he could even farthings out of twelve, thrown eral times into the air."

By the 1 & 2 W. 4. c. 32. s. 13., lords of manors are authorised to appoint gamekeepers, by writing, under hand and seal, to keep and kill game within the limits of their manor, and may further authorise them to take and seize all dogs, nets, and other engines and instruments for the killing or taking of game, which shall be used by unauthorised persons within their limits. A gamekeeper may carry a gun anywhere out of the manor. (*Rogers* v. *Carter*, 2 Wilson, 387.) A lord of a hundred or wapentake cannot grant a deputation to a gamekeeper. (*Ailesbury* v. *Pattes.* 1 Douglas, 28.)

GAMING. This pernicious practice, common alike to the most barbarous and the most civilised nations, is in every way discountenanced by the laws of England. By the statute 16 Car. 2. c. 7. any person who by fraud, shift, cozenage, circumvention, deceit, or any unlawful device or ill practice whatsoever, in playing at or with cards, dice, racing, or any other game or pastime, shall win any money, is to forfeit treble the amount so gained, one moiety to the king, and the other to the party grieved. And by the 9 Anne, c. 14. s. 5. any person winning by fraud above 10*l.* at one sitting (or 20*l.* within 24 hours, 18 G. 2. c. 34. s. 8.) is to forfeit five times the value. And by the 13 G. 2. c. 19. s. 2. horse races are prohibited for less sums than 50*l.*; or matches (*Bilmead* v. *Gale*, 4 Burrows, 2432.); but a match for 25*l.* a-side is a running for 50*l.* Wagers on horse races for less than 50*l.* cannot be recovered by law (*Johnson* v. *Bann*, 4 T. R. 1.) But they can if the wager is under 10*l.* and the race for 50*l.* (*M'Allester* v. *Harden*, 2 Campbell, 438.) But the courts will discountenance all wagers on races, run otherwise than on a proper race-course, such as on a high road (*Whaley* v. *Pajot*, 2 B. & P. 51.), or as in a post-chaise against time. (*Ximenes* v. *Jacques*, 6 T. R. 499.) Neither will they try actions on wagers, with regard to cock fights (*Squires* v. *Whiskin*, 3 Campbell, 140.), or illegal games. (*Brown* v. *Leeson*, 2 H. Black. 43.) And it is always in the discretion of the judge whether he will try an idle or frivolous cause on a wager. (*Robinson* v. *Mearns*, 6 D. & R. 26.) A wager may generally be considered as legal, unless it be laid upon subjects tending to excite a breach of the peace, or which are *contra bonos mores*, or affect the interests or feelings of third persons, or which expose a third person to ridicule. (*De Costa* v. *Jones*, Cowper, 729.) All bills or other securities which originate in gambling transactions are void *between the parties to them* (5 & 6 W. 4. c. 41.): and it will not avail the party their circle so suitable for the occupation of man in a state of innocence, as that which embraces the cultivation of plants; and it is an instance of the beneficent providence of the Deity, that he assigned a garden as the dwelling of our first-created parents. It is no consequence of the fall of Adam, that plants require cultivation: he was placed in Paradise to till and to keep it. Then, the weed had not sprung up to render the tillage toilsome: fruit trees which God had "planted" were the chief objects of care, and it was an employment without much labour, combining the preservation of health with amusement, pure without insipidity, constant without sameness. From that period gardens have never ceased to engage the attention of man; and even now that their labours are manifold, they still afford "the purest of human pleasures."

Whether as a private individual man regulates his garden, or with more extended benefit cultivates his farm, still he participates in pleasure combined with utility: whilst his time is agreeably employed, he is benefiting mankind — "Nihil melius, nihil uberius, nihil libero homine dignius." When Alexander of Macedon inquired of Abdalonimus, a Sidonian prince, who had been reduced to support himself from the produce of a garden cultivated with his own hands, how he had endured his poverty, Abdalonimus answered, "May heaven assist me in bearing my prosperity as well! I then had no cares, and my own hands supplied all my wants." (*Just.* ii. c. 10.; *Q. Curtius*, 4. c. 1.; *Diodorus*, 17.)

For many ages after the Creation, the arts and sciences were chiefly confined to

rience would soon teach mankind
getables were salutary, and the
erring guide would speedily di
situations and circumstances in w
were found in the greatest perfect
vine would be observed most v
warm climates, by the side of str
thence man would learn to carry
those at a distance from its b
would see those of its clusters firs
which were open to the sun, and
learn to expose them to its influ
would observe the rankness of
where animal exuviæ were depo
thence would be taught the use of
Thus as necessity prompted an a
plants, so experience would giv
their culture. These supposition
ported as probable by the know
possess of the different nations of
and their various grades of imp
they are strengthened by daily e
for this demonstrates that every
prised of the results of experim
that is the most perfect, in illus
which the most have been obtai
mediately after the Flood, Noah
vineyard, and became intoxicated
produce of its fruit. This slende
ation substantiates the suppositio
rapid improvement in the arts,
though discovered by chance, wou
lengthened attention and practice
facture, yet Noah was only the
scendant from Adam.

That their attention was chiefl
to fruits is evident. In Jacob's
vine, the fig, and the almond, are
but exclusively, mentioned as p
the garden. As might be anticip

property became appreciable;
nds were enclosed and trees
in hedge-rows. (*Ibid.* xxiii. 9.)
ued on Mount Sinai extended
ection of vineyards. Olives,
garlic, cucumbers, and melons,
the inhabitants of gardens.
.) The vineyards were so ex-
Solomon had one which let
and pieces of silver per annum.
iii. 12.)

yle of laying out their most
lens, we have but two authentic
ich describe that of Solomon,
Babylon. (Solomon's Song,
es. ii. 4.)

ning the state of the horticul-
e of these early nations, we
guide us. They appear to
e most care of fruit trees, and
vine was preferred. They
hat it flourished best upon a
xx. 10.; Isa. v.) Stones were
n the soil. (*Ibid.*) The mar-
water was preferred. They
ve raised varieties from seed,
ed thee a noble vine, wholly a
how then art thou turned into
te plant of a strange vine unto
em. ii. 21.) A reproach to the
would have been unintelligible
not aware of the practice of
ne from seed. That they were
e effects of one flower being
by the pollen of another, ap-
following verse: "Thou shalt
vineyard with divers seeds, lest
hy seed which thou hast sown,
t of thy vineyard be defiled."
9.) We may likewise conclude
ere aware that plants grow
g the night, from the distinction
s made between the "fruits
h by the sun," and those "put
it may be translated, thrust
moon." (Deut. xxxiii. 14.)

period was not without its
ative to plants. Solomon wrote
om the lofty cedars of Leba-
to the humble hyssop of the
ings, iv. 22.) It is to a still
d that many historians refer
en identifying him with Ham,
izraim of the holy writings;
him at a much later period: a
sider that there were several of
ne. One of these two last opi-
ably correct, since Pliny relates
er left a treatise upon garden-
scarcely credible as existing in
ge of the world. (*Plin.* b. vii.
x. c. 1.)

century posterior to Solomon flourished the poet, or poets, who composed the poems attributed to Homer. If we are to judge of the state of gardening among the Greeks at that period, from Homer's writings, we may decide that their gardens were not very extensive. As with the brilliant fancy of a poet he has given to the garden of Alcinous an eternal summer, and to his palace silver pillars, we may reasonably conclude with Walpole, that the size of the garden was proportionably exaggerated. This he states as being four acres, an enclosure comprehending the orchard and kitchen garden, which the Grecians probably never witnessed. The apple, fig, pomegranate, pear, olive, and various herbs were its products. The vine was there in regular rows; the whole watered by two fountains, and surrounded by a hedge.

That vegetables and their cultivation were highly esteemed among the Grecians in their earliest days is evident from their mythology. Minerva, their personification of Divine Wisdom, gave, as the greatest blessing to mankind, the olive tree, and this fable is as old as the foundation of Athens, or about 1550 years B. C.; whilst Ceres, the sister of their King of Heaven, was invoked as the presiding deity of Agriculture, and the original imparter of the art to mankind. It may serve as an illustration of the same remark, that almost every deity had some plant held as sacred to him or her. The oak was sacred to Jupiter; the cypress to Narcissus, and the maidenhair to Pluto; the dittany and the lily to Juno; the poppy to Ceres; the olive and dog's grass to Minerva; the myrtle, rose, and apple to Venus, &c. It is also worthy of notice that the most admired human favourites of the gods were changed after death, or to avoid calamities, into trees, or flowers. Many other fables of their mythology are poetical and beautiful. Flowers in general, they declared, sprang from the tears of Aurora. The tremblings of every leaf, the graceful waving of the grass, were attributed to the passing breath of Zephyrus; as the curl of the waters was said to arise from the sports of the Naiades.

We are without any very clear information of the skill of the Greeks in cultivating their gardens, or of their taste in disposing them, even during the splendour of their republics.

The Academus at Athens, which was laid out by Cimon the Athenian general, about 430 years before the Christian era, as well as other gardens of which we have record, consisted of walks shaded by plane-trees, watered by streams, and enclosed by walls. (*Pausanias*, b. i. 29.) The warlike manners of the people made them delight in the ad-hundred and sixty pounds, no inconsiderable sum in that age. He had it laid out around his house, being the first of the kind introduced into the city. (*Pliny*, b. xix. c. 4.) Of their horticultural skill, the Geoponick writers give us a favourable idea; for however empirical, and accompanied by gross superstitions, they were aware of practices at present adopted and recommended. Thus Anatolius says, that if you wish an apple tree to bear much fruit, a piece of pipe should be bound tight round the stem. Sotian recommends the same, and to sever some of the largest roots when the tree is over luxuriant. They were aware of the necessity of caprification, and hung wild figs upon the branches of the cultivated trees to prevent them casting their fruit; "wherefore," says Democritus, "some insert a shoot on each tree that they may not be obliged to do that every year." The knowledge of grafting which this and other passages intimate, was the acquirement of a period coeval with the earliest age of which we have any information. Of manures they had a correct knowledge; and when these were deficient, they turned in green vegetable matters, and even sowed beans, for the purpose of ploughing them in, when grown up. (*Theophrastus*, viii. c. 9.) They were very fond of flowers, which were used as ornaments upon all occasions; they cultivated violets, roses, the narcissus, iris, &c. (*Ibid.* vi. c. 5.), which were extensively sold at Athens, in a market place appropriated to their disposal. (*Aristophan. Acharn.* v. 212.)

Hesiod is the most ancient author on the cultivation of the earth, whose work has descended to us. His history is obscure and uncertain.

He is to be admired both as a poet and

season of the Pleiades, the sna
ground for shelter upon the pla
vintage was in the course of Nove
common with all other heathens
superstitious regard to lucky an
days; the thirteenth day of the
considered favourable to plantin
to sowing; the sixteenth and n
also propitious to planting. That
as known to us is not perfect,
further proved by no mention b
of the olive, or of manures, nor e
burning of stubble, which is, pe
most ancient mode of amelioratin

I have not followed historicall
sions of the Eastern nations. T
tians, the Chaldeans, the Medes, th
the Macedonians, the Greeks, &
successively rose into separate po
only off-sets of the same or
people, and practised the same
manners and habits, modified, p
a slight difference of climate, but
without change.

It is certain from the writing
and others, that the principal inh
Rome had their horti, or coun
where they grew all kinds of veg
some luxuriant part of the countr
city, and from these obtained th
Hence, in the first years of Rom
but of one garden within its pre
of Tarquin, which was evidently
flowers and ornament; and even
walls of the city formed a circu
miles under the Emperor Valeria
cus in Aureliano), it appears sole
been distended by buildings an
grounds. In the first ages after
dation of the city, the farms, which
our market-gardens, were cultiva

itchen-garden, as might be ex-
have less information in the
at have survived to us than
the other horticultural depart-
rature was confined to the higher
se would not condescend to re-
les for planting cabbages, and
no practical, and therefore more
ors in those days. Cato has
r the subject, and Varro, Co-
l Palladius have done no more.
ttle information they do afford
casual lights that break in upon
writings of other authors, we
h to assure us that their culinary
vere excellently cultivated, and
perhaps better.

centuries after the foundation
r 150 years B. C., lived Cato.
ritings we learn that it was con-
arden should have a southern
be well supplied with water.
kes a similar statement; a gar-
his author, should be a level,
ng piece of ground, divided by
rent of water. (*De Re Rustica*,
rnips, coleworts, radishes, basil,
ages, garlic, and asparagus are
by Cato. Endive, parsley, cu-
ttuces, beets, peas, kidney beans,
nips, mallows, onions, mustard,
mushrooms are noticed by the
, Columella, Varro, Pliny, Virgil,

s is one of the very few plants
e have the full detail of the
lture pursued by the Romans;
re justified in considering it a
rd by which to estimate their
in the art, we cannot but con-
t was decidedly excellent. The
hich are given by Cato, are an
hose which occur in Abercrom-
or any other standard work on
. It is certain they took great
ultivating their grounds, and not
ed under the best of masters —
it consulted the ancient writers
upon the subject. When, as the
uch attention and study, the
C. Furius Cresinus produced
than even the more extensive
ess assiduous neighbours, he was
used of making use of magical
s presented his tools before the
These, Quirites," he exclaimed,
agic implements; but I cannot
his forum the cares, the toils, the
ughts, that employ me during
l over my lamp." (*Pliny*, xviii.
he time of the later emperors,
had become acquainted with
ifficult branch of kitchen garden

practice — forcing; a still further evidence of their horticultural skill. Cucumbers were the principal subjects of forcing. The emperor Tiberius was exceedingly fond of them, and, by artificial means, had them in perfection throughout the year. They were grown in large baskets of dung covered with earth, and were sheltered during cold days by means of thin plates of lapis specularia, which admitted the passage of light nearly as well as glass, and were transported at night to the shelter of some house. (*Columella*, b. xi. c. 3.; *Pliny*, b. xix. c. 23.) Whether they ever employed the more transparent medium of glass as a shelter, we are unable to determine. It is certain that in the reign of Aurelian, A. D. 273, the luxury of glass windows was enjoyed.

In those early days, when the departments were amalgamated, and when from the pot-herbs and fruits produced by their joint growth, the poorer Romans and the slaves of proprietors derived their chief sustenance, the garden was usually under the care of the house-keeper or steward's wife, who was lightly estimated, if it was not productive and capable of sustaining the household. (*Pliny*, xix. 4. s. 19.) The husbandman used to deride its culture, and to designate it *a second dessert*, and *a flitch of bacon*, always ready for cutting. (*Cicero de Sen.* 16.)

In accordance with the observation which we made at the commencement of this article, that the cultivation of fruit appears always to engage the first horticultural notice of every nation, we find that the Romans were much more attentive to their orchards than their kitchen gardens, as is manifested by the greater number of species and varieties cultivated. Cato, our earliest informant, mentions seven varieties of the olive, six good ones of the vine, more than four of the apple, five of pears, pomegranates, services, six varieties of fig, three of nuts, quinces and plums.

The assiduity of the Romans in collecting new species and varieties of fruit, may be gathered from the writings of the elder Pliny, who lived A. D. 23–79. There were then cultivated in the vicinity of Rome, nearly all the fruits with which we were acquainted at the commencement of the present century, the chief exceptions being the orange and pine apple, the first of which, however, they became possessed of in the fourth century. Very few of their cultivated fruits were indigenous, but were introduced at great expense and trouble from distant and different climes. The fig and almond were brought from Syria; the citron from Media; the apricot from Epirus or Armenia; the pomegranate from Africa; apples, pears, and plums, from Armenia, Numidia, Greece, &c.; the peach from Persia; and cherries from Cerasus in Pontus, by Lucullus, about 73 B. C. Mr. Vernon found on the borders of the Black Sea abundance of wild cherries, near Cheresium, from whence the name probably arose, and is identical with the Cerasus of Lucullus. (*Bradley's Gen. Treatise on Husb.* vol. ii. p. 130.) Strawberries, raspberries, and others mentioned before by Cato, appear to have been natural products. (*Pliny*, xv. 25. xvi. 14.; *Mercellin*, xxii. 13.) The gooseberry and currant are found wild in the hills of Northern Italy. As the species were increased in number, so were the varieties. Pliny mentions 22 of apples, one without kernels; 8 cherries; 6 chestnuts; figs, many black and white, large and small; medlars large and small; large and small black mulberries; filberts and hazel-nuts; 36 pears; plums "ingens turba," black, white, and parti-coloured; 3 quinces; 3 services; grapes numerous; 2 walnuts; almonds, bitter and sweet. (*Trans. Lond. Hort. Soc.* vol. i. p. 152.)

There is no doubt, supported as the opinion is by Martial, Pliny and Columella, that the Romans of their age forced fruit in a kind of hot-house, protected from the exterior cold, and heated artificially. (*Martial's Epig.* viii. Ep. 14. 68.; *Pliny*, xix. 23.; *Columella*, xi. 3.)

Pliny the younger was born, A. D. 62. From his writings we acquire the most complete description of the Roman gardens, as regards their disposition, that is extant. His Laurentine villa was one in which he spent some of the colder months of the year, when his professional duties allowed his absence from the city. It is, therefore, not surprising that the garden does not occupy any considerable part of the narration in which he describes this estate. He merely, in an epistle to his friend Gallus, states that the Gestatio, or place for exercise, surrounded his garden,—"This," he continues, "is encompassed with a box-tree hedge, and where that is decayed, with rosemary; between the garden and this Gestatio, runs a shady walk of vines, which is so soft that you may walk upon it barefoot without injury. The garden is chiefly planted with fig and mulberry trees, to which the soil is as favourable as it is averse to all others."

His description of the gardens attached to his Tuscan villa is more diffuse, yet particular. It is contained in a letter to his friend Apollinaris (Ep. v. 6.), which is elegantly translated by Melmoth.

At the time Alaric invaded Rome, A. D. 408, there were in that city 1780 residences of wealthy and honourable citizens (*Nardini, Roma Antica*, p. 89. 480. 500.); the precincts
of each palace contained not only
porticoes, and baths, but groves,
hippodromes, temples, and even
(*Claudian, Rutil. Mumatian. Itin*
iii.) A moderate palace would
vered the whole four-acre farm o
natus. (*Val. Max.* iv. 4.) So lit
was left for the houses of the pleb
they built them many stories high,
habited by more than an equal n
families. Wealth, and consequent
property, gradually accumulated
hands of the comparatively fe
families. The estates of the sa
stretched over a large space in
well as distant provinces. Fa
Roman, as Gale conjectures, pos
estate near the modern Bury in
and a second in the vicinity o
(*Antoninus, Itinerary in Britain*, p.

We have thus followed the pr
gardening among the Romans fr
first existence as a colony, thro
rise as a people to the pinnacle
and thence through their decay in e
and debauchery.

When the conquering arms
reached England, they found the
inhabitants existing chiefly upon
duce of their herds, and of th
although not totally inattentive t
tivation of the soil. The inland in
descended from the Cimbri, lived
thatched cottages, and a fixed hab
an earnest of the existence of the
arts among the settlers. That t
practised in Britain at this early
certain; for although Tacitus af
the inhabitants were without corn,
standing the soil was favourab
growth (*Vitâ Agricol.* c. 12.), yet
only have been partially the c
farms of some of their neighbours
genitors, the Gallic husbandmen,
(*Pliny, Hist.* xviii. c. 6. 28.); and
of the manners and habits of th
were in accordance with theirs, w
tified in including this among th
of their coincidences, more espec
some of the details of agriculture
even superior to the Gallic cultiv

That the southern Britons act
gardens disposed around their
stated by Strabo. (*Strabo's G*
p. 306.) These, of course, were chie
pound of our kitchen and orchar
ments. There are many facts
besides those already mention
justify an inference that gard
pursued by the Britons with
The carrot grows wild in Britain,
in France; from the latter, it was
into Italy, being only improved

'lin. xix. c. 5.) Unless it had
oyed by the natives, we can
iceive so useless a weed, as it is
tate, would have gained the at-
he Roman legionaries. Turnips
ılarly abundant in Gaul; so ex-
ndeed, were they cultivated as
to cattle. (*Columella, De Re*
ii. c. 10.) The idea of a park,
cumulation of game, has been
raced, by a learned antiquary, to
Britons, who, particularly de-
the breeding of hares (as Cæsar
, usually kept many of those
out the courts of their chiefs.
s Hist. of Manchester, p. 235.)
apple was known and cultivated
ons before the arrival of the Ro-
re warranted in believing by the
of the name. In the Welsh,
morican, and Irish languages or
is denominated the Avall or
he Hœdui, who dwelt in the
mersetshire, appear particularly
ultivated this fruit, and their
stood upon the site of the pre-
ıbury, was known when the Ro-
isited it, by the name of Aval-
e orchard). (*Richard's Chron.*

Avellana afterwards came into
the north of England. Other
e pear, damson, &c., being known
evidently derived from the Ro-
ations, we, on the other hand,
to consider as being introduced
ons from Italy. The same ob-
ay apply to the rose, violet, and
itants of the flower garden, of
is little doubt the Britons were
efore their introduction by the
The kitchen-garden is similarly
r most, though not all, of its in-
The cabbage or kale tribe is an
the exceptions.
informs us that all fruit trees
in Britain, but the olive and
uch others as require a warmer
r although vegetables were quick
up, yet the moisture of the at-
rendered them slow in arriving
. (*Vitâ Agric.* c. 12.) It is evi-
this cursory remark, that the
began immediately their en-
improve the place of their set-
ven before they had penetrated
outhern milder districts of the
before its climate could be ame-
the removal of exuberant forests,
panying marshes, the never fail-
rators of the climate of the
which they abound. That they
urther proved by the testimony of Pliny, who informs us that they introduced cherries into our island, B. C. 42.

The art of cultivating the ground was a principal object of improvement, and that they extended the practice of this pursuit is certain, since, during their possession of the island, large quantities of corn were annually exported from it. About A. D. 278, the Roman settlers, finding that some parts of the island were not unfit for vineyards, obtained permission of the Emperor Probus to plant vines and make wine of their produce; a liberty which had been refused to them by the narrow-minded policy of his predecessor Domitian. (*Vospiscus.*) Some varieties of the apple, pears, figs, mulberries, and almonds were also introduced. Before the third century, the apple had become pretty generally an object of cultivation; for, at that period, large plantations of this fruit had been made as far north as the Shetland Islands. (*Solinus*, c. xxii.)

Immediately after the departure of the Romans, about A. D. 450, the Saxons formed a settlement in our island, and a series of civil wars succeeded until the inhabitants pretty generally hailed Egbert, about A. D. 726, sole sovereign of the realm. During this stormy period, in A. D. 507, Christianity was introduced among the inhabitants, and may be reckoned as an epoch in the Hortulan annals of this country. Independent of the tendency which Christianity had to soften the manners of the people, and thus, by rendering them more domestic, in an equal ratio encouraging the progress of the useful arts, to its ministers, in those days especially, gardening was an art most congenial; it helped innocently to beguile otherwise unoccupied hours, and was the means of affording luxuries to the palate, which were by no means held in contempt by the monks and other *religieux* of those times. They were persons of education when compared with the laity, and had an intercourse with foreign countries, through their brethren, which facilitated the communication of improvements; even their fasting from animal food was of benefit to horticulture, for it rendered them more desirous of superior vegetables and condiments arising from their tribes. Thus Italy, Spain, Germany, France, countries always abounding in the ministers of religion, became distinguished for their culinary vegetables and fruits. It may be added, as another truly valuable advantage to horticulture secured to it by religious establishments, that whilst the country at large was devastated in war, their property was usually held sacred, and, consequently, many varieties of vegetables were preserved, which otherwise would soon have become extinct if cultivated only in less hallowed ground.

Gardens and orchards are mentioned as being in the possession of the inhabitants of monasteries and other religious establishments in the oldest chartularies. Of orchards many traces still remain. One in Icolmnkiln, or Columbkill, one of the Hebrides, is described by Dr. Walker (*Essays*, vol. ii. p. 5.) as having existed there probably from the sixth century. The monastery of St. Columba was founded there, A. D. 566. (*Gibbon's Hist. of Rome*, c. xxxvii.) Another, which belonged to the cathedral at Elgin, still remains. Camden and Leland also mention various other instances in England. The vine, we have seen, was introduced by the Romans, and was particularly admired, and attended to by the carousing population of that age, if for no other of its qualities than the liquor yielded by its fruit. Guinuydden, Guinbren, Guin-ien, or Fion-ras, its names in the Welsh, Cornish, Armorican, and Irish dialects, is, literally, the wine tree. Vineyards were flourishing here at the commencement of the eighth century, as is testified by Bede. (*Eccles. Hist.* b. i. c. 1.)

During these periods, marked by a continuous series of intestine broils, the continued invasions of the Danes, who finally established their power in the island, A. D. 1017, and who in their turn were succeeded by another conquering dynasty in 1066, in the person of William I., horticulture continued unimpaired and silently to advance. Nor is this a matter of surprise, for the Saxons and Danes, when they won a better home than they had left in their native land, came as students in the arts of civilisation, which their successive sovereigns (Alfred and Canute need alone be instanced) used every means in their power to foster and improve. They came not, as did the Caliph Omar to Alexandria, to destroy those acquirements as useless which he did not already possess.

The Normans were about our equals in civilisation, when William acquired the throne of our island. At the time of the arrival of the Normans, gardens were generally in the possession of the laity, as well as of the ecclesiastics. Even gardens for the growth of vegetables to supply the public demand were then in existence. Eight Cotarii and their gardens are enumerated in the manor of Fulham, in Middlesex, a village, it is worthy of remark, still celebrated for its market gardens. Private houses with their gardens are in like manner recorded. (*Domesday Book*, p. 127.) In fact, there is no reason to doubt that at this period every house, from the palace to the cottage, was possessed of a garden of some size.

From the writings of William o
bury, who died in 1143, we learn
yards and orchards were posse
barons as well as the monks. H
that the grapes of the vale of
furnished the best wine. Next in
were those of the isle of Ely.
Gloucester also informs us that
was celebrated for its fruit, probab

Brithnod, the first abbot of
1107, was celebrated for his skill
culture. "He performed anot
and useful work," says the histori
Monastery; "being skilful in
planting and gardening, he laid
extensive gardens and orchards,
filled with a great variety of herb
and fruit trees. In a few years
peared at a distance like a wood, lo
the most excellent fruits in great a
adding much to the commodiou
beauty of the place." (*Gale's Hi*
vol. ii. c. 2.) At Edmonsbury, th
Bury in Suffolk, the monks of the
then flourishing there, planted
for their own use in 1140. The
of the garden at this period w
means so restricted as some aut
estimated. Matthew Paris, in rec
ungenial seasons of 1257, says,
were scarce, pears still scarcer; bu
plums, figs, and all kinds of fruits
in shells (filberts, walnuts, &c.), w
quite destroyed." (*Henry's Hist.*
land, b. iv. c. 5. s. 1.) So numerous
various plants which engaged th
cultural skill, that the different de
occupied separate enclosures. We
that the vineyard was independe
orchard, the latter was separated
kitchen garden, and the herbary,
a distinct enclosure. The monks
stable, it is recorded, were at
pense in 1294, in repairing the wal
gardens, and of their herbary. A
the eighth century, the list of
herbs was very numerous, as
from the *Capillarium de Villis et*
which Charlemagne details to his
such herbs as he requires them to

As an art of design and taste,
can scarcely be considered to hav
The gardens belonging to the c
dwellings of the gentry were confin
the narrow space included by th
required for defence in those times
broils. In the orchards without
of their castles, they, however,
their taste for ornamental gardeni
consisted, as it continued to a m
age, in having plants cut into
figures, labyrinths, &c. Henry
formed at Woodstock, A. D. 1123,

of which we have any record. Spel-
ays he borrowed the idea from the
rns. It was probably chiefly designed
reserve for game — *habitationem fera-*
(*Henry of Huntingdon's Hist.* b. 7.)
tained, however, a labyrinth, which
rs to have chiefly constituted the
, so immortalised by the fate of the
unate mistress of this monarch, fair
ond. Labyrinths were so much in
with the taste of the age, that there
ely a design for a garden given by
rceau in his *Architecture* about A. D.
in which there is not a round and a
one. About a century before this
entioned date, namely, in the reign of
the Second (1154—1189), Fitz-
s describes the gardens around the
of the London citizens as "large,
ful, and planted with trees."

he reign of Edward III. the first work
in this country on the cultivation of
l is supposed to have been composed.
uthor was Walter de Henly; it is
d *De Yconomia, sive Housbrandia.*
Tanner says the subject is treated
, according to the usage of the time.
ey's Sketches of Botany, vol. i. p. 23.)
s Bollar, an Oxonian of skill in
l philosophy, wrote three books, *De*
s Plantatione; and another work in
oks, *De Generatione Arborum et Modo*
ndi et Plantandi, and some other
still in MS. (*Ibid.* p. 24.)

ndness for plants as an object of study,
w awakened, and is an earnest that
tention to their cultivation propor-
y increased; for although plants were
after chiefly with a view to ascertain
medicinal qualities, yet the spirit of
otanical science was awakening, many
existing that were written at this
, devoted entirely to a tracing of the
teristics of plants, their synonyms, &c.
rst Royal Professor of Botany may
l to have been appointed in this age,
person of John Bray, by Richard II.
—1399), who allowed him an annual
n for his knowledge and skill in botany
ysic. (*Ibid.* p. 22.)

have seen in preceding observations
e gardens of the age were extensive,
en the slight mention we have of
of their inhabitants, it is pretty certain
ere well stocked. We however have
ticular list of them until the time of
r. That his catalogue would be a
t one of our horticultural products at
h earlier period, is certain. In the
of Edward III. cucumbers were cul-
l: it is a mistake, however, to consider
melons were likewise, for the melons
se and of later writers were the pompions of our times. (See this in *Lyte's Herbal*, A. D. 1619.) It is certain, however, from concurrent testimonies, that the cultivation of edible vegetables and fruits was exceedingly neglected. A bushel of onions in the reign of Richard II. usually cost about 12*s*., estimating the charge according to the value of our present currency. In the reign of Henry VII. (1485—1509), it appears in a MS. signed by the monarch himself, preserved in the Remembrance Office, that apples were from 1*s*. to 2*s*. each, a red one fetching the highest price. Pearmain apples are as old as the days of King John (1199—1216). (*Rot. Fin.* 6. *John*, m. 13. *Blount's Ant. Tenures*, p. 69.) Yet it was not because the varieties of our garden products were few. Tusser enumerates of "seedes and herbes for the kychen, herbes and rootes for sallets and sawse, herbes and rootes to boyle or to butter, stewing herbes of all sortes, herbes, branches, and flowers for windowes and pots, herbes to still in summer, necessarie herbes to grow in the garden for physik, not reherst before," above one hundred and fifty species. Of fruits, he mentions many kinds of apples; apricotes; bar-berries; bullase, black and white; cherries, red and black; chestnuts; cornel plums, (? cornelian cherry); damisons, white and black; filberts, red and white; gooseberries; grapes, white and red; green or grass plums; hurtil-berries, (*vaccinium vitis-idœa*); medlars or merles; mulberries; peaches, white, red, and yellow fleshed; peres of many kinds; peer plums, black and yellow; quinces; raspes; reisons (? currants); hazelnuts; strawberries, red and white; services; wardens, white and red; walnuts; and wheat plums.

The almond was introduced in this reign. Some authors also affirm that the cherry, having been lost during the turmoils of the Saxon dynasty, was introduced again during this reign by Rich. Haines, the king's fruiterer; but this is an error, for Warton gives a quotation from Lidgate, a poet who lived about 1415, which proves that cherries were then so common as to be hawked about the streets. Although the lemon was not cultivated in this country until the reign of James I., it is upon record that the Leathersellers' Company gave six silver pennies for one, which was served up at a civic feast given to Henry VIII. and Anne Boleyn, in honour of the coronation of the latter. Thus, as Apicius, the Roman epicure and glutton, first taught his countrymen the use of this fruit, so Henry, his peer in sensuality, first partook of it in this country.

To these may be added the fig, which we have seen was cultivated here as early as

278, and makes up a list of fruits as complete as that which comprises those now cultivated by us, without the aid of glass and artificial heat. Yet, notwithstanding this, culinary vegetables were as scarce in the concluding years of the reign of Henry VIII. (1509—1546) as good apples were in that of his father. Sugar was the sauce usually eaten with every kind of flesh meat. Neither was it because vegetables were little estimated, for Catherine, his last queen, was accustomed to send a messenger to Holland, or Flanders, when she required a salad. (*Hume's Hist. of Eng.* anno 1547.) The gardeners of London and Kent were regular importers of these edibles. In excuse for this inferiority of our garden produce, it was a conclusive assumption to assert, that our climate and soil were unfavourable to their growth. Against this unfounded opinion, Dr. Bulleyn stood forward, the patriotic, and we may add, the successful opponent: for, although the error would naturally have a tendency to correct itself, it is too much to consider that the opinion of a man of his estimation would be delivered without effect. From this period our practical horticulture was more attended to, and with its improvement the embassies to Holland for a salad ceased.

We have thus traced the progress of Gardening in its several departments in this country from the accession of our Third Edward, to the conclusion of the reign of Henry VIII., a period of more than two centuries; the first one hundred and fifty years of which were characterised by a still lingering taste for hunting, chivalry, and war; by crusades to the Holy Land, and as wild expeditions to the Continent; and, above all, by the civil horrors induced by the contest between the houses of York and Lancaster. Notwithstanding these circumstances, so hostile to domestic improvement and the cultivation of the social arts, we have seen that the art of gardening in its various departments had continued to advance, and in the concluding years of the period had considerably improved.

Previous to the reign of Elizabeth (1558—1602) horticulture was considered as little more than a mechanical art; but brighter days were now arrived to it. Botany, previous to this period, was almost unknown as a science; yet it must be acknowledged that botany is a chief part of the only foundation, upon which an enlightened practice of horticulture can be raised. In this reign, England was enriched with the first regular establishment for the scientific cultivation of plants in the physic garden of Gerarde (1567)
not, however, in England alone
study and cultivation of plants be
popular; there were many tributa
to this branch of the river of sc
ancestors were only followers
ample that was set by many
powers, and which seems to have
a desire for the improvement o
ledge of plants, and their cult
pervaded Europe simultaneousl
period. Padua took the lead by
ing a public botanic garden, wh
the Venetians, in 1533. Luc
at Bologna, who was the first p
fessor of botany in Europe, was a
advocate of such institutions. B
fluence a similar garden was e
at Bologna in 1547, where Dr
whom we shall presently notice,
bibed much of that knowledge w
dered him eminent in this country
the earliest private gardens of
kind was that of Enricus Cordus, a
who died in 1538; and of Mo
Cassel, who flourished about the
Gesner constructed the first bota
in Switzerland at Zurich in 1560
established at Paris in 1570; at L
1577; Leipsic, 1580; Montpeli
Jena, 1628; Oxford, 1632. This
its foundation to the munificence
Danvers, Earl of Danby, who fo
pose gave five acres of ground on
of the Charwel, to the south of
Magdalene's. He built greenh
stoves, inclosed it with stone wall
feet high, erected a house for the
and endowed the establishment.
and Sir Andrew Balfour endow
Edinburgh in 1680; and the Ap
Company founded that at Chelse
This last-named expensive esta
was commenced at a time when
pany was without any disposa
and when, to enter upon the unde
well as to re-erect their hall, bu
in the great fire, they were oblig
recourse to the private resourc
members: conduct which redoun
honour, for the outlay was without
pect of pecuniary advantage, but m
a desire to promote the objects of

An estimate of the greater att
paid to gardening for the publi
may be formed from a knowled
cheapness of some articles. Ea
tumn, 1594, half a peck of filber
be had for sixpence. In Septem
30 lettuces were to be bought
pence; 16 artichokes for three sh
fourpence; but 2 cauliflowers
and-sixpence each. In the reign

2—1625) superior varieties of the
a large pale gooseberry, the lemon
everal varieties of salad herbs and
es were introduced. Melons appear
e been especial favourites of this
ch.

taste for flowers, we have seen in
ious section, was prevalent in this
y at a very early period; a great
e of information as to their culti-
as well as new varieties, were intro-
by the Flemish worsted manufac-
who were driven over to Norwich
the persecutions in their country,
hilip II. and by the Duke of Alva,
67. They brought over with them
wers, Provence roses, and carnations.
was in 1558—1602. Tulips, and the
and musk roses, appear to have
introduced early in the reign of
beth. Gerarde says, in 1596, that a
pal collector and propagator of tulips
een so for twenty years, and had an
se variety. There is mention of a
feast at Norwich so early as 1637,
ich a play, or pageant, termed "Rho-
nd Iris," was performed. (*Linnæan*
ar. ii. 296. *Ray's Catalogus Canta-*
m.)

fondness for flowers first manifested
in Holland, and in that country rose
extraordinary height, continuing until
iddle of the last century, at which
two hundred pounds were given for
yacinth root; and more than six hun-
pounds for the *Semper Augustus* tulip.
man's *Hist. of Inven.*)

een Elizabeth was a great delighter
wers; nor were many of her subjects
o. Johnson, in his "*Mercurius Bo-*
s," (1634) gives a list of 117 exotics
ated by Mr. Gibbs, of Bath, many of
he had brought, himself, from Vir-
Among other eminent patrons of
ulture and botany were Sir Walter
gh, Lord Zouch, and Lord Hunsden,
ll, during their travels, acquired and
duced to this country many new plants.
icholas Bacon, the Lord Keeper, was
tinguished patron of gardening in this
It was upon the gardens of his
tiful mansion of Gormanbury that his
care and cost were bestowed. Several
s were introduced in this reign by
al. Fuller states that peas were
y imported from Holland, as "dain-
r ladies."

mes I. was an eminent patron of
ulture. He is especially to be dis-
ished in the annals of the art, for
g in the third year of his reign formed
ardeners of London, and those within
uit of six miles around it, into a corporate body, consisting of a master, wardens, assistants, and commonalty. No one was to practise as a gardener, within the above limits, unless approved of by this company. They were empowered to examine all, and seize such seeds or other horticultural products, as they might esteem defective; also to impose fines, and the offenders to be committed to prison by the magistrates until they were paid. This charter, as stated in its preamble, was granted on account of the great disappointment caused to persons having defective samples supplied to them. It was confirmed in the 14th year of the same reign.

In the same reign an academy was formed in Scotland for the improvement of gardening, which, it would appear, was in existence as late as 1724. It had professors, who delivered lectures. (*Bradley's General Treat. on Husb. and Gard.* vol. i. p. 134.) The same monarch appointed a royal botanist in the person of Matthias de Lobel, the first of whom we have mention since the time of Richard II. Lobel was under the patronage of Lord Zouch, and cultivated a garden at Hackney, of which his lordship bore the expense. Lobel had a considerable correspondence with foreign botanists, and by that means was enabled to introduce many new exotics into England. (*Pultney's Sketches of Bot.* vol. i. p. 98.)

The succeeding monarch, Charles I., was particularly fond of gardening. He created the place of Royal Herbalist, and conferred it on Parkinson. Orangeries were now much in request, the queen had 42 trees in hers, at Wimbledon, which were valued at 10*l.* each.

During the Commonwealth, as it is very erroneously termed, (1648—1660) Cromwell was a great improver of agriculture and the useful branches of gardening. He allowed Hartlib an annuity of one hundred pounds.

Charles I. (1660—1685) was a great patron of our art in general. Regular glazed edifices for the preservation of tender plants appear to have been first erected in this reign. Evelyn mentions Loader's Orangery in 1662, and those of the Duke of Lauderdale and Sir Henry Capel. The last mentioned also had a Myrtilleum. The green-house and hot-house in the Chelsea garden are mentioned by the same author, as well as by Ray in 1685.

For the encouragement of his gardeners, and to insure their utmost exertions, as not being liable to capricious removal, this monarch gave them patents of their places (*Cook upon Forest and Fruit Trees*, p. 62.).

Evelyn in his diary affords much information on the history of horticulture. He says he saw the first pine apple presented to the King in the banqueting house in 1661, and tasted of it. He speaks most highly of Sir William Temple's gardens at East Sheen. Sir William introduced some of our best peaches, cherries, grapes, and apricots from Holland. (*Ibid., and his own Works.*)

In the reign of James II. (1625—1689) Bishop Compton had enriched the gardens and green-houses of Fulham Palace to such an extent, that they were considered as containing a greater variety of plants than any other in England.

To his taste for gardening was united a knowledge of botany, a scientific attainment, observes Dr. Pultney, not usual among the great of those days. He was a great encourager of Mr. London; was one of the first to encourage the importation and raising of ornamental exotics; was very curious in collecting them, as well as in cultivating kitchen garden plants, especially kidney beans. (*Switzer's Prac. Kitchen Gard.* p. 237.) In his stoves and gardens he had above 1000 species of exotic plants, a larger number than had been seen in any private English collection. In his gardens he cultivated a great many plants that had been previously esteemed too tender to be exposed unprotected to our climate. Every thing was done under his own superintendence. (*Switzer's Icnographia Rustica*, vol. i. p. 70.)

Horticulture was now borne vigorously forward in this country; nor was it here alone that it was fostered, and gathered strength. We had previously received an impulse in this art from Holland; we had surpassed our teacher, and we now strove for the pre-eminence with France, who certainly had been also in a great measure our tutor.

William III. (1689—1702) introduced the Dutch style of laying out gardens. He delighted in blanched vegetables, and it was by his instrumentality that forcing asparagus was introduced here, being previously unknown. (*Switzer's Prac. Kitchen Gard.* p. 173.) Mary his queen delighted in the practice of gardening, more than he did. She superintended in person all improvements made during her life. She was particularly fond of exotics, and allowed Dr. Plukenet two hundred pounds annually for assisting her in collecting and cultivating them. Her fondness for gardening is mentioned by Dr. Tillotson in her funeral sermon. (*Icnog. Rust.* vol. i. p. 77.)

To be an efficient cultivator of plants, a knowledge of botany, we have already observed, is requisite. Whilst that science remained the chaos of unarranged facts, and ill-classified individuals, which it was until the master mind of Linnæus reduced its confusion and discord to harmony in
required for its acquisition the de
a life. Such acquisition the new
classification rendered comparati
in a few months. That gardener
themselves of the advantage needs n
instance than Philip Miller, in whom
fect botanist and horticulturist w
bined, and who was a corresponde
chief men of science then living.

For the working with full effe
spirit of the immortal Swede, our
had prepared the arena. Inde
enthusiastic in his pursuits, of c
comprehensive mind, he gave an in
botany and its correlative arts, mo
tual to their advancement than
received during ages of years p
For fifty years he most successfully
to clear the path of this science a
crease her stores. Nor does he
fame only among his countrym
afforded to him by all Europe. Ha
he was the improver and elevator o
into a science, and dates from his l
era in its history. In little more tha
years, Ray recorded an increase in
glish Flora of 550 species. His
Plantarum Angliæ, in 1670, contai
species: his Synopsis, in 1696, descri
than 1600 species. A phalanx of
were then contemporaries which
ages never equalled, nor succeeding
passed. Ray, Tournefort, Plumier
net, Commelin, Rivinus, Bobart,
Sherard, Boccone, Linnæus, may b
have lived in the same age.

I will not pass unnoticed, as bein
period, Abraham Cowley, the we
poet, physician, and author of
Books of Plants. Although he dese
praise as a botanist or as a gard
merits notice as assisting in their
ment by winning to them and enc
the attention of the literary. Of t
ence which botanists possess over
warding the interests of horticultur
quote but one more instance. Si
Rawdon was so gratified with the
cent collection of West Indian pl
sessed by Sir Hans Sloane, that he di
a skilful gardener, James Harlow,
maica, who brought thence a ves
freighted with vegetating and drie
the first of which Sir Arthur Rawd
vated in his own garden at Moira in
or distributed amongst his friends,
of the continental gardens. His
exotic plants was probably much en
by his intimacy with Dr. William
who, being one of the most munifi
trons and cultivators of exotic bota
that "golden age" of the science,

asselquist observed, "the regent of the
nic garden" at his house at Sedekio, near
rna, where he was British consul; for
he cultivated a very rich garden, and
cted the most extensive herbarium that
ever formed by the exertions of an in-
dual. It contained 12,000 species. His
ger brother, Dr. James Sherard, also
ivated at Eltham, in Kent, one of the
st gardens England ever possessed.
ney's *Sketches of Bot.* vol. ii. p. 150.)

t it was not only in the collecting and
ging of plants that botany was adding
stores and zest to gardening. Previous
is period little was known of the struc-
of plants, and the uses of their several
. Grew, Malpighi, Linnæus, Hales,
net, Du Hamel, Hedwig, Spallanzani,
leared away, in a great measure, the
ance which enveloped vegetable phy-
gy. Previous to their days the male
ng plants of diœcious plants, as spinach,
he male flowers of cucumbers, &c., were
mended to be removed as useless;
taught the importance of checking the
n of the sap; the mode of raising va-
s: in short, all the phenomena of vege-
life, which throw so much light upon
ractice of the gardener, were first noted
xplained by the labours of these phi-
hers. Another class of philosophers
contributed a gigantic aid to the ad-
e of horticulture, were those chemists
especially devoted themselves to the
table world. Such men were Ingen-
, Van Helmont, Priestley, Sennebier,
eder, Saussure, &c. To them we are
ted for the most luminous researches
the food of plants, the influence of air,
at, of light, and of soils. Previous to
researches the immense importance of
eaves of plants was unknown. Culti-
s were unaware that by removing one
m they were proportionably removing
neans of breathing and of nourishment
the parent plant; and mankind in ge-
were ignorant that it is by the gas
h plants throw off that the animal
tion is alone enabled to breathe.

e scientific institutions of previous years,
h had merely existed, were now in a
of vigorous exertion. The Botanic
len at Chelsea was especially distin-
hed under its curator Philip Miller.
garden, as previously stated, was
ded in 1673, though the inscription over
ateway is dated 1686, until which year
as not effectually arranged. It was
gthened and rendered permanent by
ans Sloane, in 1721. He, having pur-
d the manor, gave the site, which is a
old of four acres, to the company, on
ition that they should pay 5*l.* per annum for it, and that the demonstrator of the company, in their name, should deliver annually fifty new species of plants to the Royal Society, until the number amounted to 2,000. This presentation of plants commenced in 1722, and continued until 1773, at which time they had presented 2550 species.

If old botanical institutions improved, so also new ones were formed. The Kew Gardens were commenced in 1760, by the Princess Dowager of Wales, mother of George III. The exotic department was established chiefly through the influence of the Marquis of Bute, a great patron of gardening. It was placed under the care of Mr. W. Aiton, and it has since become one of the most celebrated botanical institutions in the world.

The Cambridge Botanical Garden was also founded in 1763, by Dr. Walker, vice-master of Trinity College. He gave the site, comprising nearly five acres, in trust to the chancellor, masters, and scholars of the university, for the purpose of establishing the garden. Thomas Martyn, the titular professor of botany, was appointed reader on plants, and Charles, son of the celebrated Philip Miller (who had aided Dr. Walker in selecting the ground), was made first curator. (*Loudon's Encyc. of Gard.* pp. 86. 1071, edit. 5.)

Previous to this period, the number of exotics cultivated in this country probably did not exceed 1000 species; during this century above 5000 new ones were introduced. Some tolerably correct idea may be formed of the improvement arising to horticulture, from this spirit of research after plants, by a knowledge that in the first edition of *Miller's Dictionary*, in 1724, but twelve evergreens are mentioned. The Christmas flower and aconite were rare, and only to be purchased at Mr. Fairchild's nursery at Hoxton. Only seven species of geranium were then known. In the preface to the eighth edition of the Dictionary, in 1768, the number of plants cultivated in this country are stated to be more than double those which were known in 1731. The publication of the seventh edition of that work, in 1759, was of the greatest benefit to horticulture. In it was adopted the classical system of Linnæus. It gave a final blow to the invidious line of distinction which had existed between the gardener and the botanist, and completed the erection of the art of the former into a science, which it had been long customary to esteem as little more than a superior pursuit for a rustic. From being merely practised by servants, it became more extensively the study and the delight of many of the most scientific and noble individuals of this country. Miller improved the cultivation

M M 2

of the vine and the fig, and was otherwise distinguished for his improvement of the practice, as he had been of the science, of gardening. Having thus decisively gained the attention of men of science, the rapid progress of horticulture from this era is no longer astonishing. The botanist applied his researches to the increase of the inhabitants of the garden, and the better explanation of their habits. The vegetable physiologist adapted his discoveries to practical purposes by pointing out the organs and functions which are of primary importance; and the chemist, by his analysis, discovered their constituents, and was consequently enabled to point out improvements which practice could only have stumbled on by chance, and perhaps during a lapse of ages.

The general introduction of forcing houses likewise gave to our science a new feature. Green-houses, we have seen, were in use in the 17th century; but no regular structures, roofed with glass, and artificially heated, existed until the early part of the succeeding one. Though a pine-apple had been presented by his gardener to Charles II., it is certain that they were only successfully cultivated here about 1723, by Mr. Henry Talende, gardener to Sir Matthew Decker at Richmond; Mr. Loudon gives the date as 1719. Mr. Bradley says, that Mr. Talende having at length succeeded in ripening them, and rendered their culture "easy and intelligible," he hopes ananas may flourish for the future in many of our English gardens. (*Bradley's Gen. Treatise on Husb. and Gard.*) That forcing was rare, and but of late introduction, is further proved by Mr. Lawrence, who, in 1718, observes, that he had heard that the Duke of Rutland, at Belvoir Castle in Lincolnshire, hastened his grapes by having fires burning from Lady-day to Michaelmas behind his sloped walls, a report to which he evidently does not give implicit credence, but which "it is easy to conceive." (*Lawrence's Fruit Gard. Cal.* p. 22.) That such, however, was the fact, is confirmed by Switzer, who further adds, in 1724, that they were covered with glass. The walls were erected, he says, at the suggestion of Mr. Facio, whom we have before mentioned. The walls failing in their anticipated effect were covered with glass, and thus led to the first erection of a regular forcing structure of which we have any account. (*Switzer's Practical Fruit Garden*, p. 318.) Lady Wortley Montague, in 1716, mentions having partaken of pine-apples at the table of the elector of Hanover; and speaks of them as being a thing she had never seen before, which, as her ladyship moved in the highes
circles, she must, had they been i
to table here.

Mr. Fowler, gardener to Sir
at Stoke Newington, was the fir
cucumbers in autumn, for fruiti
Christmas. He presented the king
with a brace of full-grown one
year's day, 1721. (*Bradley's*
Treatise on Husb. and Gard. vol.

Even as late as the commen
the century we are tracing, eve
vegetable, in a greater or less d
obtained from Holland. The p
the royal family sent thither for
pot-herbs; and the seedsmen obt
thence all their seeds. But in 17
boasts of the improvements made
Cucumbers, that twenty-five ye
were never seen at table until th
May, were then always ready i
days of March, or earlier if tried
lons were improved both in q
earliness. "The first, owing to
spondence that our nobility and g
abroad, now equalling, if not ex
French and Dutch in their c
lections of seed; but the second
the industry and skill of our ki
deners." Melons were now cut
of April, which before were r
middle of June. The season of
flower being in perfection was
from three or four, to six or seve
Kidney beans were now forced.
of peas and beans was extended
from April until December, wh
ously only lasted two or three m
(*Preface to Switzer's Pract. Fru*

The early part of this century
the labours of Professor Bradley
one of the first to treat of gard
agriculture as sciences. Althoug
in discoveries, his works are no
of information derived from co
gardeners and other writers.
luminously on the buds of trees,
and especially on the mode of
variegated plants and double flo
must be looked upon as a be
horticulture, for he at least ma
acquainted with the discoveries
and, recording them in his widely
works, he spread such increased
and diffused over the whole
sophic views, as the science
afforded.

Some of our most celebrated
flourished during this century.
Gordon, Lee, and Gray introd
plants during its first half.
Chalfont, and Thornton of Clapha
particular mention for their enco

botany. The garden and hot- the latter were among the best bout London.

ave seen under what favourable and with what great improvements g was on the advance at the close th century; but the present cen- ushered in with even greater of success, for the light of science nore powerfully concentrated upon ce, and began to be felt and ap- . This especially applies to the of the chemist and physiologist. bination of horticultural art and was especially promoted by the n of the Horticultural Societies of nd Edinburgh. The first of these began to be formed in 1804, the 1809. Nothing can more con- y display the high estimation in rdening is held, nothing can af- eater guarantee for its improve- n the lists of the fellows of the ieties. In them are enrolled the the most talented, the most noble, most wealthy individuals of the ingdom.

crease of the inhabitants of our grounds within the last few years e taste and patronage which are on gardening in a very conspicuous view. Of stove plants we now about 1800 species and varieties. -house plants, nearly 3000. Of es and shrubs, nearly 4000. Of rennial flowers, nearly 3000. Of nd annual flowers together, about particularise the different ge- these would exceed the limits I cribed to this article. I have not the varieties of florist's flowers in general list. They are more than nably numerous. Of hyacinths about 300 varieties, whereas in rkinson mentions but 50. The or this flower, however, has much for Miller, in the early part of the ry, says the Dutch gardeners had s. Of tulips we have nearly 700 The cultivation of this flower has ned of late years. It was at its th in this country and in Holland the middle of the 17th century. In nearly 600*l.* was agreed to be given gle root. Of the ranunculus we ly 500 varieties. Of the anemone, 0. Of dahlias, between 200 and cissi, 200; auriculas, more than ks, 300; carnations, about 350. included in the list we have hardy trees and shrubs, there than 1450. Another instance of ress made in increasing the number of our cultivated plants is furnished by the genus *Erica*. But five kinds of heath were described by Miller, as known in England about 60 years since; we now cultivate nearly 350.

Mr. Loudon makes the number of plants cultivated by gardeners at present amount to 13,140. Of these 1400 are natives of Great Britain; 47 were exotics introduced previous to and during the reign of Henry VIII.; 7 during that of Edward VI.; 533 during that of Elizabeth. In that of James I., 20. Charles I., 331. During the usurpation, 95. Charles II., 152. James II., 44. William and Mary, 298. Anne, 230. George I., 182. George II., 1770. George III., 6756. During the first 16 years of this century, on an average, 156 plants were annually introduced. The ardour of research is not the least abated now.

The style in which our grounds are now usually laid out may be characterised in one sentence. Convenience is endeavoured to be rendered as attractive as possible, by combining it with the beautiful and appropriate. The convenience of the inmates of the mansion is studied by having the kitchen and fruit gardens near the house, fully extensive enough to supply all their wants, and kept in the appropriate beauty of order and neatness; without any extravagant attempt at ornament by the mingling of useless trees, or planting its cabbages, &c. in waving lines. In the flower garden which immediately adjoins the house, dry walks — shady ones for summer, and sheltered, sun-gladdened ones for the more intemperate seasons — are conveniently constructed. Their accompanying borders and parterres, are in forms, such as are most graceful, whilst their inhabitants, distinguished for their fragrance, are distributed in grateful abundance; and those noted for their elegant shapes and beautiful tints are grouped and blended as the taste of the painter and the harmony of colours dictate. The lawn from these glides insensibly into the more distant ground occupied by the shrubberies and the park. Here the genius of the place dictates the arrangement of the levels and of the masses of trees and water. Common sense is followed in planting such trees only as are suited to the soil. A knowledge of the tints of their foliage guides the landscape gardener in associating them, and aids the laws of perspective in lengthening his distant sweeps. If gentle undulations mark the surface, he leads water among their subdued diversities, and blends his trees in softened groups, so as to form light glades to harmonise with the other parts. If high and broken ground has to be adorned, the designer mingles waterfalls with broader masses of darker foliaged trees, and acquires the beauty peculiar to the abrupt and the grand, as in the former he aimed at that which is secured by softer features.

He is no philosopher who neglects a certain present good for fear that in some future period it may be abused; but in the encouragement of gardening, whilst an immediate good is obtained, there is no fear of its perversion in after days. Its diffusion among the poorer classes is an earnest or means of more important benefits, even, than the present increase of their comfort. The labourer who possesses and delights in the garden appended to his cottage is generally among the most decent of his class; he is seldom a frequenter of the ale-house; and there are few among them so senseless as not readily to engage in its cultivation when convinced of the comforts and gain derivable from it. Gardening is a pursuit adapted alike to the gay and the recluse, the man of pleasure and the lover of science. To both it offers employment such as may suit their taste; all that can please by fragrance, by flavour, or by beauty; all that science may illustrate; employment for the chemist, the botanist, the physiologist, and the meteorologist. There is no taste so perverse as that from it the garden can win no attention, or to which it can afford no pleasure. He who greatly benefited or promoted the happiness of mankind in the days of paganism was invoked after death and worshipped as a deity: in these days we should be as grateful as they were without being as extravagant in its demonstration; and if so, we should indeed highly estimate those who have been the improvers of our horticulture; for, as Socrates says, "it is the source of health, strength, plenty, riches, and of a thousand sober delights and honest pleasures.' "It is the purest ofhuman pleasures," says our own Verulam. It is amid its scenes and pursuits that "life flows pure, the heart more calmly beats." (*G. W. Johnson's History of Gardening*.)

GARDEN WARBLER. See WARBLER.

GARGET. In farriery, a disease in the udders of cows, arising from inflammation of the lymphatic glands. It is also a distemper incident to hogs; and which is known by their hanging down their heads, and carrying them on one side, moist eyes, staggering, and loss of appetite.

In order to remove the disease in cows, where the inflammation is great, the cow should be bled, a dose of physic administered, the udder well fomented, and the milk drawn gently but completely off, at least twice a day. (*Youatt on Cattle*, p. 553.) When the disease happns to hogs, they may also be bled, and should ha
stimulating cordial drinks.

GARLIC. (*Allium*, from the Ce
or burning.) Under this name Sir
(*Eng. Flor.* vol. ii. p. 133.) en
seven native species; viz.

1. The great round-headed g
ampeloprasum.) A rare plant, fo
sionally in open hilly places. The st
or three feet high, and the herba
what similar to that of the leek;
globose bulbs or cloves increase
a garden, by lateral offsets, till they
a mass as big as a man's head, rese
bunch of grapes. The scent of
plant is strong, and of the most dis
kind.

2. The sand garlic (*A. arenariu*
in mountainous woods and fields in
on a sandy soil; stem two or three
bulbs small, ovate, with many
offsets.

3. The mountain garlic (*A. ca*
which is nearly related to the next
species, though differing in the fla
of its leaves.

4. The streaked field or wild
oleraceum) found in pastures,
corn fields, and their borders—
whitish green blossoms in July.
plant has an unpleasant scent of g
is a very troublesome weed, difficu
tirpation, though not of common oc
It is eaten by cattle, sheep, and h
the tender leaves, boiled in soups
with other herbs, form an wholeson
of food.

5. The crow garlic (*A. vineale*) wh
in dry pastures, corn fields, and wast
among ruins, especially on a
gravelly soil. The stem is slend
two feet high, bulb small, ovat
flowers small, pale rose-coloured.

6. The broad-leaved garlic or
(*A. ursinum*), which grows in moi
hedges, and meadows, and produ
white flowers, that blow in the
May and June. Every part of the pla
trodden upon, or otherwise bruised
the strong odour of its genus. Th
is eaten by cows; but if they feed
so sparingly, it communicates its
flavour to the milk and butter to
degree as to render those articles
during the spring. It should the
carefully eradicated as an intoler
sance from all pastures. It affor
cellent remedy for driving away
moles, and it is said the plant will
any other vegetable to thrive near

7. *Chive garlic* (*A. schœnopras*
is rare, but sometimes found in
and pastures, and was formerly in

an ingredient in salads, but has
erly neglected. See Chives.
ultivated varieties are — Common
l. *sativum*), which is a hardy plant,
f Sicily, capable of growing in
ny soil. It is generally propa-
r the cloves obtained by parting
but may be raised from the bulbs
l on the stems. The planting
performed any time in February,
nd early in April, but the middle
cond is the usual time of insertion.
clove to be placed in each one of
de six inches apart and one and a
p, in straight lines, six inches dis-
n each other, care being taken to
root end downwards; to do this
greatest facility, it is the best
to thrust the finger and thumb,
a clove between them, to the re-
lepth, without any previous hole
de.

nly cultivation required is to keep
n of weeds, and in June the leaves
l in knots, to prevent their running
which would greatly diminish the
the bulbs. A few roots may be
as required in June and July, but
must not be lifted until the leaves
hich occurs at the close of July,
course of August. It is usual to
art of the stalk attached, by which
tied into bundles, being previously
ed by exposure to the sun and
eeping during the winter.

mbole, or, as it is sometimes called,
garlic (*A. scorodoprasum*), has its
cloves growing in a cluster, form-
d of compound root. The stem
ny bulbs at its summit, which, as
hose of the root, are often preferred
ng to garlic, being of much milder
It is best propagated by the root
hose of the stem being slower in
n. The plantation may be made
February, March, or early part of
well as throughout the autumn.
y be inserted either in drills or by
e, in rows six inches apart each
l usually two inches within the
though this, as well as the preced-
ty, would thrive better if grown on
ce. A very small bed is sufficient
pply of the largest family. See
and Leek.

s the above, there are large num-
different foreign species, most of
e pretty: they increase abundantly
ets. The onion, leek, garlic, sha-
s, &c., all agree in their stimulant,
and expectorant effects, differing
e of activity. (*G. W. Johnson's*
ard.; Smith's Engl. Flor.; Willich's *Dom. Ency.; Loudon's Ency. of Gard.; Paxton's Bot. Dict.*)

GARNER. A term used provincially to signify a granary, or repository for corn; also a binn or a mill. See Granary.

GARTH. A country word, signifying a small garden, yard, backside, or croft.

GAS, AMMONIACAL. See Saline Substances; their uses to vegetation.

GASES, *their uses to vegetation.* It is not, I think, necessary, in drawing the cultivator's attention to the uses of that great portion of the food of plants which they imbibe in the state of gas, or of aqueous vapour, to enlarge upon the importance of the question, since that is a truth which, as illustrating the value of certain modes of cultivation, I hope to render intelligible in the following paper, as I examine in succession the advantages of the gases and vapour of the atmosphere, as well as those emitted during putrefaction, to the commonly cultivated crops of the farmer. And even if the accomplished farmer shall dissent from some or all of my conclusions, he will yet readily admit that all such observations, with regard to the habits and food of plants, and their ready absorption by the soil, cannot be too generally understood and acted upon by the cultivators of our island.

That the atmospheric air exerts an extensive and very important influence upon vegetation, is a fact which has been well known from the earliest days of agriculture. Too many circumstances combine to render this truth apparent to the very meanest cultivator for it long to escape observation. The superior luxuriance of the *borders* of all growing crops, from those of the field to the outer circle of timber in a wood, naturally pointed out that *something* was gained by these, of which the inner sheltered portions were partially deprived. And that this something was the air of the atmosphere, appears to have been the conclusion of the early Italian cultivators, who, on all occasions, were attentive to let their crops enjoy as much of the breeze as possible, — an object which they endeavoured to attain, not only by an attentive consideration of the natural and acquired habits of the plants in transplanting them, but also by increasing the access of air to their roots by deep and regular periodical stirrings of the soil around them. Thus Cato, the earliest of their agricultural writers, whose works remain to us, when instructing the Roman farmers as to the best mode of cultivating the vine and the olive, advised them, if they wished their vines and olive-trees to grow luxuriantly, to stir the trenches around them once a month, until they were three years old; and he adds, "bestow the same care then, as in those days, the air of the atmosphere was considered to be a simple body, we need not search in the works of the early agricultural writers for any evidence of very definite ideas of the mode of its action. That the air they breathed was highly serviceable to plants of all kinds was the extent of their information; they had no knowledge of the existence of three distinct gases in the atmosphere. That was a discovery reserved for modern ages — for the days of Priestley, and the dawn of pneumatic chemistry in England. When, therefore, the early cultivators made the observation, that the free supply of air to the leaves and roots of plants materially promoted their growth, they did what too many modern agriculturists have since done, merely noticed the effect without making any very accurate inquiries as to the cause of the benefit; they were too often content, in fact, with merely substituting words as an explanation of facts. It is probable that the early Greek and Italian philosophers were farther led to this knowledge of the advantages of air to vegetation, from noticing the power which some eastern plants possess, such as the *Flos æris* and others, of entirely supporting themselves upon the nourishment they derive from the atmosphere, even when suspended by a string from the ceiling of a room, — many parasitical plants subsist upon hardly any thing else; thus, some of the mosses of this country cling to life, and even grow well, in situations where hardly any thing except air and moisture can nourish them: some of the aloe tribe do the same.

Carbonic acid gas. — When, however, later ages had acquired the knowledge that it was only a portion of the air that main-

varieties of air contain a very
increased proportion of carboni
Many very accurate experimen
demonstrated that such foul air
increased the luxuriance of vege
fined in them, and that plants
also the power of restoring to
hausted air the portion of oxy
either fire or the breathing of a
removed: thus, a confined port
in which a mouse had died in te
for want of air, having had a spr
introduced into it for some hour
found to be so replenished with
that a second mouse being placed
as long as the former mouse; an
lar treatments, a lighted taper be
substituted for the mouse, the
was produced — the exhausted ai
replenished with oxygen gas.

These facts naturally opened
It then became an interesting
ascertain the proportion of th
acid gas in the atmospheric air,
sessed the maximum advantage
tion; and it was found, that
carbonic acid gas, plants would
tate at all, or in air containing 7
of it, but that, when the proport
in common air was reduced
cent., then the plants confined i
vegetated, and that they grew
when the proportion was 25 per
better when it was 12½ per cent.
when it was reduced to only
then they flourished much bet
common atmospheric air. It was
however, that the increased
carbonic acid gas was only b
plants when they were vegetat
light, but that, when this was ex

ults naturally led to the addi-
ry, Whether the presence of
id gas in water produced the
on plants, since it was well
when plants were immersed in
xposed to the sun's rays, they
bles of oxygen gas, by decom-
arbonic acid gas, and setting its
Various kinds of water were
ining different proportions of
l gas; and the beneficial result
tion was found to be exactly
e to the quantity of carbonic
ch they contained. In pump-
yielded the most oxygen; from
a smaller quantity; but from
little or none. Now, by boil-
gases are driven out of water;
the reason why such water is
ipid. And yet it was found,
he boiled water was again im-
ith carbonic acid gas, those
ed in it emitted as much oxygen
did before it was boiled; and,
when the plants had exhausted
carbonic acid gas, then they
it oxygen.

ity of carbonic acid gas which is
lants, varies in different species.
ussure found that the purple
Lythrum salicaria) absorbed in
seven or eight times its bulk;
actus opuntia, in common with
-leaved plants, did not absorb
of that amount. In these ex-
owever, the atmosphere in which
ere confined, contained 7½ per
gas; so that when they are
n the open atmosphere, in which
on of this gas does not exceed
a thousand, the quantity ab-
nsiderably less.

rption of the carbonic acid gas,
r should clearly understand, in-
a great degree the composition
. All those vegetable carbona-
ious substances which are found
ich as gum and sugar, are in-
quantity by its copious supply;
is gas is no longer secreted by
s health becomes languid, and
ion more watery. Thus, a *Byssus*
n the dark (when carbonic acid
ed by plants), was analysed by
and found to contain only 1-89th
ht of carbonaceous matter; but
it had been allowed to vegetate
ys in the light, it was again ex-
was found to contain 1-24th of
f carbonaceous matter. Similar
obtained by M. Sennebier, who
when plants were made to
the dark they contained much
less oil than those vegetating in the light.—their resinous matter being then as 2 to 5½, compared with those vegetating in the light. They had even less earthy matters by one half; but then they had exactly double the quantity of water that the light-growing plants possessed.

Such, then, are the results of the free access of the carbonic acid gas of the atmosphere to the leaves of plants,—it promotes their growth, increases their vigour, and enriches their secretions. The application of the same gas to their roots, although it has not been examined with the same care as its action upon their leaves, is yet evidently attended with the highest advantage. Thus, this gas is one of the constant products of putrefaction, wherever this is going on; as over stagnant drains, dung-heaps, and other putrefying matters: there, vegetation is sure to be rankly luxuriant, and that, too, in situations where the roots of the plants are far removed from immediate contact with the decomposing organic matters. This may be easily shown by the repetition of a very simple experiment, which was first made by Davy. This great chemist filled a glass retort, capable of containing three pints, with the hot fermenting dung and litter of cattle, and examined the elastic fluids which were generated. In 35 cubic inches which were thus produced in three days, he found 21 of carbonic acid gas, the remainder being chiefly nitrogen; and after thus ascertaining the composition of these gases, he introduced the beak of another retort, filled in a similar manner, in the soil under the roots of some grass growing in the border of a garden. In less than a week, a very remarkable effect was produced on the grass exposed to the action of these gaseous matters of putrefaction; their colour became deeper, and their growth was much more luxuriant, than the grass in any other part of the garden. And hence, too, is derived one of the chief advantages of applying organic matters to the soil, and that in as immediate contact with the crop as possible, just as is effected when manures are added to the soil by the drill; for the roots or leaves of the plants are, by the adoption of this plan, immediately in contact with the evolved carbonic acid, and other gases of putrefaction: they are thus readily absorbed as they are generated, and nothing is lost by escaping into the atmosphere. The gas, in fact, is instantly, yet gradually, transmuted from the putrefying products of the farm-yard into the flour of the wheat, or the nutritive matters of the grasses. And there is yet another chemical reason why the manure-drill, or any other machine, should be adopted by the farmer to bring, as closely as possible, every plant into immediate contact with the decomposing manure he applies to his soil; and that is, the superior readiness with which, in all cases of decomposition, the disengaged substance enters into new combinations at the very instant of its disengagement, than it does after it has been completely formed. Thus, to give an instance, during the putrefactive fermentation of vegetable substances, a quantity of nitrogen is disengaged; and if this takes place under certain favourable circumstances, — such as the presence of calcareous matters, potash, and a dry warm temperature at the moment it is formed, — the nitrogen combines with oxygen, forms nitric acid, which unites with the potash, and thus nitrate of potash, or saltpetre, is formed; but if the nitrogen is once fairly disengaged, almost every endeavour of the chemist has failed in making it unite with oxygen, so as to form the acid of saltpetre.

In every way, therefore, in which the question of applying manures in immediate contact with the roots of plants can be viewed, the more advisable does the adoption of the practice appear.

The important services of the carbonic acid gas of the atmosphere to vegetation have been illustrated in various ways by more than one able chemist. That given by Professor J. F. Johnston, in his able *Lectures on Agricultural Chemistry*, p. 218., is, perhaps, the most recent and the most practical. He observes, "If we were to examine the soil of a field on which we are about to raise a crop of corn, and should find it to contain a certain per centage, say 10 per cent. of vegetable matter (or 5 per cent. of carbon), and after the crop is raised and reaped should, on a second examination, find it to contain exactly the same weight of carbon as before, we could not resist the conviction that, with the exception of what was originally in the seed, the plant, during its growth, had drawn from the air all the carbon it contained. The soil having lost none, the air must have yielded the whole supply. Such was the principle on which Boussingault's experiments were conducted. He determined the per centage of carbon in the soil before the experiment was begun; the weight added in the form of manure; the quantity contained in the series of crops raised during an entire rotation or course of cropping, until, in the mode of culture adopted, it was usual to add manure again; and, lastly, the proportion of carbon remaining in the soil. By this method he obtained the following results, in pounds per English acre: — From a course of, 1. Potatoes or red beet, with
manure; 2. Wheat; 3. Clover; 4
5. Oats. Carbon in the manure, &c.,
carbon in the crops, 7544 lbs.; d
or carbon derived from the air, 50
The result of this course indic
the land, remaining in equal condit
end of the four years as it was
ginning, the crops collected duri
years contained three times the q
carbon present in the manure, a
fore the plants, during their grow
on the whole, have derived two
their carbon from the air.

Oxygen. — Oxygen gas, or vital
constitues 21 per cent. of the bu
air we breathe, is absolutely essent
growth of plants. If this is w
from the atmosphere, they will
vegetate, — their leaves can no lo
form their functions. But this use
by the leaves of vegetables is co
the night; it is only in the dark
absorb it. During this absorpt
leaves of some plants — such as th
opuntia and the houseleek (*Sem*
tectorum) — do not emit any p
carbonic acid gas; but the com
(*Quercus Robur*), the yellow st
(*Sedum reflexum*), and the great m
plants, emit a considerable portion,
however, in amount to the ox
which has been imbibed; and this
oxygen enters, there is little do
immediate combination with oth
stances, and forms vegetable matter
shapes. A variety of experiments
fact, been made to ascertain this.
leaves of plants which have but
absorbed a portion of oxygen gas h
exposed in the exhausted receiv
air-pump. Other leaves have b
mitted to the greatest heat they c
without undergoing combustion, b
ther case was any oxygen gas
from them. And it has been n
those plants which absorb the gre
portion of oxygen during the n
precisely those which evolve the m
siderable quantity of carbonic
during the day.

Plants of different kinds vary v
in the quantity of oxygen which
sorb. Fleshy-leaved plants, wh
little or no carbonic acid gas, ab
little oxygen; and these plants, i
remarked (says Dr. Thomson), can
in elevated situations, where the a
rarefied. Next in order come the
trees, which, although they abs
oxygen than the fleshy-leaved pl
require much less than those w
their leaves during winter. Tho
which flourish in marshy ground

little oxygen. M. Saussure tried aber of experiments on this sub- a variety of plants of different e following are some of his re- every case, the weight of the pposed to be equal to 1·00, and oxygen is expressed in the table. , p. 99.)

		Quantity of oxygen absorbed.
Evergreens.		
o-cerasus	May	3·20
(lesser periwinkle)	June	1·50
(the fir)	Sept.	3·00
abina	June	2·60
Trees which lose them in Winter.		
bur (the oak)	May	5·50
a (the abele)	May	6·20
—	Sept.	4·36
Persica	June	6·60
—	Sept.	4·20
lia	June	5·40
Herbaceous Plants.		
erosum (the potato)	Sept.	2·50
racea (the cabbage) — young leaves	Sept.	2·40
— old leaves	Sept.	2·00
he vetch), before flowering		3·70
in flower		2·00
after flowering		1·60
pa (the turnip), in flower		1·25
a (the oat)	June	2·70
tivum	May	5·00
um (the pea)	May	3·72
lens	Aug.	2·00
Aquatic Plants.		
tago	Aug.	0·70
persicaria	Sept.	2·00
licaria	May	2·30
	May	2·25
reptans	Sept.	1·50
the Fleshy Plants.		
tia	Aug.	1·00
ricana	Aug.	0·80
m tectorum	July	1·00
iegata	July	0·63

continued his researches upon oxygen gas to vegetation. He it was essential to many of its —that it was absorbed not only es, but by the roots of plants,— combined with carbon, and the id gas thus formed was thence to the leaves to be decomposed: ems and branches of plants ab- l its presence is essential to the of flowers; in its absence, seeds rminate, and hence the reason will not vegetate when placed ertain depth in the soil. The oxygen gas consumed during nation, by equal weights of dif- s, varies considerably. Wheat consume less oxygen than pease, and pease less than common broad and kidney-beans, — the latter consuming $\frac{1}{100}$th part of their weight, while wheat and barley, during their germination, only absorb from $\frac{1}{1000}$th to $\frac{1}{2000}$th their weight of oxygen gas. Recent experiments have shown, also, that the more water is impregnated with oxygen gas, the more excellent are its effects when employed for the purpose of watering plants; and hence one of the causes of the superiority of rain-water, every 100 cubic inches of which contains 3·5 of oxygen gas. Some recent experiments were made by Mr. Hill, which clearly demonstrated these facts. Hyacinths, melons, Indian corn, and other plants, were watered for some time with water impregnated with oxygen gas; the first grew with additional beauty and luxuriance, the melons were improved in flavour, the Indian corn increased in bulk, so as "to equal in size most of those imported from North America," and all of them grew more vigorously.

The uses, therefore, of oxygen gas to plants are many and important, and accord with the conclusions which naturally suggest themselves from the results of the analysis of vegetable substances, from whence oxygen is never absent; it must be therefore one of the necessary supporters of vegetable life.

Nitrogen.—This is the last atmospheric gas which exerts its influence upon vegetation, and enters in small proportions into the composition of plants. Entering in the large proportion of 79 per cent. into the composition of the atmosphere, it is yet supposed to exert but a slight influence upon vegetation. It is found in much smaller proportions in plants than either oxygen gas or carbonic acid gas, although recent researches have shown that it is much more commonly present in vegetable substances than was once supposed; and, as I have elsewhere observed, (*Johnson on Fertilisers*, p. 338.) that it exerts a more sensible influence upon their growth than is commonly believed, is very certain, and that the proportion of it present in them varies with the different states of their growth, has been clearly shown by the experiments of Mr. Robert Rigg, who found in 100 parts of

	Parts of nitrogen.
The flour of wheat unripe	2·9
The same nearly ripe	2·3
Leaves of wheat unripe	3·3
— — nearly ripe	2·1
Stem of wheat unripe	3·5
— — nearly ripe	1·3
Chaff of wheat unripe	1·8
— — nearly ripe	1·3
Common grass, not growing freely	4·4
— — growing freely	5·6
Turnip, when attacked by the fly	8·0

	Parts of nitrogen.
Cabbage, not attacked by insects	8·1
— partly eaten by insects	5·7
The insects themselves	14·0
Red clover stems	2·5
Leaf of do.	4·2
Flower of do.	3·6
Potato itself	2·9
— stem	3·1
— leaves	8·5
— apple	3·9
— corolla	3·9
— pistils	4·6

It is also well worthy of the farmer's attention, that Mr. Rigg found that when barley was made to vegetate in the shade, the increase in the quantity of its nitrogen was nearly 50 per cent., but when vegetating exposed to the direct rays of the sun, the increase was only 30 per cent.; and he also made the observation, that the more rapidly the plants vegetate, the more nitrogen they are found to contain. It is also well known to the cultivator, that plants growing in the shade have usually a deep green colour, vegetating with much luxuriance, and that certain animal manures applied to plants produce similar results in a remarkable degree, such as gelatin, oils, urine, blood, fish, ammonia, &c. Now these fertilisers all contain nitrogen, and which gas must be evolved in some shape or other during their decomposition in the soil;—gelatin, containing 16·998 per cent., albumen 15·705, the fibrin of blood 19·934, urea 46·66 per cent.; and although nitrogen usually exists in plants in very small proportions, yet I am entirely disposed to agree with Mr. Rigg in his conclusion, that more attention should be paid than has hitherto been done, in the examination of vegetable substances, "to those products, which, though so minute in quantity as to be with difficulty detected in our balances, have nevertheless been wisely assigned to discharge the most important functions." (*Phil. Trans.* 1838, p. 406.)

Such, then, are the essential and highly important uses of the three gases of the atmosphere, nitrogen, oxygen, and carbonic acid, to all vegetation; an attentive consideration of which will explain to the farmer the cause of many of the phenomena he daily witnesses, and suggest to him unanswerable arguments for the adoption of those modes of cultivating his land, the results of careful and scientific investigations, which such chemical researches suggest and render intelligible.

Thus, the absolute necessity for all crops receiving a regular supply of carbonic acid gas, will explain to him why his crops always yield an inferior produce when they are surrounded by thick plantations of timber trees; and why the portion
of plantations growing on the
field the most exposed to th
almost always of the most luxuri
it will explain to him the reason
skilful farmers drill their corn,
most prevalent winds may, wit
facility, circulate *along* the rows
across them; and why all farme
their crops prosper better in
windy weather than in calms;
these instances, and in many
known popular observations o
kind, the copious supply of th
acid and oxygen gases of the at
naturally impeded by thick pla
other vegetable substances, an
by the winds.

The consumption of oxygen
roots of plants, and their increas
and vigour when their usuall
supply is increased, is equally f
instruction to the cultivator; fo
to explain the reason why stirr
around the roots of trees, acco
fashion of the early vine and ol
tors of Italy, or merely disturbin
between the rows of cabbages a
as practised by the best English
attended with decided advanta
suffers the air to have more fr
their roots. It renders apparent,
the chief reasons why mere subsoil
adds so materially to the luxuri
of even the poorest cultivated l
as the soil is deepened and pul
atmosphere more freely and mor
penetrates to the roots of the v
supports. The same facts expl
vantages of deep-ploughing, o
ploughing, and of trenching; wh
lent farmer in vain tries to render
his shallow-ploughed lands; and
the industrious cottager encloses
from the barren waste, too poo
ciently manure it, he yet renders
tive of excellent crops, by merely
it to the depth of eighteen or twe

And it is vain for the cultiva
that this benefit is not to be m
buted to the freer circulation in
the gases and watery vapour of
sphere, but that it is owing to t
of the surface-soil with the substr
such a conclusion is not only opp
fact, that many soils do not diff
position from the substratum on
rest, and yet are materially be
trenching or subsoiling, but is co
by many agricultural facts with w
cultivator is familiar; and if any
swer were requisite, that would
supplied by the recent experime

acey, with his new subturf plough, ely passes under the turf at a inches, and disturbs and loosens ally the soil; but when the plough under, every thing resumes its ition, although every portion of ratum has been thoroughly agiendered more permeable to the . The soil is neither displaced and yet this mere *loosening* is of the highest advantage, the grass is extensively and permaoved. Sir Edward Stracey, after he increased produce of the grass ery remarkable, tells us, that o marks left by which it can be the land has been so ploughed, the lines of the coulter, at the about fourteen inches one from n about three months from the ughing, these lines are totally and yet the quantity of afterhe thickness of the bottom, have bject of admiration of all his (*Jour. Eng. Agri. Soc.*, vol. i.

, with regard to the carbonic e carburetted and sulphuretted ases evolved during the putrenimal and vegetable manures, ies of the chemist are equally and confirmatory of the observhe intelligent farmer; the one hese gases, so grateful to the ps, are the most copiously emitearly stages of putrefaction; gradually decrease in volume as tion proceeds; and finally, when reduced to the state of vege-l, cease altogether. Now the ell aware that the manure of the in common with all organic deertilisers, is by far the most ady applied, and produces the most good effect when it is used in the e that is at all compatible with tion of the seeds of weeds, with collections usually abound. He hat in all situations where the trefaction are emitted, such as tables, marsh-ditches, covered that there vegetation of all kinds its rank luxuriance that some pply of nutriment is afforded; r in his best arranged hot-beds the gases which ascend from litter through the earth (which in immediate contact with the luce the same effects long after *nth* of putrefaction has subsided. of some of his plants is in this *ted*, he says, in an extraordi*nary* These facts *and observations are* entirely confirmed by those of the chemist. He notices that all the gases of putrefaction are precisely those which are the most nourishing to the growth of plants,—that air which has been spoiled by the presence of the gases evolved in putrefaction, or by the breathing of animals, is exactly that which is the most grateful to vegetation; and that where these gases are applied to the roots of plants in the most skilful manner, so as to ensure a regular steady supply, that then the plant is enabled to vegetate in a most vigorous and unusual manner. Thus, when green manures, such as sea-weed, buck-wheat, leaves of trees, fern, &c., the most slowly decomposing of all vegetable manures, are applied to the roots of plants, the effects, according to chemical experiments, are excellent, and, as I have elsewhere observed; the farmer assures us that they are so. He tells us that all green manures cannot be employed in too fresh a state,—that the best corn is grown where the richest turf has preceded it,—and that where the roots, stalks, and other remains of a good crop of red clover have been ploughed in, that there an excellent crop of wheat may be expected, and that when buck-wheat is ploughed into the soil, this is most advantageously done when the crop is coming into flower. The chemist again explains this without any difficulty. Davy and other chemists have shown that when the flower is beginning to appear, then the plant contains the largest quantity of easily soluble and decomposable matters; and that when these green plants are in this state buried in the soil, their fermentation is checked and gradual, so that their soluble or elastic matters are readily absorbed by the succeeding crop, and every portion of it becomes subservient to the demands of other plants. No cultivator perhaps ever examined this question more accurately, or tried his experiments with more neatness, than the late excellent President of the London Horticultural Society, the lamented Knight of Downton; and these were the more valuable, from being instituted to ascertain the state of decomposition in which decaying vegetable substances could be employed most advantageously to afford food to living plants. This he clearly proved, however erroneous were his explanations of his own observations and discoveries. One of his experiments with a seedling plum-tree was very remarkable. He placed it in a garden pot, having previously filled the bottom of it with a mixture of the living leaves and roots of various grasses, covered over with a stratum of mould. The plant appeared above the surface of the ground in April, and, during its growth in the summer, was three times removed to larger pots in the green-house; in every case the bottom of them being filled as at first with living grasses, covered over with a layer of mould; and by the end of October its roots occupied a space of about one third of a square foot, it having then attained the extraordinary height of nine feet seven inches. This experiment was varied by Mr. Knight in several ways: he drilled turnip-seed over rows manured with green fern leaves, and compared the produce with other rows of turnips by their side, manured with rich vegetable mould; and in all cases those which grew over the gradually fermenting green fern not only grew more rapidly than those treated in any other manner, but they were distinguished from all others in the same field by their deep green colour. Now, when the gases of putrefaction are mixed with the roots of all growing crops, this is exactly the effect produced. The most foul stinking water, even when transparent, is ever the most grateful to plants; that from stagnant ditches, which has always a peculiar taste from the carburetted hydrogen it contains, is excellent. Every gardener prefers that from ponds, however clear; the purer water from wells, he tells you, is very inferior, it is *too cold;* but then he confesses, that even warming it does not render it equal to that from stagnant places in its effects upon his plants; so that, in whichever way the experiment is made, there is no doubt of the value of these gases to the cultivator's crops, and he will readily therefore agree with Knight in the conclusion, that any given quantity of vegetable matter can generally be employed in its recent and organised state, with much more advantage than where it has been decomposed, "and no inconsiderable portion of its component parts have been dissipated and lost during the progress of the putrefactive fermentation." (*Trans. Hort. Soc.* vol. i. p. 248.)

Aqueous Atmospheric Vapour. — The last substance ever present in the atmosphere in considerable proportions, and which bears a very important relation to the prosperity of the farmer's crop, is the aqueous vapour, without whose unvaried presence no commonly cultivated plant could flourish, and few exist at all. Providence, therefore, has ordained that this should be ever ready to meet the demands of vegetable life, and that its quantity should vary with the temperature, increase with the warmth when its pressure is most needed by the plant, and diminish in proportion as the air becomes cooler. Thus, at a temperature of 50°, supposing it to have a free communication with water, the atmosphere contains about 1-75th of its weight of vapour; but
when its temperature is increased
then its proportion of water is
to 1-21st of its weight; and t
tiful arrangement is the more i
as Davy well observed, in the
of nature, because in very inte
and when the soil is dry, the life
is mainly, if not entirely, preserv
absorbent power of their leaves,
earth in which they grow, and ha
watery vapour is most abundant
mosphere when it is most neede
purposes of life: when other sour
supply are cut off, this is most
The amount, however, of the atm
vapour varies with the kind of win
which have passed over warm sea
more than those which have trav
tensive dry countries; that whic
the hot dry sands of Asia, and
Africa, is so dry that it scorches a
all the adjoining countries, — it is
of the sirocco of Malta being so
and why the English farmer finds
easterly wind, the driest of all o
is the least propitious to vegeta
well knows, on the other hand,
westerly or south-western breezes,
watery of all winds, which come to
surcharged with all the vapours o
lantic, are precisely those which b
them luxuriance to his crops, a
his woods with verdure.

The cultivator will derive man
tages from a careful investigatio
support yielded by the vapour o
mosphere to his plants. He will
that its unvaried presence affords
tional reason why the air should b
to circulate freely through the
verised and loosened soil, to the ro
growing crops; and let him, a
avoid the very common erroneou
sion, that the atmosphere is ever
it no longer contains watery va
the real fact is, he will find the
posite to the common vulgar co
The chemist's laborious investigati
clearly demonstrated, that the
watery vapour varies in amount,
never absent from the atmosphere,
it happily always the more aboun
the cultivator's crops need its
most; it is then the most able t
the roots of his corn with all the
they require; and if it is unable
trate to them, the fault is not in the
nomy of Nature, but in the carel
the cultivator, who is either too in
to see the advantages which he m
freely derive, or too indolent to lo
case-hardened soil, which prevent
trance of the requisite supply of

nstead of prejudicing his crop by
the moisture, as is often igno-
posed, something is evidently *let*
il; for the portion thus tilled will
sibly increased in luxuriance by
manual labour thus bestowed;
s experiment, which I have often
supposing that both the portions
und are equally free from weeds;
ery other respect the treatment
e tilled and undisturbed portions
erimental plot is exactly the same.
great extent some of the best of
h farmers have long found out
s, and have acted upon the dis-
The horse-hoe of the east and
England, in the driest days of
nay be seen at work in the large
ip-fields of Norfolk and Suffolk
ried regularity, not for the mere
n of weeds, for these are not the
tenants of such skilful farmers'
for the chief and highly beneficial
increasing the circulation of the
vapour of the air. "The longer
ring the soil between my turnip
id Lord Leicester to me some
, "in dry weather, the better the
ow."

ne uniform presence of aqueous
ich marks the atmosphere in all
seasons, in a still more remark-
ee distinguishes its constituent
these never vary in amount in
, or seasons, or countries. The
ic air has been analysed, when
from the lowest valleys, and the
e highest mountains, in crowded
in the open country, but its com-
as always found to be the same,
21 per cent. of oxygen, and 79

certain, though they are too subtle to allow the chemist to detect them: thus, to such finely divided matters the physician attributes the progress of contagion — the chemical philosopher the aroma of flowers, and of many other substances. Certain diseases follow the course of particular winds; and the stones or fire-balls, and similar substances, which have in all ages been seen to fall from the atmosphere, completely baffle the scientific conjectures of the meteorologist. With such speculations, however, the cultivator need not disturb himself: resting contented with the knowledge he possesses of the invaluable and essential powers of the known gases and vapour of the atmosphere to assist and sustain the growth of his crops, and adopting in consequence those improved modes of cultivation which that knowledge suggests, he will patiently await the time when the future discoveries of science shall still farther enlarge his sphere of usefulness, by enabling him to draw forth those latent powers of production which, there is every reason to believe, yet remain hidden in the soil. (*Quart. Journ. of Agr.* vol. ii. p. 32.)

Some curious experiments upon *the gases hurtful to vegetation* were made by M. Macaire. Some plants of euphorbium, mercury, groundsel, cabbage, and sowthistle, with their roots, were placed in the morning in a large vase into which chloride of lime had been introduced. The roots were then separately soaked, and the quantity of chlorine disengaged was by no means sufficient to destroy the vegetable tissue. At night the plants had not suffered, and the smell of the chlorine was unchanged. The same plants placed in the same vase without any addition of chlorine, were found quite

Similar results were obtained when the vapour of nitric acid was employed, nitrous acid gas, sulphuretted hydrogen, and muriatic acid gas; and, as a general conclusion, M. Macaire was of opinion, from these trials, "that many of the gases are hurtful to vegetation; but that they act on them only during the absence of light." (*Quart. Journ. of Agr.* vol. v. p. 301.)

GAS-WORKS, *the Refuse Matters of, as Fertilisers.* It is only within these few years that the attention of the farmer has been attracted to the various matters produced by the gas works now so common in all parts of the kingdom. This attention, however, is confined at present to only particular localities: while in one district it is zealously used, and bought up with avidity, in others it appears to be totally neglected. In the vale of Kennet the farmers clear away from the gas-works all the refuse matters they can obtain, even at advanced prices. Those of the valley of the Itchin, in Hampshire, find it, in small proportions, an excellent dressing for grass.

The refuse matters which are produced during the distillation of pit coal in the gas-works, consist of three substances; the ammoniacal liquor, the hydro-sulphuret of lime, formed by passing the gas through lime to deprive it of its sulphuretted hydrogen, and the coal-tar; these substances are worthy of the cultivator's attention, for they are all fertilisers of considerable value. Let us examine them in the order in which I have enumerated them.

1. The *ammoniacal liquor* obtained from gas-works is an impure solution of the carbonate and acetate of ammonia; and these salts, there is little doubt, not only act as stimulants to plants, but both the acids and the ammonia, when decomposed, furnish direct food to, or constitute parts of, vegetables. Carbonate of ammonia has been detected in the stinking goose-foot (*Chenopodium olidum,*) by MM. Chevalier and Lassaigne, and it probably exists in other plants which are distinguished for their powerful disagreeable odour. If the plants do not contain ammonia, or its salts, it is the ammonia either in the soil or the air which affords them the nitrogen which enters into their composition. (*Annals of Phil.* vol. xii. p. 231.) Hydrochlorate of ammonia has been found in wood by M. Chevreul. (*Ann. de Chim.* 68. p. 284.)

There are many testimonials in favour of the use, as fertilisers, of the salts of ammonia, either in their pure state, or as found in an impure combination with soot, or in the liquor of gas works. "Soot," said Davy, "owes part of its efficacy to the ammoniacal salt it contains. The liquor produced by the distillation of coal contains
and acetate of ammonia, and is sai
very good manure. In 1808, I
that the growth of wheat in a fiel
hampton was greatly assisted b
weak solution of acetate of
(*Lectures*, p. 342.) The experi
Mr. Robertson with soot clearly
fertilising effects of the soluble po
which is principally the salts of
He mixed together, in order to for
manure, six quarts of soot in a h
water. "Asparagus, peas, and a
other vegetables," says this intelli
ticulturist, "I have manured with
ture with as much effect as if I
solid dung; but to plants in pots
larly pines, I have found it
adapted; when watered with it th
a dark healthy green, and grow
luxuriant." (*Gard. Mag.* vol.
Care must be taken in using th
other liquid fertilisers, not to
solution too strong; it is an error
all cultivators are apt to fall in
experiments. Davy was not an
from making his liquids too conce
obtained results which widely dif
his later experiments. (*Lecture*
There is no doubt but that the s
monia, and all the compound man
contain them, have a very c
forcing or stimulating effect up
tion. In the experiments of D
upon the common garden cress,
ing them with a solution of ph
ammonia, the plants were fiftee
warder than other plants growin
milar circumstances, but watered
water; and he also describes the
of a Mr. Gregory, who by wa
half of a grass field with uri
abounds with the salt of ammon
doubled his crop of hay. (*Com
of Agr.* vol. iv. p. 416.)

"It is probable," says Mr. Han
the ammoniaca liquor which abou
works, and which, when former
to run waste into the Thames, w
destroy the fish and prejudice t
of the river water for human co
and which is still thrown away t
the country, except at a few w
they manufacture sal ammoniac
long, be extensively used as
either through the interventi
water cart, or for the process of
and decomposing soil or vegeta
A very satisfactory illustration,
scale, has recently been submitt
Pain. He put into a vessel som
trees, saw-dust, chopped straw, a
which he applied ammonia, and

In about three weeks the whole was ced to a slimy mass: he then stirred it, added a little more ammonia; and submitted to the English Agricultural ety, it was reduced to a black mass of table mould, strongly impregnated with ile salts, and in comminuted particles ar to surface peat mould. When ap- in its liquid form to grass, like salt, parently destroys the plant; but the s distinguished by increased verdure acceeding year." (*Eng. Agr. Soc.* s. vol. i. p. 46.)

r. Paynter, of Boskenna, in Cornwall, iven the result of an experiment made "the water in which street gas had cleansed, on a piece of barley land. uarter of an acre was taken in the le of a field of rather close soil, in a te district. The land was of average ity; the gas water was distributed over quarter acre by a contrivance resem- that of a common watering cart, and e rate of 400 gallons to the acre: about ek before seed time, the rest of the was manured in the usual way. The rence both in colour and vigour of the y plant was so strikingly in favour of part manured by the gas water, that ns passing within view of the field st invariably came to inquire about the . The yield also was superior, as well e after-pasture, the field having been down with the barley." (*Ibid.* p. 45.)

e refuse Lime of Gas-Works.— This er is produced by passing the gas gh dry lime, in which operation the combines with a quantity of sulphur- d hydrogen, from which the coal gas purifying, and is partly converted hydro-sulphuret of lime: in the state the powder is usually vended by the manufacturers, it contains a consider- portion of uncombined lime. The -sulphuret of lime has a bitter and taste; it is soluble in water, and has peculiarly disagreeable smell of sulphu- d hydrogen. When mixed with or ed upon the soil, it gradually decom- s, a portion of hydrogen separates from nd it is converted into sulphuret of , which by absorbing oxygen from the sphere, finally becomes sulphate of . There is no reason, therefore, to doubt rtilising properties of this manure; but too powerful in its effects upon vegeta- to be used in the large proportions in h it has been sometimes employed; and uld not, for these reasons, be added e soil immediately in contact with the . It is generally to be obtained at a moderate rate, and by its gradual con- on to sulphate of lime (gypsum), it must be a very excellent addition to those soils which are described by the farmer as having become "tired of clover."

"In many parts of the country," says Mr. Handley, "where gas-works are established, the refuse has become an object of interest to the agriculturist, as containing many of the essentials of the most effective manures. The refuse lime which was formerly an inconvenience to the manufacturers, and was carted away as valueless rubbish, is now contracted for by the neighbouring farmers (in an instance within my own knowledge at 7*s.* 6*d.* per chaldron), and applied either in compost, or in a direct form, to the land, where, in addition to the usual operation of lime, it is said to furnish a protection against many of the noxious grubs and insects." (*Ibid.*)

Gas Tar.— This substance being produced in smaller quantities, and employed very commonly as a paint, has not been used as a manure to any extent; but whereever it can be obtained (as I am aware it can in some places, almost for the expense of carriage), it is an article every way worthy of the farmer's notice. It is composed entirely of substances which enter into the composition of all plants, is gradually decomposed in the soil, is powerful in its effects, and still more so, from its containing a considerable portion of the carbonate and acetate of ammonia; hence it is best applied mixed with earth, so as to be easily and evenly spread over the ground. These facts will explain some of the phenomena witnessed in the recent experiments of Mr. Bowley with gas refuse, at Sidington, Gloucestershire. He says (*Farm. Mag.* vol. ix. p. 197.), "I have long used the refuse of the gas-house as a manure; my usual practice is to form out my compost-heap with long dung about three feet deep, pour the coal tar regularly over it, then put another layer of dung or turf, throw up the lime on the top, allow it to remain in this state two or three months before it is turned. The lime should not be under the tar in the first instance as the tar will find its way through the dung, and unite with the lime into a hard cement, in which state, even if, with considerable labour, it is broken into small particles, I believe it to be of little service on the land.

"After pursuing the above system for some time, I resolved to try some experiments with each in its unsophisticated state. I accordingly commenced with the tar, which I had poured out of a watering-pot, in a small stream, regularly over about half an acre in a field of rye-grass; this was done in February, 1838. Soon afterwards, the seeds presented the rather singular appearance of having been burnt in stripes with a hot iron, for the tar had completely destroyed all it touched, and I was told I had poisoned the land, and it would never recover itself; however, in June, I noticed that the grass between the streams of tar looked more luxuriant, and the sheep fed on it in preference to the other parts of the field. In the autumn the whole was ploughed, and sown with wheat, which looked much more flourishing on the half-acre dressed with tar than any where else; the difference was so conspicuous from the first, that the most casual observer could not pass without remarking it; and at the present time (August, 1839), there is a heavy crop on it ready for the sickle, while the rest of the field is light, and will not be ripe for a week or ten days. I put some tar in the same way on a piece of land, a month before it was ploughed for spring vetches; the vetches were sown two weeks after the plough, and many of them were destroyed; but the crop of wheat which succeeded was benefited equally with the one in the other experiment. I have tried the lime with great advantage, putting from twelve to fifteen cart-loads to the acre, but I find it is better to remain a time before it is ploughed in. All these experiments were tried on a cold sandy clay, worth about 10*s.* per acre." In these experiments, the quantity applied per acre was too large, and the manure in a state much too powerful. It was only where it had become diffused through the soil by time, that its fertilising powers were apparent.

Coal tar is much improved in effect, when employed as a coating for palings, by mixing it with a small portion, say one fortieth of its weight of grease; this is easily united by heating the tar.

GATES. Good gates, (say the Messrs. Ransome and Mr. Arthur Biddell, to whom I am indebted for this article,) are no less essential to the respectable appearance of an estate, than they are necessary for the convenience of an occupier. There are few outgoings that cost so much and are so little thought of, as the repairing and renewing gates upon enclosed stock farms. These considerations induced us to seek information to enable us to point out defects in the common construction of farm-gates, and to give a better plan. The usual defects are,

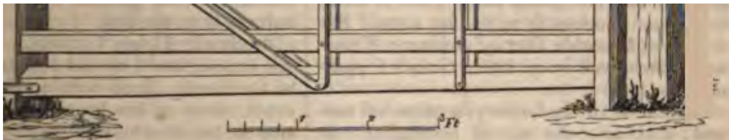
1st. Not sufficient height, so that horses and large cattle, when pushing against the gate, break it, however strong it is, as the back thereof comes in contact with that part of the chest of a horse where the collar goes, and without inconvenience he leans his weight against the opposing bar, which, if a few inches higher, presses against his
neck and windpipe, and he makes
pression upon it.

2d. They are generally hinge-bo
that in attempting to lift up the hea
is often required to be done, the le
braces are either pulled from the b
or broken therein; the person li
head having a nine-feet leverag
enables him to do this mischief.

3d. The places of contact bet
brace and the uprights and the l
broad, and it being impossible to k
places of contact dry, the parts be
maturely decayed.

We have lately inspected gates
used many years by Mr. A Biddell,
sive farms near Ipswich, which ob
defects, and are found in the en
than any other gates, although rath
sive in the first cost. Instead of b
pending irons are used to prevent
from dropping at the head. These
shown in the annexed plan: they
in one piece, go on both sides of
are rivetted through the back a
with thick lead or zinc collars be
iron and the wood; clasp round
head to form the upper hanging
out being welded into a close eye,
the gate would be confined, and at
ledge turn up to form one of th
iron uprights. The second pair o
are also rivetted through the le
thick small lead collars to prevent
from injuring the wood; and w
piece of zinc for the same reason,
the iron and the back of the ga
whole of the irons and rivets we
one pounds for a gate. A gate n
sawn young fir-trees, and havin
vantage of such irons, will last a g
years. If cut out of good timber, t
planks nine feet long, there is n
of stuff wasted. The eye for th
the lower iron is made oblong, to
gate room to rise. The only faste
are chains, eighteen inches long,
the top of the post to a hook near
dle of the fore head, which takes
weight of that end of the gate, an
its giving a little way outward.

Having summed up in brief th
imperfections of gates, and give
an improved one, combining the
objects, strength and lightness,
very little further practical inform
the construction of gates must n
depend, in a great measure, upon
poses to which they are to be ap
locality, the materials at hand,
means of the farmer. Much has be
on the subject, and I may refer
article on gates in the *Quar. J*



.; and to another in the *Trans.*
Soc. vol. ii. p. 260., where a self-
uited for the entrances to parks
oaches to mansion houses, is
lescribed. There is also a use-
On the Construction of Gates
mon purposes of a Farm, the
eir Decay, and the manner of
em," in the *Commun. to Board*
vii. p. 144.
ING. Provincially, rolling
into cocks or bundles.
IND. An ancient custom or
xed to all lands in the county
specially exempted), and some
f England, and which exten-
s in Ireland, by which the land
is equally divided at his death
sons, or the land of the bro-
all his brethren if he have no
wn. Tenure in gavelkind is
y Blackstone to have been in
free socage. In most places
d tenant had the power of de-
ll before the statute of wills.
stom seems to have been pre-
ales, where all gavelkind lands
descendible to the heir at com-
stat. 34 & 35 H. 8. c. 36. In
ds have for the most part been
or deprived of their customary
quality by particular statutes;
Kent are presumed to be gavel-

gument (says Mr. Ross) the smaller Irish landholders continue to divide their farms among their children, and these divide on until division is no longer practicable; and, in the course of two or three generations the most thriving family must necessarily go to ruin.

GEERING. A term provincially applied to the ladders and side-rails of a waggon.

GEERS. A country phrase for the harness of draught or team horses.

GELATIN. In chemistry the name given to an abundant proximate principle in animals. It is confined to the solid parts of the body, such as tendons, ligaments, cartilages, and bones, and exists nearly pure in the skin; but it is not contained in any healthy animal fluid. Its leading character is the formation of a tremulous jelly, when its solution in boiling water cools; and it may be repeatedly liquefied and again gelatinised by the alternate application of heat and cold. Isinglass, glue, and size are various forms of gelatin, the first being this substance in a very pure state, obtained by washing and drying the swimming bladder of the sturgeon (*Acipenser Huso*) and some other fish. Its most distinctive chemical character is the formation of a dense white precipitate when its solution in warm water is poured into an infusion of galls, or that of any other astringent vegetable; the substance formed in such cases is a tannate of soil, in a degree which could scarcely be imagined by one totally unacquainted with the influence which it possesses." See also *Ibid.* p. 417., and Mr. Martin "On the Geology of Morayhire," (*Trans. High. Soc.* vol. iii. p. 417.)

As my observations on geology in this work will be chiefly confined to its connection with practical agriculture, I shall not detain the farmer with any of the valuable geological researches which extend far beneath the earth's surface. Indeed, as Professor Brande remarks in his *Outlines of Geology*, p. 32. when speaking of geology, "Its first and leading object is to become practically acquainted with the present state of the earth's external structure, for excepting of its crust or rind, we know nothing; and all that has been suggested either by theory or experiment, relating to its internal *composition*, its density, and the constitution of the entire mass, is mere surmise and guess work, — deductions hastily drawn from superficial observation or unwarranted inferences from imperfect researches." To the student who wishes to make himself practically master of the science, I commend these lectures of Professor Brande, as well as the *Outlines of the Geology of England and Wales*, by Conybeare and Phillips. To the practical intelligent farmer the work *On Soils*, by Mr. John Morton, will also be very valuable. To this excellent little book I gratefully acknowledge my obligations in this and many other articles.

The best popular description, perhaps, of the position in which the various strata of the earth are placed is that long since given by Mitchell. "This very ingenious writer," says Brande (*Outlines*, p. 13.), "describes the general appearance of the strata, points

follow, that we ought to meet wit
kinds of earths, stones, and min
pearing on the surface in long nar
and lying parallel to the greatest r
large ridge of mountains, and so, i
find them.'" (*Phil. Trans.* 1760.)

And this system of layers or
only marks the arrangement of
masses of which our earth is comp
it is that of the very rocks thems
is to us attended with many advant
as the formation of springs, — the
tion of soils,—which last is that all
Dr. Paris, *On the Soils of Cornwa*
phenomenon of stratification, wh
well characterised in clay slate, I h
regarded as a wise provision of
facilitate its decomposition, and
the descent of the roots of trees:
idea is further strengthened whe
cover that this structure is almos
confined to secondary rocks, whose
and nature render them capable o
tion: they are all, for instance, res
gently undulating hills, and by fa
composition they form rich and fe
Primitive formations, on the contra
possess no such structure, disinte
rugged piles, whose declivities are
to admit the accumulations of soil,
not, therefore, ever constitute the
parts of the globe; and, as far as
logical knowledge will allow us
ralise, it would appear that primit
are accumulated towards the poles,
the great mass of secondary form
found to occupy the middle and
latitudes, principally between the
55th degrees, which constitute a
the globe eminently calculated for
of man, and the animals which ar

and indefinitely blended rather
rict chemical combination, consti-
ry large relative proportion of
y masses, or scattered or com-
ubstances, which form, or have
e most exterior constituents of
, and of these, considered in the
the chemical and mineralogical
soon told." Of that brief his-
ver, it will be well for the farmer
general knowledge. Davy de-
em with a view to assist the
his tillage operations long since.
ry clearly the importance of the
practical agriculture, and what
e so well it is useless for me to
describe in different language.
" said that sagacious philosopher,
rally divided by geologists into
divisions, distinguished by the
primary and secondary. The
cks are composed of pure crys-
ter, and contain no fragments of
. The secondary rocks, or strata,
y partly of crystalline matter;
gments of other rocks or strata;
nd in the remains of vegetables
e animals; and sometimes con-
emains of land animals. The
primary rocks which are com-
erved in nature are eight:—1.
omposed of quartz, felspar, and
n these are arranged in regular
he rock it is called *Gneiss*. 2.
schist, composed of quartz and
Sienite, which consists of horn-
l feldspar. 4. *Serpentine*, com-
felspar and resplendent horn-
5. *Porphyry*, which consists of
. *Granular* marble or pure car-
lime. 7. *Chlorite schist*, a green
bstance somewhat analogous to
elspar. 8. *Quartzose rock*, com-
uartz. The secondary rocks are
rous than the primary; but 12
clude all that are usually found
lands:—1. *Grauwacke*, which
fragments of quartz or chlorite
edded in a cement principally
of felspar. 2. *Siliceous sand-*
h is composed of fine quartz,
ited by a siliceous cement. 3.
or *carbonate of lime*, more com-
texture than in the granular
d often abounding in marine
. *Aluminous schist*, or *shale*, con-
the decomposed materials of dif-
s, cemented by a small quantity
ous or silicious matter, and often
the impressions of vegetables.
ous sandstone, which is calcareous
nted by calcareous matter. 6.
formed of nearly the same materials as aluminous schist or shale, but containing a much larger quantity of oxide of iron. 7. *Basalt*, or *whinstone*, which consists of felspar and hornblende. 8. *Bituminous*, or *common coal*. 9. *Gypsum*, or *sulphate of lime*. 10. *Rock salt*. 11. *Chalk*, which usually abounds in remains of marine animals, and contains horizontal layers of flints. 12. *Plum-pudding stone*, consisting of pebbles cemented by ferruginous or silicious cement." (*Elem. Agr. Chem.* p. 192.)

"The highest mountains in these islands, and indeed in the whole of the old Continent," adds Davy, "are constituted by granite; and this rock has likewise been found at the greatest depths to which the industry of man has yet been able to penetrate; micaceous schist is often found immediately upon granite, serpentine or marble upon micaceous schist; but the order in which the primary rocks are grouped together is various. Marble and serpentine are usually found uppermost; but granite, though it seems to form the foundation of the rocky strata of the globe, is yet sometimes discovered above micaceous schist. The secondary rocks are always incumbent on the primary: the lowest of them is usually grauwacke; upon this limestone or sandstone is often found. Coal generally occurs between sandstone and shale: basalt often exists above sandstone and limestone; rock salt almost always occurs associated with red sandstone and gypsum. Coal, basalt, sandstone, and limestone are often arranged in different alternate layers, of no considerable thickness, so as to form a great extent of country." (*Ibid.* p. 195.)

The formation of a soil from the different strata by natural causes is well described by the same great chemist. "It is easy," he says, "to form an idea of the manner in which rocks are converted into soils by referring to the instance of *soft granite* or *porcelain granite*. This substance consists of three ingredients, quartz, feldspar, and mica. The quartz is almost pure siliceous earth, in a crystalline form. The feldspar and mica are compound substances: both contain silica, alumina, and oxide of iron; in the feldspar there is usually lime and potassa; in the mica, lime and magnesia.

"When a granitic rock of this kind has been long exposed to the influence of air and water, the lime and the potassa contained in its constituent parts are acted upon by water or carbonic acid; and the oxide of iron, which is almost always in its least oxidised state, tends to combine with more oxygen; the consequence is, the feldspar decomposes, and likewise the mica, but the first the more rapidly. The feldspar, which is, at it were, the cement of the stone, forms a fine clay. The mica partially decomposes, mixes with it as sand, and the undecomposed quartz appear as gravel or sand of different degrees of fineness.

"As soon as the smallest layer of earth is formed on the surface of a rock, the seed of lichens, mosses, and other imperfect vegetables which are constantly floating in the atmosphere, and which have made it their resting-place, begin to vegetate. Their death, decomposition, and decay afford a certain quantity of organisable matter, which mixes with the earthy materials of the rock; in this improved soil more perfect plants are capable of subsisting; these, in their turn, absorb nourishment from water and the atmosphere, and, after perishing, afford new materials to those already provided. The decomposition of the rock still continues, and at length, by such slow and gradual processes, a soil is formed in which even forest trees can fix their roots, and which is fitted to reward the labour of the cultivator." (*Ibid.* p. 189.)

That the geological formation of the soil influences to a considerable degree its relations to a fertilising supply of moisture, was thus noticed by Dr. Paris when addressing a Cornish Agricultural Society: — "There is a popular adage well known to all the members of this society, that 'the land of Cornwall will bear a shower every week-day, and two upon a Sunday,' — the fact is, that the shallowness of the soil, and the nature of its rocky substratum, render a constant supply of moisture indispensable; and here we cannot avoid admiring the beautiful contrivance of nature in connecting the wants and necessities of the different parts of the creation with the power and means of supplying them; thus, in rocky countries like Cornwall, where the soil is necessarily greedy of moisture, the very cause which creates this want is of itself capable of supplying it; for the rocks elevated above the surface solicit a tribute from every passing shower, while in alluvial and champaign countries, where the soil is deep and rich, and consequently requires less moisture, the clouds float undisturbed over the plains, and the country frequently enjoys that long and uninterrupted series of dry weather which is so congenial to it. As a general rule it may be stated, that to obtain the greatest fertility the proportion of siliceous sand in a soil ought to increase in proportion to the quantity of rain that falls, or rather perhaps to the frequency of its recurrence; for one of the effects of silex is to diminish in the soil its power of absorbing moisture: we accordingly find that in the rainy climate of Turin the most prolific soil has from 77 to 80 per cent. of siliceous earth, and from 9 to 14 of calcareous, whereas, in the neighbourhood of Paris, where there is much less rain, the silex bears only the proportion of from 26 to 50 per cent. in the most fertile parts; and I have found some of the most productive corn lands in the parish of St. Burian to contain as much as 70 per cent. of that earth." See EARTHS, THEIR USE IN VEGETATION.

It will perhaps considerably assist the cultivator in his examination of the different geological formations to which he may have to direct his attention, if, before we commence a rapid examination of the different strata of which our island is composed, we first examine the chemical composition of a few of the stones and other substances of which the rocks of those strata are chiefly formed.

Common Mica.— This stone is composed, according to the analysis of M. Klaproth, of —

	Parts.
Silica	47·
Alumina	20·
Oxide of iron	15·5
Oxide of manganese	1·75
Potash	14·5
Loss	1·25
	100·

Common felspar, according to M. Vauquelin, is composed of —

	Parts.
Silica	62·83
Alumina	17·02
Lime	3·
Oxide of iron	1·
Potash	13·
Loss	3·15
	100·

The decomposing felspar of Cornwall is composed, according to Mr. Wedgwood, of —

	Parts.
Alumina	60
Silex	20
Moisture and loss	20
	100

Brande found in a specimen of pale flesh-coloured felspar from the Alps —

	Parts.
Silex	68·
Alumina	20·
Potash	8·50
Lime	2·
Oxide of iron	0·50
Loss	1·20
	100·

on hornblende was found by M.
to contain —

	Parts.
a	42·
nina	12·
e	11·
nesia	2·25
le of Iron	30·
le of Manganese	0·25
er	0·75
	1·75
	100·

on serpentine contains, according
uquelin —

	Parts.
a	44·
nesia	44·
nina	2·
le of Chromium	2·
le of Iron	7·3
le of Manganese	1·5
	100·8

er specimen examined by Dr. John
d to contain —

	Parts.
a	31·50
nesia	47·25
nina	3·
e	0·50
	5·50
le of Manganese	1·50
er	10·50
	99·75

contains —

	Parts.
e	56·5
onic acid	43·
er	·5
	100·

on compact limestone contains —

	Parts.
e	53·
onic acid	42·5
er	1·63
a	1·12
nina	1·
le of iron	0·75
	100·

sian limestone, from Sunderland,
, according to Dr. Thomson (*Sys-
hem.* vol. iii. p. 396.) —

	Parts.
onate of lime	56·8
onate of magnesia	40·84
le of iron	0·36
, water, &c.	2·
	100·

Quartz, according to the analysis of M. Bucholz, is composed of —

	Parts.
Silica	97·75
Alumina	0·50
Water	1·
Loss	0·75
	100·

Porcelain earth was analysed by Mr. Rose (*Jameson's Min.* vol. i. p. 298.): he found in it —

	Parts.
Silica	52.
Alumina	47·
Oxide of iron	0·33
Loss	0·67
	100·

Potter's clay, according to M. Vauquelin, contains —

	Parts.
Silica	43·5
Alumina	33·2
Lime	3·5
Oxide of iron	1·
Water	18·
Loss	0·8
	100·

Clay slate is composed of —

	Parts.
Silica	48·6
Alumina	23·5
Magnesia	1·6
Peroxide of iron	11·3
Oxide of manganese	0·5
Potash	4·7
Carbon	0·3
Sulphur	0·1
Water and volatile matter	7·6
Loss	1·8
	100·

Common clay is merely a mixture of alumina with silica, in endless proportions. The alumina is in the form of a very impalpable powder; but the silica, says Dr. Thomson, is almost always in small grains, large enough to be distinguished by the eye. Clay, therefore, exhibits the characters of alumina, and not of silica, even when this last ingredient predominates. Besides alumina and silica, clay often contains carbonate of lime (chalk), carbonate of magnesia, carbonate of baryta, oxide of iron, &c. (*Chem.* vol. iii. p. 341.)

Loam may be regarded as a very impure potter's clay united with iron, ochre, and mica.

Basalt is composed, according to Mr. Kennedy (*Edin. Trans.* vol. v. p. 89.) of—

	Parts.
Silica	48
Alumina	16
Lime	9
Soda	4
Oxide of iron	16
Muriatic acid	1
Water	5
Loss	1
	100

Chlorite earth is composed of —

	Parts.
Silica	50·
Alumina	26·
Lime	1·5
Oxide of iron	5·
Potash	17·5
	100·

Gypsum, of which there are several varieties, is composed of —

	Parts.
Sulphate of lime	79·32
Water	20·68
	100·

The cultivator, therefore, must take it as an axiom in his geological observations, that the earthy composition of the surface soil almost always partakes of the nature of the rock or subsoil on which it immediately rests, and from which, in fact, it has been generally thus formed, in the progress of time, by various external agencies.

Alluvial soils, perhaps, are the most extensive exceptions to this remark, for they are formed commonly of the materials of different strata, brought from various distances by the flood waters, and mingled together, often in very confused, yet most commonly in very fertile proportions. (See ALLUVIUM.) Of this description of soil there are in our island many valuable tracts, such as that extending from Lynn, through Lincolnshire to the Humber, and thence to Bridlington. Both sides of the valley of the Thames, about Sandwich in Kent, Romney Marsh, between Bristol and Bridgewater, and Liverpool and Lancaster, and on the banks of the rivers Forth and Tay in Scotland. "This kind of soil," says Mr. Morton, "is always fertile, free in its nature, and easily cultivated; is fitted for the production of every variety of crop, which it brings to the highest perfection, and produces in the greatest abundance. This formation is perfectly dry. About one half of all the alluvial accumulations may be in tillage, and the remaining half in meadow and pasture land." (*On Soils*, p. 10.)

Diluvium is the geological name
masses of soil, composed of sand
&c., which are found to a consider
tent in most parts of our island,
some of the older formations. I
rious composition: when it is fou
on the tertiary and chalk format
usually composed of red clay an
flints. In Dorsetshire the diluviu
monly composed of a mixture of
gravelly flints. In Kent, Berkshi
shire, Sussex, Surrey, and other
rolled flints are mixed with a ten
clay. "Most of this soil," says
ton, "is in arable culture, and
turnips, barley, oats, wheat, cl
when under proper management,
a useful soil. The tenacious cla
expensive in the cultivation, as
difficult to work, except betwe
dry. The greatest improvement
been made in this soil is by the
of chalk." The larger portion
and Norfolk is composed of
sand, resting on chalk or marl.
trict is very level: it extends fro
to Bungay and Cromer, from So
Shelford, and from Swaffham
mouth. Resting as it does on
substratum, the excellent cultiv
district have gradually and p
improved the soil by bringing t
marl to the surface, and spread
the land at the rate of about
yards per acre: in this way
warrens of blowing sands have
proved so as to yield excellen
corn, and rentals have been i
raised from a few pence to 20*s.*

Peat Soils.—These abound in
tions of the United Kingdom. I
ties of Lincoln, Huntingdon, No
Cambridge, Norfolk, Somerset,
Yorkshire, and the more northe
Their best mode of improvement
by mixing them with the earths.
SOILS.

The London Clay Formatio
formation extends with little i
from Orford in Suffolk to M
Colchester, Maldon, London,
Staines, Oakingham, Strathfiel
Rotherwick. There is also a
able extent of this formation
called the Isle of Wight Basin, f
church to Ringwood and South
thence through Tichfield and
to near Worthing. There are
in this formation. It is so close a
as to be completely impervious
therefore prevents the water wh
plastic clay below from coming
it. It is of a black or bluish

il is materially improved by the
of chalk, sand, or marl. In the
hood of London it is enriched by
anure.

Clay.—" This formation," observes
n, "occupies the space between the
ay and the upper chalk, and is com-
n indefinite number of beds of clay
of every variety of colour,—white
e, purple, bright yellow, orange,
The sand alternates with partings
th of which are sometimes as thin
oard; although in some places the
of the sand and of the clay are
t in thickness." Composed chiefly
nd clay coloured with iron, it has
ly in it veins of white clay capable
nade into tobacco-pipes. It fol-
outline of the London clay. It
t a breadth of about ten miles
Horsham to Braintree and Wal-
ss: hence, but in a diminished
Hatfield, Watford, Salthill, Read-
Hungerford, Odiham, Guilford,
and Dartford. It is found again
cted chain near Dorchester, Poole,
, Fareham, Chichester, and Arun-
very variety of soil," adds Mr.
may be met with in a short dis-
er the whole of this formation,
owing to the rapid succession of
clay, and the other materials of
onsists."

st mode of improving the soil of
clay is by drainage and the mix-
ther soils, as very commonly fol-
the Norfolk and Suffolk farmers.
astic clay sand, where it rests on
alk, by chalking or claying it at
f 100 cubic yards per acre once in
ht years; or where it rests as in

Barton, Hull, and Beverley; and again from Dover to Chatham, Guildford, Farnham, Winchester, and Salisbury. "The water which comes from below the lower chalk," says Mr. Morton, "is pure and limpid, and delicious to drink. It contains carbonate of lime, and is of the best quality for watering meadows: hence the best water meadows are in the chalk valleys." The soil of the chalk formation is composed of chalk and flint in various proportions. These soils are materially improved by a mixture with those of the green sandstone formation, and by enclosing into much smaller fields than those into which they are at present generally divided.

Green Sand Formation.—This formation is found under the chalk. It is formed of a variety of beds: the upper beds near the chalk have a green or greyish colour, the lower beds, which are commonly much thicker, vary in colour from yellow to brown and red. It is composed of silicious sand, mixed with mica and chlorite. "The means of permanently improving this soil," says Mr. Morton, "after it is drained and enclosed (if for pasture), are so immediately within the reach of the farmer, that he can at little comparative expense improve its texture, and permanently increase its productiveness, by chalk or chalk marl, on the one hand, and the oak or clunch clay, on the other; but even without the application of these substances, deep or double ploughing or trenching has the effect of deepening the soil, and increasing its capability. When mixed with the chalk marl above it, it has the power of receiving and transmitting moisture more freely, and is neither so easily injured by wet weather nor by excessive droughts as other soils which the wealds of Sussex, Surrey, and Kent are chiefly composed. "It is formed," says Mr. Morton, "of various layers of a whitish, yellowish, fawn, or buff-coloured clay. These beds are sometimes of a thin slaty nature, and some of them have the appearance of tile or shale in their composition. They are composed of very minute particles of clay and sand, in an impalpable state of division, but in close mechanical contact: so minute, indeed, are the parts, that no particle can be perceived by the touch, and there are neither stones, gravel, nor calcareous matter in any of the beds of this formation. It extends from Bonnington, in Kent, by Tunbridge, Crawley, Haslemere, Petworth, and Hailsham, to the beach in Sussex: when ploughed, it cuts like a piece of soap, and the furrow turns over unbroken. The peculiarity of this soil is the minute division of its parts, the silicious matter being so very fine, and the clayey particles being equally minute, they form a close firm paste, which dries into a substance almost as hard as brick, and which the roots of vegetables are unable to penetrate. From the great expense in cultivating this soil, a considerable portion of it is in woods, some in poor wet pasture, and the remainder under the plough. The sources of improvement are drainage, the subsoil plough, chalk, or lime." (*Morton on Soils*, p. 49.)

Iron Sand, or Hastings Sand. — A very fine white, yellow, or red sand with clay. The largest formation of this sand is from Hastings in Sussex to the river Arun, with a breadth of about twelve miles. Deep ploughing, and the addition of calcareous matters, are amongst the chief sources of improvement for the soils of this formation.

Coral Rag. — Aylesbury and *Portland-stone*. There are several varieties of these, all calcareous. This formation is found near Devizes, and thence extends to Farringdon and Abingdon.

The Oxford Clunch, or Fen-clay, is composed of clay of a blue colour, mixed with bituminous shale and septaria. "It forms," says Mr. Morton, "the foundation of the hills which are capped by the coral rag. The extent of this formation is considerable; from near Crewkerne it passes to Mere, Oxford, Fenny Stratford, Bedford, Kimbolton, to Peterborough. It then disappears under the fen-land, but is found every where under the peat at the distance of a few feet. At Bourn it again comes to the surface, and continues its course to Folkingham, Lincoln, Barton, &c.: no springs are found in it. The richest and most productive pastures are on the soil of this formation, but there is every shade of qual
(*On Soils*, p. 56.)

Oolite Formation. — "This is compo
adds Mr. Morton, "of various members
shelly oolite (sometimes called forest-
ble), cornbrash, stonebrash, a bluish ra
limestone, weatherstone, or shelly
stone, and the great oolite, or Bath-
This formation has a very extensive r
from Crewkerne to Bath, Cirencester,
ford, Buckingham, Olney, Stamford,
ford, and Lincoln. The River Th
takes its rise in this formation, near to
cester. The soil over the whole ser
chiefly arable, and produces wheat, b
oats, turnips, and clover; and, when
it is most productive of sainfoin.
almost wholly enclosed with stone
and the enclosures are large." (*Ibid.* p

Inferior Oolite. — This, resting on
blue lias, is the lowest of the oolite
ation. It is chiefly composed of sand
mica, sometimes, as in Oxfordshire,
with calcareous matter. It generally
companies the great oolite. It is found
Bridport to Yeovil, Cheltenham, Stan
to the Humber. The soils of this form
are generally very productive.

Blue Lias. — This formation is com
of blue clay, mixed with thin beds of
stone, and with alumina. It is fou
broken intervals in almost a conti
chain from Lyme Regis to Whitby in
shire. The greater portion of the
districts of the counties of Gloucester,
wick, Somerset, and Leicester is resti
this productive formation.

New Red Sandstone. — "This," say
Morton, "is a reddish sandstone or
marl, tolerably compact, but more
quently of a friable texture, or congl
rate. The sandstone is silicious, an
frequently so indurated as to be fit for b
ing, as at Wellington in Somerset
Warwick, Nottingham, &c.; but it is
times a loose red or yellow sandstone.

"The clay beds of this formation ar
nerally marly, or clay of a red colour,
mixed with blue, white, and green sp
stripes. This is the most extensive
ation to be found in England: it beg
Torbay, and passes through Exeter, H
Taunton, Bridgewater, Gloucester,
cester, Birmingham, Nottingham, Yor
the mouth of the Tees; and from Bir
ham to Liverpool, Preston, and Lanc
This district, although it may be said
dry, has many springs in it; and, in
centre of the kingdom, the Severn, T
Mersey, and their tributaries rise in
formation." (*Ibid.* p. 72.) This is a
fertile formation; the only earthy m
which it seems to need is lime, whi

dicial effects upon vegetation of
lressings of lime made from the
n limestone, and the same stone in
cined form, or in the state of car-
(See Lime.) These, however, as
en under that head, have very dif-
emical properties.

'oal Formation. — The coal fields
l in detatched masses in various
resting under strata of a varying
on. If these are argillaceous, or
of shale, the soil (and this is most
y the case) is of a yellowish clayey
, "wet, poor, and cold," producing
rbage, which is readily improved
ng it with lime. In Somerset and
rshire, however, the soil over the
are formed of the red sandstone,
nsequence, the surface soil is fri-
ed with small fragments of rock.
e of the coal fields, however, of the
counties, the soil is sometimes a
ay loam, at others a poor, barren,
y on ironstone, or a hungry, inert,
ay, resting on clay.

ne Grit. — This rock is silicious
ented with clay. This is the lowest
of the coal formation. It is of con-
extent. It reaches from Alnwick
ingham, Barnard Castle, Middle-
ey, and Halifax, and from Penis-
ghill; is found also from Chester-
hover, and from near Macclesfield
gleton to Cheadle; and in Lanca-
n Clithero to Preston andIngleton.
acter of this formation is that of an
poor, cold, peaty district: for the
improving which see Peat Soils.

ain Limestone, or *Carboniferous*
e. — The soils resting on this form-

of a red clayey description produces the best crops of wheat. From the loose nature of the subsoil, the roots of trees readily penetrate into it; hence one reason why the county of Hereford, which is composed principally of this formation, is so well adapted to the growth of orchards. The soils resting upon it are, perhaps, amongst the most fertile in the kingdom, yielding not only the finest wheat, barley, and hops, but fruit of all kinds, and excellent pasturage.

Greywacke and *Clay Slate.* — These are classed together by Mr. Morton, from the similarity of their composition, and of the soils which rest upon them. Clay slate is composed of clay and iron: mica slate contains also mica, quartz, or felspar. "Some varieties," he observes (p. 93.), "have carbon in their composition: that which passes into mica slate, or greywacke slate, has mica in very thin plates." It is a very extensive Welsh formation, reaching from Abergavenny to St. David's Head in Pembrokeshire, and from Aberystwith to Ludlow; in fact, comprehending two thirds of the principality. It extends also from Bridgewater to the Land's End in Cornwall, and from Penrith to Morecombe Bay. The soil which forms the surface of this formation "is almost universally of a thin shelloty nature, formed of loose fragments lying between the solid rock and the soil, which are every where imbedded in a reddish or grey shivery kind of substance, formed by the decomposition of those fragments, which compose the basis of the soil." (*Ibid.* 95.) Being of a mountainous nature, this formation is principally in pasturage.

The Granitic Formation. — This is a still careous sea sand of Devon and Cornwall. On the more elevated ridges of the granite formation, however, the soil is thin, and, in the west, being usually enveloped in a very humid atmosphere, the improvement of the soil is attended with many difficulties. It is, however, readily and profitably planted with larch and other trees.

"The highest mountains in Britain," says Mr. Brande, "are composed of granite and its associates; but these are mere trifling protuberances upon the earth's face, when compared with the exceeding height of the Alpine chain, or the more elevated mountains of South America and of the Asiatic continent, which consist of the same materials. Ben Nevis, the loftiest of the British mountains, is situated in the south of Inverness-shire, and is 4370 feet high. Cairngorm, in the same county, is 4050 feet high. Mont Blanc, in Switzerland, has its peak elevated 15,600 feet above the level of the sea: it is the highest mountain in Europe. Chimborazo, the highest summit of the Andes, is 20,280 feet above the sea's level. The highest mountains in the world are those of Thibet, constituting the Himalayan chain. Of this, the highest peak, covered with eternal snow, is called Dwawalagiri, or White Mountain: it is called the Mont Blanc of the Indian Alps, and rises to the astonishing altitude of 26,862 feet above the level of the ocean. This is about 6000 feet higher than Chimborazo, 11,000 feet higher than Mont Blanc, and 22,000 feet higher than the most elevated peak of the British dominions. (*Outlines of Geography*, p. 127.)

Basaltic Rocks. — These abound all over Scotland, but only in small beds in Cumberland, Northumberland, Derby, a few of the western counties, and in Wales. The soil resting on basalt forms in Fifeshire and the Lothians, observes Mr. Morton, "produces the richest and most abundant crops. It is composed of the elements of the rock on which it rests; it is therefore of a reddish, brownish, or greyish-coloured cast, with fragments of the rock, Scotch pebbles, topaz, agate, and chalcedony mixed in it. It is friable, and, if well drained, may be easily kept, by manure and good culture, in a state which would gradually increase its productiveness." (*On Soils*, p. 101.)

From such facts as these the farmer will readily perceive that the science of geology is not without its material and extensive value to the tiller of the earth. It enables him at least to cultivate his soils on solid data, to avoid the adoption of idle and fruitless modes of cultivation, to pursue that which the situation of the strata he tenants determines to be the best. It is no reason for the neglect of its assistance that other
sciences can perhaps do more for the f
and even the objection, though ver
mon, amounts, in fact, to an admissio
geology *is* a science capable of ren
services to agriculture. (*Brande's*
Geology; Morton on Soils; Davy's
Ag. Chem.; Paris on the Soils of
wall; J. F. Johnston's Lec. Che
Geol.)

GERANIUM. (*Pelargonium.*)
of beautiful plants, indigenous
south of Africa. The varieties cu
in England are very numerous,
are tender. The common scarlet g
is the hardiest shrub, and the hand
It looks beautiful planted in law
gardens, and grows extremely bu
handsome in a fine light soil.
strike so readily, that the old shr
die every fall, and be renewed eve
mer from the frame. The best plan
from seed sown in July: the
must be kept warm, but not force
scarlet geranium thrives well thro
winter, if placed in the house, fr
damp and from stagnant air. It is
ornamental of shrubs during sum
autumn.

Sweet's Geraniaceæ, and other
the subject, may be consulted with
tage by those desirous of further info
as to the best varieties of geranium,

GERANIUM, STRIPED. (*G*
striatum.) A hardy plant withou
blooming its flowers in May and Ju
petals are striped with red veins,
corners of its leaves are spotted w
plish brown. It loves a loamy
shade. Propagate by parting the

GERARDE, JOHN, was born
wich in Cheshire, in 1545. He was
a surgeon, and practised in London
he attained considerable eminence
profession. He was patronised b
Burleigh, who was a great admirer o
having a better collection at that ti
any nobleman in the kingdom.
was superintendent of his lordship's
for twenty years. He lived in
where he had a physic garden of
probably exceeding, in the numb
variety of its products, any then
land. It contained nearly 1100
plants, exotic and indigenous. In
talogue he describes 1033 specie
catalogue was his first publicati
appeared in 1596, entitled, "Catalo
borum, Fruticum, et Plantarum,
horto Johannis Gerardi," 4to. An
tion was published in 1599. In 1
published his "Herbal, or General
of Plants," folio; and another editio
to have appeared in 1599. This was

ring, names and qualities. From
auses, but especially from being in
and obtaining so learned an editor,
as Johnson, it remained the stand-
ical work for more than a century.
was certainly as good a practical
as the age afforded. He died in
f his "Catalogue" scarcely a copy
except one in the British Museum,
her in the Bodleian Library. (*G.
son's Hist. of Gardening.*)

RDE, HERB. See Gout-Weed.

ANDER. (*Teucrium.*) Of this
perennial plants there are three
ies common to our island. 1. The
mander, or wood sage (*T. scoro-*
hich is found growing very pro-
heathy bushy places and woods,
dy soil, and flowers in the month
The root is creeping; the stem
to two feet high, is leafy, hairy,
uadrangular. The leaves are deep
inkled, hairy, copiously serrated;
rs are pale yellow, in clusters, ter-
nd axillary; corolla pale yellow,
be concave and hairy. The whole
glutinous, and has a bitter taste,
greeable aromatic scent, much re-
that of hops, for which it is said
bad substitute in making beer. It
the island of Jersey in brewing.
e water germander (*T. scordium*)
mmon, and grows in low wet mea-
damp marshy situations, and pro-
rplish flowers in July and August.
b is downy; the leaves are very
nd somewhat pungent, with a strong
ke odour. The root is creeping;
recumbent, branching, with obtuse,
carcely serrated sessile leaves, an

GERMANDER CHICKWEED. See Chickweed.

GERMANDER, The SHINING. (*Teucrium lucidum.*) A native of Provence, blowing reddish-purple flowers in June and July. It grows two feet high, and is indifferent as to soil. Propagated by separating the roots in autumn, and by seed sown in warm borders, or on a hotbed.

GERMANY. The agriculture of a district so extensive as that of Germany naturally varies with the nature of the climate and the degree of knowledge possessed by the inhabitants of the numerous and extensive provinces of which the empire is composed. In the Mecklenburgs, or that portion of Germany bounded by the Baltic on the north, according to Mr. J. S. Carr, "from north to south there is a ridge of elevated sandy land (the same which may be traced from the Bannat in Hungary to Jutland in Denmark) varying from ten to twenty miles in breadth, affording miserable crops of corn, and worse pasture; but the soil improves on both sides towards the Elbe and the Baltic, where fine districts of rich loams and clays are managed with considerable plodding industry." The farms in northern Germany vary in size from fifty to sixty acres, cultivated by peasants, to 300 and even 2000 in the hands of the farmers and proprietors. The number of cows kept by the farmers are often 300 and 400, and they are sensibly alive to the advantages of sheltering stock in winter. Their sheep-houses are commonly made large enough to hold 5000 head. They usually harvest all their corn in barns. Their agricultural implements are defective: for instance, they use generally, instead of a plough, an instrument

4. Barley. 5. Peas (with light dunging). 6. Rye. 7. Oats, sown down with rye or Timothy grass, and red clover, "which, as well as the peas, is gypsumed with great effect before the dew has left the plant of a May morning." The clover, after being twice mown, is left two years longer for pasture. Marl, at the rate of 164 cubic feet per acre, is much used, and is the beginning, in many places, of all improvements. The *haken* is worked by oxen. The merino breed of sheep is now extensively cultivated in the Mecklenburghs and in Saxony. There is little else to be noticed in their live stock. The farm servants are commonly lodged and fed in the house, and are paid from 5*l.* to 6*l.* per annum. The married labourers have a free house and firing, the keep of a cow, and about one rood of garden, and twice as much potato land. The average rent of wheat and barley lands is about 18*s.* per acre. Manures of all kinds are preserved with much care; and they show a wisdom in the collection of night-soil and that of the sewerage of their towns, which it would be well to imitate in England. These manures are extensively used for their vineyards in several parts of Germany. The following account of them is taken from a paper by Dr. Granville: —

"In most of the cities of the second order, and the smaller capitals, night-soil is a source of profit, first to the householder, next to a middleman, and thirdly to the farmer, who is the last purchaser, and employs it. In all the towns of the Grand Duchy of Baden, of the kingdom of Würtemburg, of Bavaria (except Munich and Würtzburg), of the province of Salzburg,

strongest analogy to the case
lected. At Strasburg a compa
dlemen engage to empty the c
which every house has at least
air and water tight), once a ye
thing, and pays, moreover, 6
charette, containing 96 *baquets*,
pacity of 4 gallons each. This q
company sells afterwards to the
ten francs. (The capacity of t
being to that of a ton, as 28,772
to 35,840, it follows that the pric
at Strasburg would be 10*s.*) No
are 14,000 houses in Strasburg,
which have cesspools affording
question (which is always semi-li
posing the latter to be emptied
year, and to furnish each 3 charet
six francs, we have 10,000 × 6 ×
francs, which the company pay
the inhabitants of a town having
tion of 70,000 souls. But as th
re-sells to the farmer the said s
nuring purposes, at *ten* francs p
it follows that this article of traffi
yearly at Strasburg 300,000 fra
about 4¼ francs for each inhabi
average sum, therefore, for each
of a city, where the *mixed* conte
pools are sold for their benefit, w
assumed, may be adopted with
founded on fact. (*Journ. Roy.*
vol. i. p. 124—371.; *Rep. Tham*
17.)

GERMEN. (Lat. *a bud.*)
the organ commonly called the

GERMINATION. (Lat. *ger*
process by which a plant is produ
seed. It is in truth the springin
of a new individual. The phe

bove 100°, the young germ is
ared. No seed will grow without
water is at first absorbed by the
e external covering, and decom-
seed gradually swells, its mem-
st, and the germ expands. The
irst most rapidly developed, the
or its growth being derived from
ons; and when it shoots out its
otlets, these absorb nourishment
il, and the plumula is developed,
rds in a contrary direction to the
expanding into stem and leaves.
rowth the presence of air is re-
it be carefully excluded, though
at and moisture, yet the seed will
e. Hence it is that seeds buried
n the earth or in a stiff clay, re-
but on admission of air by turn-
soil, begin to vegetate. From
s which have been made upon
ation of seeds in confined at-
it appears that the oxygen set
decomposition of water, combines
tion of the carbon of the seed,
s it off in the form of carbonic
hat the consequence of this is the
of part of the albumen and starch
ledons into gum and sugar; so
eeds, as we see in the conversion
nto malt, become sweet during
n. Light is injurious to the
the seed. It is, therefore, ob-
the different requisites for ger-
are attained by placing a seed
surface of the soil, where warmed
n's rays, and moistened by the
f the atmosphere, it is excluded
but the air has access to it.
is an essential agent in the pro-

to the agency of air and of light; moisture, and occasionally carbonic acid, is transpired. But the leaves also at times absorb moisture, and during the influence of light they decompose the carbonic acid, and retaining the carbon, evolve oxygen; the sap thus becomes modified in its composition, and the characteristic proximate principles of the vegetable are formed. These return in appropriate vessels from the leaves chiefly to the inner bark, where we accordingly find the accumulation of the peculiar product of the plant; they also enable it annually to form a new layer of wood. Hence it is that the transverse section of the wood exhibits as many distinct zones as the tree is years old. We are ignorant of the causes of this ascent of the sap; but that it does follow the cause which has been stated is proved by the operation which gardeners call *ringing*, and which they sometimes resort to, to make a barren branch bear flowers and fruit. It consists in cutting out and removing a circular ring of bark, so as to prevent the return of the sap by the descending vessels, which at first ooze copiously, but afterwards the wound heals, and the juices are accumulated in all parts above the extirpated ring, producing tumefaction in the limb, and often inducing a crop of flowers and fruit, or causing those to appear earlier than on the uncut branches.

If a tree be wounded so as to cut into the central portions of the wood, or the outer layer of new wood, the flow of ascending sap is then seen to take place upon the lower section, where the vessels are that carry it up to the leaves; and the flow of descending proper juice is principally confined to the all these cases were small, delicate, and never came to perfection.

GESTATION. The gestatory term in quadrupeds is much regulated by their bulk. In the elephant it is about twenty months, in the camel between eleven and twelve, in the mare and ass the same. According to the observations of M. Teissier of Paris, in 582 mares, which copulated but once, the shortest period was 287 days, and the longest 419; making the extraordinary difference of 32 days, and of 89 days beyond the usual term of 11 months. The cow usually brings forth in about 9 months, and the sheep in 5. Swine usually farrow between the 120th and 140th day, being liable to variations, influenced apparently by their size and their particular breeds. In the bitch, on the contrary, be she as diminutive as a kitte as large as the boarhound, pupping o on or about the 63d day. The cat pro either on the 55th or 56th day. Th causes which abridge or prolong more the period of gestation in the femal quadrupeds, and of the incubation of are yet unknown to us. Many perso also unacquainted with the proper a reproduction, the duration of the po reproduction, and other conditions e the domesticated animals. It cannot, fore, but be interesting to find in th lowing table the results of observ made on this subject by the best a and modern naturalists. (*Aeconomisch gikund Verhandl.*)

Kinds of Animals.	Proper Age for Reproduction.	Period of the Power of Reproduction.	Number of Females for one Male.	The most Favourable Season for Copulation.	Period of Gestati Incubation.	
					Shortest Period.	Mean Period.
		Years.			Days.	Days.
Mare - - -	4 years	10 to 12	- -	May	322	347
Stallion - - -	5	12 to 15	20 to 30			
Cow - - -	3	10	- -	July	240	283
Bull - - -	3	5	30 to 40			
Ewe - - -	2	6	- -	Nov.	146	154
Tup - - -	2	7	40 to 50			
Sow - - -	1	6	- -	March	109	115
Boar - - -	1	6	6 to 10			
She-Goat - -	2	6	- -	Nov.	150	156
He-Goat - - -	2	5	20 to 40			
She-Ass - - -	4	10 to 12	- -	May	365	380
He-Ass - - -	5	12 to 15				
She-Buffalo - -	-	- -	- -	- -	281	308
Bitch - - -	2	8 to 9	- -	Feb.	55	60
Dog - - -	2	8 to 9				
She-Cat - - -	1	5 to 6	- -	- -	48	50
He-Cat - - -	1	9 to 10	5 to 6			
Doe-Rabbit - -	6 months	5 to 6	- -	Nov.	20	28
Buck-Rabbit - -	6	5 to 6	30			
Cock - - -	6	5 to 6	12 to 15			
Turkey, sitting on the eggs of the Hen	- -	- -	- -	- -	17	24
Turkey, sitting on the eggs of the Duck	- -	- -	- -	- -	24	27
Turkey, sitting on the eggs of the Turkey	- -	- -	- -	- -	24	26
Hen sitting on the eggs of the Duck	- -	- -	- -	- -	26	30
Hen sitting on the eggs of the Hen	- -	3 to 5	- -	- -	19	21
Duck - - -	- -	- -	- -	- -	28	30
Goose - - -	- -	- -	- -	- -	27	30
Pigeon - - -	- -	- -	- -	- -	16	18

Some of these results do not altogether coincide with the practice of this country. For the season of copulation for the cow, for instance, July is considered too late. That period would produce late calves in the following year. November is stated to be the best season for the ewe; for the black-faced ewe it is, but for the Leicester, and, in many situations, for the Cheviot ewe, it is a month too late. The duration of the power of reproduction accords with our experience as respects the mar stallion; but thirteen years of age f cow, and eight years for the bull, is too a period for old age in them, fine a of both sexes, of a valuable breed, been kept in a useful state to a much g age. I have seen a short-horn bull in thirteen years, and a cow of the same bearing calves at eighteen; but if the of eight and thirteen respectively re the usual time bulls and cows are ke the statement is not far from the

om some carefully collected and very
sive notes made by Lord Spencer on
eriods of gestation of 764 cows, it re-
d that the shortest period of gestation
a live calf was produced was 220
and the longest 313 days, but he was
ble to rear any calf produced at an
r period than 242 days. From the
of his experiments it appears that
ows calved before the 284th day, and
alved after the 285th; so that the
ble period of gestation ought to be
dered 284 or 285 days. The expe-
ts of M. Teissier on the gestation of
are recorded to have given the follow-
sults: —

d between the 240th & 270th day, the mean time being 259½
— 270th & 299th — 282
— 299th & 321st — 303

most cases, therefore, between nine
n months may be assumed as the usual
l; though, with a bull-calf, the cow
en generally observed to go about 41
, and a few days less with a female.
alf produced at an earlier period than
ys must be considered decidedly pre-
e, and any period of gestation ex-
g 300 days must also be considered
lar; but in this latter case, the health
produce is not affected. I will con-
this article with the remarks of Mr.
lyard, of Northampton, who states
he period of gestation of a cow is 284
or, as it is said, 9 calendar months
days; the ewe 20 weeks; the sow 16
; the mare 11 months. The well-
cattle of the present time appear to
bring forth twins more frequently
the cattle did fifty years ago. The
of all animals, hares excepted, are
than the females. Castrated male
become larger beasts than entire
. (*Blaine's Encyclo.* pp. 205. 281.;
Journ. of Agr. vol. x. p. 287.; *Journ.*
oy. Agr. Soc. vol. i. p. 165.; *Brit.*
vol. ii. p. 438.; *Hillyard's Pract.*
. and Grazing, p. 83.)

LL, or ALEHOOF. One of the com-
names of Ground-ivy. See ALEHOOF.

LL. A small valley, connected with
am and some woodiness. Also a rivu-
r small brook. It is likewise a pro-
al name in some districts for a pair of
r wheels.

LLIFLOWER, THE SEA. See
ros THRIFT.

LTS. A provincial term applied to
g female pigs, whether open or spayed.

MMER. A young female sheep:
gimmer-hog is a ewe of the first
; and gimmer-lamb, a ewe-lamb.

LPIN, WILLIAM, one of the reformers of the old style of ornamental gardening, was a native of Carlisle. He pursued his university studies at Queen's College, Oxford, where he took his degree of Master of Arts in 1748. He was for many years a schoolmaster at Cheam in Surrey. Subsequently he obtained the vicarage of Boldre in Hampshire, and a prebendary stall in Salisbury Cathedral. He died in 1804, at the advanced age of eighty. He bequeathed the profits of his numerous publications for the endowment of a school at Boldre. His religious works are many, but we must here confine our attention to those relating to rural affairs.

1. Observations on the River Wye, and several Parts of South Wales, &c. relative chiefly to Picturesque Beauty, made in the Summer of 1770. London. 1783. 8vo. 2. Observations relative chiefly to Picturesque Beauty, made in the year 1772 on several parts of England; particularly the Mountains and Lakes of Cumberland and Westmoreland. London 1787. 2 vols. 8vo. 3. Observations chiefly relative to Picturesque Beauty, made in the year 1776 in several parts of Great Britain, particularly the Highlands of Scotland. London. 1788. 2 vols. 8vo. 4. Remarks on Forest Scenery, and other Woodland Views, relative chiefly to Picturesque Beauty. Illustrated by Scenes in the New Forest, Hants. In 3 books. London. 1791. 2 vols. 8vo. 5. Three Essays, On Picturesque Beauty; on Picturesque Travel; on Sketching Landscape; to which is added a Poem on Landscape Painting. London. 1792. 8vo. 6. Observations on the Western Parts of England relative chiefly to Picturesque Beauty. To which are added a few remarks on the Picturesque Beauties of the Isle of Wight, 18 Plates. London. 1798. 8vo. 7. Observations on the Coasts of Hampshire, Sussex, and Kent, relative chiefly to Picturesque Beauty, made in the Summer of 1774. London. 1804. 8vo. 8. Observations on several parts of the Counties of Cambridge, Norfolk, Sussex, and Essex; also several parts of North Wales relative chiefly to Picturesque Beauty. Made in two Tours, the former in the year 1769, and the latter in 1773. London. 1809. 8vo.

It may be observed here that his powers of describing scenery were most peculiar and effective; or, as Dallaway expresses it, "he had the happy faculty to paint with words." No one, though reading for mere amusement, can fail of being delighted with his elegant descriptions and tasteful observations. (*G. W. Johnson's Hist. of Gardening.*)

GIPSEY-WORT, or WATER HOREHOUND. (*Lycopus Europæus.*) An herbaceous perennial plant, growing on the banks of clear ditches, pools, and rivers, on a sandy or gravelly soil, flowering in July or August. The root is creeping, stem two feet high, leaves numerous, oblong, acute, deeply serrated, often deeply pinnatifid. Flowers white, with purple dots. (*Smith's Eng. Flor.* vol. i. p. 33.)

GIPSIES. See GYPSIES.

GLADDON. A provincial name applied to the large and small cat's-tail grass

GLADWYN, or GLADDON. See IRIS.

GLANDERS. A disease in horses, attended with a copious discharge of mucus from the nose. It is needless to endeavour to describe the various attempts which have been made to cure this almost invariably fatal disorder. But the farmer must avoid a common error of confounding ulceration of the membrane of the nose with glanders, for the symptoms are very similar. Blue vitriol (sulphate of copper) in thin gruel (one drachm doses) has been given in recent cases with occasional success. The nostrils may be washed with a solution of chloride of lime. The farmer will do well, as soon as he finds a horse attacked with this disease, to place him by himself, give him green food, and thoroughly whitewash the stable from which he is taken, for it is a most contagious disease.

GLASSWORT, JOINTED. (*Salicornia;* from *sal*, salt, and *cornu*, a horn.) Of this genus of plants there are four indigenous species, which are found very common in salt marshes and muddy sea-shores that are frequently overflowed by the tide.

1. The common jointed glasswort, sea grass, or marsh samphire (*S. herbacea*), is an annual plant, with a small fibrous root, a bushy green stem a foot high, with opposite branches; woody centre very tough. Flowers on numerous short-jointed spikes. The whole plant has a saline taste, abounding in salt juices, and is therefore devoured with avidity by all kinds of cattle; and it is a very wholesome food, especially for sheep. It is often pickled, as a substitute for the very different strongly aromatic rock samphire (*Crithmum maritimum*), to which it is for this purpose very little inferior.

2. Procumbent jointed glasswort (*S. procumbens*), also an annual, flowering in August, a span long, branched from the base, with the interstices obtusely quadrangular.

3. Creeping jointed glasswort (*S. radicans*). This is a perennial, which has the lower part of the stem woody (hence it is sometimes called the woody jointed glasswort), slender, throwing out fibrous roots; upper part erect, six or eight inches high, with opposite crossing branches, sometimes purplish, whose interstices are contracted just below the summit, and more slender than either of the foregoing. The flowers are on tumid spikes, with short joints.

4. The shrubby jointed glasswort (*S. fruticosa*), very rare; possibly a variety of the last. It has a woody stem, with numerous branches, more slender and cylindrical throughout. The spikes are small, short, and dense. The style of the flower is permanent, and elongates after flowering. Soda is yielded in large quantities by the ashes of the different species of *Salicornia;* and is in great request for manufacturing soap and glass: the best is imported from Spain, under the name of *Barilla* (see SODA). These plants will grow in any
common soil, and are readily in
divisions. Being natives of the
the plants will thrive better if a
be occasionally sprinkled on the
the soil. (*Eng. Flor.* vol. i. p. 2.
Bot. Dict.; Willich's Dom. Ency

GLEANING (Fr. *glaner*),
ING, as it is called in some coun
gathering or picking up those ea
which are left after the field has b
and the crop carried home. It i
of great antiquity; for we are
Ruth went to glean in the fields
she "gleaned in the field after th
(*The Book of Ruth*, chap. ii.)
parts of the Continent the far
this privilege only upon conditio
gleaners contribute their labour
two hours towards the housing o
Such regulation is occasionally b
both parties, especially to the far
approach of rain. In considerat
services, these voluntary laboure
mitted to glean for one or two h
or less, according to the time the
sisted, before others are suffere
the field indiscriminately.

There has usually existed mu
ception in England with regard
of poor persons to glean; no
exists at common law. No pe
right to glean in a harvest field
consent of the owner, neither
poor of the parish legally settled
any right of the kind. (*Steel* v.
1 H. Blackstone, 51.; *Worledge* v.
Ibid. 53.) And even when ex
particular places by any custom,
exercised under proper circumst
restrictions (*Rex* v. *Price*, 4 B
1925.); for, as Lord Mansfield re
this case, "stealing under the
leasing or gleaning is not to be
Whatever may be the right of
sons to glean in the farmers'
true spirit of charity which has
tuated the British farmer, in com
those of a very early age, has
lowed this boon to the cultivato
neighbours — a spirit which seem
measure derived from the Levi
(*Levit.* xix. 9. xxiii. 22. *Deut.*
&c. &c.) It seems, also, from
of Ruth before alluded to, that it
in those days to glean barley. (R
Judge Gould, in *Steel* v. *Hough*
Blackstone, 51., delivered a lear
ment in favour of the right of th
glean; but the other three ju
against him.

GLOBE-FLOWER, MOU
(*Trollius Europæus.*) A hardy
native of Britain. It grows a fo

-THISTLES. (*Echinops*, in al-
e hedgehog-like heads of flowers
us of plants.) The *Echinops*
uncommon in our gardens. It
shed by its globular capitate
pinnatifid leaves, smooth above
below. The whole genus is
oarse plants, but nevertheless of
e beauty, attaining from one to
gh. They are well adapted for
account of their stiff growth;
n soil suits them, and young
btained by division of the roots.
ey use the down of the flower
species (*E. strigosus*) for tinder.
ot. Dict.)

LARIA, WEDGE-LEAVED.
cordifolia.) A perennial plant,
o a very handsome genus, na-
any, which blooms a blue flower
f April. It likes a light soil,
eased freely by cuttings, by di-
roots in autumn, or by seed
s or a hot-bed.

daisy (*G. vulgaris*) is a peren-
plant, five inches high, which
e flower in June and July. It
in peat.

n-house species of Globularia
in a mixture of loam and peat:
inds do well in sandy light soil.

WORM. (*Lampyris noctiluca.*)
is remarkable for the light it
g the night. This luminous ap-
epends upon a phosphorescent
at the lower extremity of the
ch, by unfolding or contracting
withdraw at pleasure; a power
ence to the insect, as it is thus
n the attacks of nocturnal birds.
arises from a sac, which is dia-

Glue will not harden in a freezing temperature, the stiffening depending upon the evaporation of its superfluous water. There are several kinds of glue; among others, Flemish or Dutch glue, French glue. Hatmaker's glue is obtained from the tendons of the legs of neat cattle and horses; bone glue, from *gelatin bent* (see GELATIN); fish glue, from various membranous and solid parts of cetaceous animals. Size is made mostly from rabbits' skins, old gloves, parchment, and gelatin, but in the same manner as glue. The refuse matter of the gluemakers, according to Mr. Miles, is an excellent manure for turnips. (*Journ. Roy. Ag. Soc.* v. ii. p. 266.; *Liebig's Veg. Chem.*; *Brande's Dict.*; *Gray's Supp.*)

GLUTEN. (Lat.) The viscid elastic substance which remains when wheat flour is wrapt in a coarse cloth, and washed under a stream of water, so as to carry off the starch and soluble matters. Gluten, when pure, is inodorous, insipid, tenacious, adhesive, and elastic. It is insoluble in water, but soluble in hot alcohol. It is also soluble in a dilute solution of potash. When kept moist and warm, it ferments. Gluten exists in grains, and occasionally in other parts of vegetables; but it is a characteristic ingredient in wheat, giving wheat flour its peculiar toughness and tenacity, which particularly fits it for the manufacture of bread, and for viscid pastes, such as macaroni and vermicelli. There is generally more gluten in the wheat of warm climates than of cold; hence the excellence of that grown in the south of Europe for the manufactures just mentioned. Gluten seems also to constitute the essential part of yeast. Its uses as a varnish, a ground for paint, &c., pointed out by Cadet, likewise deserve attention.

p. 97.) Gluten has been shown to resemble albumen so closely, that they can hardly be considered as distinct principles. Gluten contains nitrogen, and has consequently been called the vegeto-animal principle on this account. It yields ammonia, when subjected to destructive distillation; and the vegetables which contain it give out a peculiarly disagreeable odour during their putrefaction. M. Magendie, after feeding animals upon different kinds of food, states, that gelatine, fibrin, albumen, when taken singly, do not possess the power of nourishing animals for any length of time; they always die. The reverse is the case, however, with gluten, upon which animals thrive well and long. (*Brande's Dict. of Science; Thomson's Chemistry.*) See MANURE.

GNATS. (*Culex*, Linn.) A genus of insects comprising several species, which are well known by the severe punctures they inflict. The gnat most common is the *C. pipiens*, so named from the sound which it emits in its flight. The sting consists of five pieces and a sheath; some of the pieces are simple lancets; others are barbed, and act both as piercers and as siphons, to extract the blood from the wounds which they make. Gnats deposit their eggs to the number of 200, by each female, on stagnant waters, where they are hatched into small grubs, in the course of two or three days. On the sides are four small fins, by the aid of which the insect swims about, and swiftly dives to the bottom. The larva retains its form a fortnight or three weeks, when it is converted into the chrysalis, in which state it continues three or four days, floating on the surface of the water, till it assumes the form of the gnat. The most efficacious remedies for their sting are olive oil, unsalted butter, or fresh hog's lard, timely rubbed in. (*Willich's Dom. Encyclo.*) Gnats have occasionally appeared in such numbers as to form a cloud, almost darkening the air, as was the case in August, 1766, near Oxford. Spencer describes a similar flight of them in Ireland—

> " As when a swarme of gnats at eventide,
> Out of the fennes of Allan doe arise,
> Their murmuring small trumpets sownden wide,
> Whiles in the air their clust'ring army flies,
> That as a cloud doth seem to dim the skies."
>
> *Faery Queen.*

The mosquito of tropical climates is a species of the same genus as the gnat; and the latter is not less troublesome in some of our marshy districts than the mosquito in the West Indies. In the marsh land of Norfolk, the better classes are forced to have gauze curtains to keep them off during the night. (*Kirby and Spence's Introd. to Entomology*, vol. i. p. 143.)

GOATS. (*Capra.*) There
species of this genus enumerated
ralists — 1. The wild goat (*C. ag*
The ibex (*C. ibex*); 3. The Cauc
(*C. Caucasia*): of these, the first
to be the original of the many
the domestic goat.

The goat appears (says Prof. Lo
the connecting link between the
the one hand, and the antelope tri
other. Being the natural inha
mountainous regions, it is, therefo
rocky countries that the goat
reared. Goats are stronger, mo
and less timid than sheep, and
easily supported than any othe
for there are few herbs which th
relish: they will browse on heath
and plants, which are rejected
animals; and it is well known th
with safety herbs (such as the
henbane, &c.) which would prov
tive to sheep and other anima
are more hardy, and not liable to
diseases as sheep. The goat is
adapted to a country of enclosure
it feeds upon the twigs of he
escapes over the barriers intended
it. But where there are no you
be injured, they may browse at
the mountain brakes without ex
in winter, when housed, they are
ported on whins or furze, cabba
potato-peelings, and such worthle

Goats emit at all times a stron
agreeable odour, named *hircine*, w
ever, is not without its use, for
these animals be kept in a stabl
firmed that it will be an effectu
tive of the *staggers*, a nervous
which is often very fatal to horses
island, the cultivation of the goat
and partial. It is chiefly confin
mountainous parts of Wales, the
of Scotland, and to the little far
poorer peasants of Ireland, who
possessions will not support a
great objection to the rearing of t
this country is the want of dema
flesh, which is hard, and almost in
Even the kid, whose flesh is kn
very delicate and nourishing, is
timation amongst us: hence all
properties of the goat are insu
render it an object of profitable p
But the goat, although it never
valuable here as in the dry and ro
tries of the south of Europe, does n
that entire neglect with which it
It arrives early at maturity, and is
lific, bearing two and sometimes
at a birth. The period of gesta
months. The female bears for si

e male should not be kept longer
In Portugal and some other coun-
goat is used as a beast of draught
urdens. The hair of the goat may
as it is of some value, making
ey; that of the Welch he-goat is
request for making white wigs.
sometimes made from goats' hair,
id to last much longer, when used
ter, than those made of hemp.
re manufactured from their fat,
whiteness and quality, are stated
rior to those of wax; their horns
cellent handles for knives and
l the skin, especially that of the
demand for gloves and other pur-
oats' milk is sweet, nutritive, and
, and less apt to curdle on the
han that of the cow: it forms an
substitute for that of asses. When
ilk, the goat will give, for several
t the average of two quarts per
. Pringle, of Kent, in his Essay
ge Management" (*Gard. Mag.*
nforms us that two milch goats
lent to one small Shetland cow.
epared from goat's milk is much
in mountainous countries, after it
kept a proper age. (*Low's Pract.*
Breeds of Dom. Animals; Wil-
. Encyc.)

'S-BANE. One of the names of
of aconitum (*A. tragoctonum*), a
Switzerland.

'S-BEARD. (*Spiræa aruncus.*)
ative of Siberia, belonging to an
genus of very handsome plants,
w, for the most part, white flowers.

'S-BEARD. (*Tragopogon.*) Of
non pasture-weed there are two
. The yellow goat's-beard (*T. pra-*
biennial, growing in grassy pas-
meadows, on a loamy or clayey
. The root is tapering, flowering in
e whole herb very smooth, abound-
milky juice, rather bitter, but not
tems several, round, leafy, often
one and a half to two feet high.
ng and taper-pointed, often flaccid,
at the extremity. Flowers large,
wide, bright yellow, opening very
the morning, and closing before
ept in very cloudy weather. The
young shoots have been eaten as

purple goat's-beard (*T. porrifo-*
biennial, grows in moist meadows,
rivers; herb smooth, three or four
glaucous. The dull purple flowers,
preceding species, close at mid-
nce it is called in the country *Go-*
noon. (*Smith's Eng. Flor.* vol. iii.

GOAT'S-RUE. (*Galega*, from *gala*, milk; the plants are said to increase the milk of such animals as eat of them.) A genus of tall ornamental plants, well-suited for flower borders, provided they have plenty of room, blowing blue or white flowers in July. They are readily increased by dividing their roots or by seeds. (*Paxton's Bot. Dict.*)

GOAT MILKER, and GOAT SUCKER. Local names for the fern owl.

GOAT'S-THORN. (*Astragalus tragacantha.*) A handsome evergreen shrub, native of Syria, blowing pale yellow flowers in July.

GOATS'-WHEAT. (*Tragopyrum*, from *tragos*, a goat, and *pyros*, wheat.) A genus of ornamental dwarf shrubs, thriving in a mixture of peat and sandy loam, and increased by layers in spring.

GOAT-WEED. (*Capraria biflora.*) An uninteresting species of plants, of easy culture. The leaves of this genus are liked by goats; hence the common and generic names.

GODWIT. (*Scolopax*, Penn and Bewick, *Limosa* of Selby and Gould.) Godwits, of which in Britain there are two species, appear to have been more common formerly than they are at present. Though considerably larger than the ruff, they are not in such high estimation as an article for the table. The black-tailed godwit (*L. melanura*) is most frequently seen in spring and autumn. It is called provincially "shrieker;" but its note, though loud, is far from inharmonious. The black-tailed godwits commence laying their eggs early in May. The nest is composed of dry grass and other vegetables, and is concealed among the coarse herbage of swamps and low meadows: the eggs are four in number, of a light olive brown, blotched, and spotted with darker brown, 2 inches 2 lines long, by 1 inch 6 lines broad. The food of these birds consists of insects and their larvæ, worms, and almost any other soft-bodied animals. In its winter plumage the godwit has the head, neck, and back ash-brown; chin, breast, and belly light greyish ash; claws black. The whole length of a male bird is 16 inches; the beak alone being 3¼ inches. The length of the female is about 17 inches. The bar-tailed godwit (*L. rufa*) is, in its habits in this country, very similar to the black-tailed godwit last described, with two exceptions: the bar-tailed godwit very rarely, if ever, remains to breed, and more frequently stops with us through the winter. The plumage is of a browner shade; breast and belly white; and the tail feathers are barred throughout their whole length with dark brown and greyish white, in nearly equal breadth. (*Yarrell's Brit. Birds*, vol. ii. p. 563—572.)

water, to which they are a very great ornament. It is also a very common practice to keep them in large globular glass vessels, frequently changing the water and feeding them with bread and gentles. (*Walton's Angler*, p. 213.)

GOLDEN CRESTED REGULUS. See Regulus.

GOLDEN EAGLE. See Eagle.

GOLDEN ORIOLE. See Oriole.

GOLDEN OAT GRASS. See Avena.

GOLDEN-ROD. (*Solidago*, from *solidare*, to unite, on account of the supposed vulnerary qualities of the plants.) This is an extensive genus of coarse flowering plants suitable for the back of flower borders. Any common soil suits them, and they are readily increased by division of the roots. The common golden-rod, or wound-wort (*S. virgaurea*) is a native of Britain, growing in woods, hedges, heaths, and copses; and on mountains at every degree of elevation. It is a perennial, and flowers from July to September. It is a very variable plant in magnitude, number, and size of flowers, and serrature of the leaves: nor do these varieties altogether depend on situation, except that in alpine specimens the flowers are larger and fewer. The root is woody, with long stout simple fibres; the stem usually from one to three feet high, never quite straight, purple below, most downy in the upper part, where it terminates in a leafy cluster, either simple or compound, of bright yellow flowers. When bruised, the whole herb smells like wild carrot. Its qualities are diuretic, astringent, and perhaps tonic; and it has been recommended as a vulnerary both externally and internally, but it is now never used in me-

reniform, rough on both sides t
but the under disk pale and
radical leaves on long stalks, t
summit crowded and sessile; f
corymb, deep yellow. The opp
golden-saxifrage (*Ch. opposit*
sembles the preceding, but is
leaves smaller and the flower
lemon yellow. (*Eng. Flora*, vol
Paxton's Bot. Dict.)

GOLDFINCH. (*Carduel*
This well-known bird is pecul
tiful in its colour, of an elegant
strikes melodious notes, which,
disposition to become attache
who feed it, are such strong r
ations, that the goldfinch has be
probably long continue to be,
most general cage favourites. I
of Europe, and is sometimes al
Africa and America. The gol
structs a very neat and compac
moss, dried grass and roots, wh
with wool, hair, the down of t
other soft substances. The fem
or five eggs, of a pale bluish w
few spots and lines of pale
brown at the larger end; siz
long, by 6 lines broad. The y
are fed for a time with cater
insects; and when able to f
parents they rove together in
over commons and other unculti
to feed on the ripened seed of
burdock, or dandelion, with
groundsel, or plantain; thus
good service to the agricultur
suming the prolific source of man
weed. Their tendency to sing an
goldfinches valuable as brace-bi

ons, dull white. (*Yarrell's Brit.*
i. p. 490.)
OCKS. One of the names of
ood crowfoot (*Ranunculus au-*
A perennial which grows in dry
bushy shady places. The root
tem about a foot high, bearing
t golden yellow flowers with a
lyx. It blossoms in April or
g. *Flor.* vol. iii. p. 47.) See

OF PLEASURE. (*Camelina*
his is rather a dwarf plant grow-
e to two feet high, which is found
l fields, chiefly among flax, with
s it is often introduced from
t it does not long propagate
s spontaneously. It is an an-
g small, pale-yellow flowers in
s cultivated in some parts of
the sake of the oil, which is
om the seeds. The species of
to which it belongs have but
, and require to be sown in the
. (*Eng. Flor.* vol. iii. p. 164.;
t. Dict.)
LOCKS, FLAX-LEAVED.
a linosyris.) A native perennial,
n twelve to eighteen inches high,
g bright yellow flowers in co-
fts in September and October.
light soil and sunny situation,
by seed sown in a hotbed, and
isplanted when sufficiently ad-
ze.
ERA, CREEPING. (*Goodyera*
rare perennial herb, found in
ne woods in Scotland, with a
, branched, knotty root, creep-
ively among moss and rotten
shoot terminating in a solitary
or eight broad-stalked, ovate,
ves, an inch long, somewhat
ith brown. The flowers, which
ly, are small, white, and sweet-
ut ten or fifteen in each spike.
as been named after one of the
ing of our early English bota-
John Goodyer, of Hampshire
ted by Johnson in his preface
nd edition of Gerarde's *Herbal*,
very accurate and intelligent
tions enrich many parts of that
ith's Eng. Flor. vol. iv. p. 34.)
, BARNABY. See HERESBACH.
A well known large web-
, belonging to the order *Nata-*
immers. These are remarkable
wers of swimming and diving;
mmonly called water-fowl, and,
r, have frequently been desig-
nipedes, in reference to their
t. From the geographical position, extent, and varied character of the British islands, the species of this order are very numerous, comprehending nearly one third of the whole number of our British birds. The first family of this order, the *Anatidæ*, is also extensive; including the geese, swans, ducks, and mergansers. The first three portions were formerly considered as belonging to but one genus, *Anas;* and hence the family name, *Anatidæ*. Modern systematic authors have found it more convenient, as well as desirable, to divide them into smaller groups, which are known to be distinct in their characters and habits. Many of the species are of great interest and value. In the present article I must necessarily confine myself to the geese properly so called.

Under the term wild geese, four or five species are frequently included, viz. 1. The grey lay-goose, or grey-legged goose (*Anser ferus*), which is considered to be the true reading. This species of goose is said to have been formerly very common in the fens of this country, residing there the whole year, breeding there, and bringing out eight or nine young; but the general system of draining pursued in Cambridgeshire, Norfolk, and Lincolnshire has been the means of driving them away. The eggs of this species are of a dull yellowish ivory white, smooth and shining; three inches one line long, by two inches and one line broad. The beak of this goose is of a pale flesh-colour; the head, back of the neck, and upper part of the body, ash brown; under surface of the body, white; sides, flanks, and thighs, barred with ash-colour and greyish-white; legs, toes, and membranes, dull flesh-colour. Whole length of an adult male, thirty-five inches; of an adult female, thirty inches.

2. The bean goose (*A. segetum*). See BEAN GOOSE.

3. The pink-footed goose (*A. brachyrhynchus*). This is a new species, first noticed and described by M. Baillon of Abbeville, which is considerably smaller in size than the bean goose, but otherwise so like it in general appearance that there is little doubt it has frequently been mistaken for the young bird of that species; but, on comparative examination, it is at once distinguished by the smaller and shorter beak, and the pink colour of the legs and feet. Little is known of the particular habits of this new species in a wild state. The whole length of the bird is about twenty-eight inches.

4. The white-fronted, or laughing goose (*A. albifrons*). This species may be considered a regular winter visiter to this country; not usually so numerous as the

5. The bernicle or barnacle goose (*A. leucopsis*), like the bean goose, is a common winter visiter to these islands. It is very prettily marked; has the neck and top of the head black; breast and belly greyish-white; flanks and thighs tinged with grey in bars; legs, toes, membranes, and claws, black. Whole length of bird, twenty-five inches.

6. The brent goose (*A. bernicla*). Of the various species of geese that visit the British islands, this is the smallest, as well as the most numerous, and possesses, also, for us the agreeable advantage of being a good bird for the table. It is a regular winter visiter to the shores of most of our maritime counties, and remains with us through all the cold months of the year. In Shetland it is called Horra goose, from the numbers that frequent Horra Sound. The upper part of the breast, head, and neck are black, except a small patch of white on each side of the neck. The lower portion of the breast and the belly slate grey; legs, toes, &c., black. The whole length of the bird, twenty-one inches.

7. The red-breasted goose (*A. ruficollis*). But little is known of the habits of this beautiful species, which appears to be very rare, except in the extreme northern parts of Asia and Siberia.

8. The Egyptian goose (*A. Egyptiaca*). It is only lately that the Egyptian goose has been admitted into the histories and catalogues of our British birds; and even now exceptions are occasionally made to it, on the ground that the specimens, though killed at large, or apparently in a wild state, had probably escaped from the waters of parks or pleasure-grounds, where they had been bred and fostered on account of the

to one of the names of this
cravat goose. The back, breas
pale brown, the lower part of
most white. The whole length
bird is forty-one or forty-two i
the swan-like length of neck, a
size of this species, some auth
cluded it in the genus *Cygnu*
Brit. Birds, vol. iii. p. 53-96.)

The domestic goose. Two
indigenous to Great Britain, t
white goose, and the pure whit
a larger size. The first is our m
breed: the second are bad bree
producing more than three g
brood, and that only every alt
There is, also, the Chinese bre
naturalised among us, valuab
early breeding, and quick fatt
Chinese goose lays about the
vember, if the weather is not
produces her goslings in Janu
goslings, if kept dry and warm
the table in April or May. T
however, smaller, less delicate
more noisy than the common
The common goose begins to
Candlemas, and after laying f
eleven eggs, she sits thirty day
brings out her little flock. If, b
shews a wish to sit when she l
two or three eggs, she must be
the nest, or be shut up for a
She will then take to lay again.
and five geese are the regular s
with: they will produce fifty g
season. Geese are grazing bird
a common, but horses do not lik
pany in a field, as they object t
them. The herb called goose

get through the goose aperture.
iave a door, also, for the poultry-
enter. The nests should be com-
straw, lined with hay, and the
d be fed near their home, to allure
t. If some of the goslings are
efore the others, they should be
rom the mother, kept warm in
ore the fire, and returned to her
whole brood are hatched. Thin
l and water is excellent food for
vith chopped goose-grass; they
to eat oats, and feed themselves.
hemlock, if any grows near the
rd: it is pernicious in its effects
ry. Fatten geese in small parties,
e society. They should be cooped
ed plentifully with sweet oats and
water in a narrow wooden trough.
iment has lately been tried of
ese with turnips, cut up very fine,
nto a trough with water. The
that six geese, weighing only nine
h when shut up, actually weighed
unds each, after about three
ling with this food alone. Half-
reen geese are delicate eating in
uly; but they need not be cooped,
only be well fed. Goose feathers
le, and their dung is employed as
oy agriculturists. See GUANO.

BERRY. (*Ribes grossularia.*)
berry is well known as a most
fruit, chiefly confined to cold or
climates, neglected in Switzerland,
lifficulty raised in Italy. As it
he woods and hedges in Cam-
, Norfolk, and other counties in
ate, Phillips and others consider it
en indigenous to this country; but
and Miller both entertained
its being truly so. In Cheshire,
, and Yorkshire, it is known under
of *fea-berry*. It appears to have
name of gooseberry from its being
auce for young or green geese.
nall berry in the wild state, the
, like the apple, has been mul-
its variety, and brought to its
ce and flavour by the art and in-
the English and Dutch gardeners;
ow deemed one of our most valu-
s, being easily propagated, and
its production; furnishing our
h a wholesome and agreeable diet.
eberry is the earliest, as well as
best, fruits for spring tarts. It
od preserved in the green state,
excellent jam, a delicious and or-
sweetmeat, and a most luscious
y little inferior, when properly
champagne.

rieties of the gooseberry are extremely numerous; Lindley enumerates nearly 800, but the following selection for a small garden is recommended: *Reds.*—Old rough red, Melling's crown bob, Farmer's roaring lion, Knight's Marquis of Stafford, Champagne and Capper's top sawyer; one of the best of the red gooseberries is the Scotch ironmonger: it is hairy, and thin-skinned. *Yellows.*—Hardcastle's gunner, Hills's golden gourd, Prophet's rockwood, Hamlet's kilton, Dixon's golden yellow, Gordon's viper. *Greens.*—Edwards's jolly tar, Massey's heart of oak, Nixon's green myrtle, early green hairy, Parkinson's laurel, Wainwright's ocean. *Whites.*—Coleworth's white lion, Moore's white bear, Crompton's Sheba queen, Saunders's Cheshire lass, Wellington's glory, Woodward's whitesmith.

The gooseberry will succeed in almost any soil, where the ground is soft and moist, and situated on a dry subsoil. The tree may be raised from cuttings, from suckers, or from seeds: the former is generally resorted to as being the more expeditious; and seeds are only sown to raise new varieties. The propagation and general management is precisely similar to the currant. The mode of training and managing the gooseberry for prize exhibition is given by Mr. Saul of Lancaster. (*Gard. Mag.* vol. x.)

No simple effectual remedy has yet been discovered for the destruction of the caterpillars which infest gooseberry bushes. Fumigation, dusting with lime, and other methods, have been recommended, but they do not always answer the purpose.

GOOSE-CORN. A local name for the moss rush (*Juncus squarrosus*). See RUSH.

GOOSEFOOT. (*Chenopodium.*) An extensive genus of plants, of which thirteen native species are enumerated by Sir J. E. Smith, viz. 1. Mercury goosefoot (*C. bonus Henricus*), growing in waste ground and by road sides frequent, and occasionally in pastures. The root is branching and fleshy; the herb dark green, nearly smooth; stem a foot high, terminating in a compound crowded cluster, or spike, of numerous green flowers; their stalks sometimes unctuous and mealy. This, our only perennial Chenopodium, may be eaten, when young, like spinach, and is cultivated for the table in some parts of Lincolnshire. It is insipid and mucilaginous, rather mawkish, and soon becomes tough and fibrous. Neither goats nor sheep relish this plant, which is also refused by cattle and hogs; 2. The upright goosefoot (*C. urbicum*), and 3., The red goosefoot, also occur commonly on waste ground; the former sometimes on dunghills, and the latter in low muddy situations. In exposed situations the whole herb of *C. ru-*

brum assumes a red colour. This species and its allies are said to be poisonous to swine; 4. The many spiked goosefoot (*C botryoides*); 5. The nettle-leaved goosefoot, 6. The maple-leaved goosefoot, call for no observation. The whole plant of the two last species is fetid; 7. White goosefoot, or common wild orache (*C. album*), is found in cultivated as well as waste ground, everywhere. The herb is mealy, with a silvery unctuous pubescence, which, by age, becomes dry and chaffy. The young plant is reported to be eatable when boiled, and is known by the name of fat-hen in some parts of Norfolk. It is eaten by cattle, sheep, and hogs, which last devour it with avidity. 8. The fig-leaved goosefoot (*C. ficifolium*) flourishes most on dunghills, especially about London; 9. The oak-leaved goosefoot (*C. glaucum*) varies in height from two inches to two feet, and grows for the most part on a sandy soil; 10. Standing goosefoot (*C. olidum*). This species is found very commonly among sand or rubbish near the sea. The whole herb is of a dull greyish-green, covered with a greasy mealiness, which, when touched, exhales a strong, permanent, nauseous odour, like stale salt fish. It is, nevertheless, eaten by cattle, horses, goats, and sheep, but refused by swine; 11. The round-leaved, or all-seed goosefoot, or upright blite (*C. polyspermum*), 12. The sharp entire-leaved goosefoot (*C. acutifolium*), are two other species, which are less common. The former is a curious plant, whose numerous black shining seeds might perhaps be advantageously employed in fattening poultry; 13. The sea goosefoot, small glasswort, or sea blite (*C. maritimum*): this species abounds on the sea shore, and grows also in sandy as well as muddy places, flowering in July and August. Stem thick and juicy, leaves smooth, about an inch long, salt to the taste, of a light bright green. Dr. Withering mentions this as an excellent pot-herb. In Siberia and Astracan the inhabitants obtain from this plant their potash, which probably partakes more of the nature of soda. The alkaline salt contained in this herb renders it serviceable in making glass, though it is inferior to some kinds of salsola found in the south of Europe. (*Smith's Eng. Flor.* vol. ii. pp. 9. 16.)

GOOSE-GRASS. See HARIFF.

GORDONIA. This is a genus of elegant plants, well deserving of extensive cultivation on account of their large and beautiful flowers. The plants are hardy enough to stand our British winters in the open air, yet the young shoots often get injured, owing to the shortness of our summer not suffering them to ripen the wood, or even to flower in perfection: they should therefore be treated as greenhouse plant
best soil for them is peat, mixed
little loam: they are readily incr
layers, or cuttings in sand, under
(*Paxton's Bot. Dict.*) Cobbet desc
large white flowers of *G. pubescen*
grows from ten to twenty feet high,
nificent.

GOSHAWK. (*Aster palumbariu*
goshawk was formerly in esteem a
coners, and was flown at hares,
pheasants, grouse, and partridges.
in powers to the falcons, though
size to the largest of them, the go
yet the best of the short-winge
This is a rare species in the south
land, and the few that are used fo
are obtained from the Continent.
grown female measures from twent
twenty-four inches in length; the
fourth, and sometimes one third l
general colour of the plumage i
brown; the throat, breast, belly, a
nearly white, with spots, transv
and undulating lines of dull black
toes, yellow. (*Yarrell's Brit. Bi*
p. 57.)

GOSS. A term provincially
the whin. It is sometimes writt
See FURZE.

GOUANIA. (So named in
Anthony Gouan, once Professor
at Montpelier, and author of th
Montpeliensis.) A genus of i
evergreen climbers, growing abou
high, and succeeding well in a m
peat and loom; cuttings root free
under a glass. (*Paxton's Bot. Di*

GOUD AND GOWLANS.
names for the common marigold.

GOURD. (*Cucurbita.*) A ge
otic plants comprising nine species
the following are the principal:—1
pion or pumpkin (*C. Pepo*), which
of both the Indies. It is chiefly
in the making of pies, &c. There
merous varieties of it, varying in
and colour of their fruit; as,
bular, oval, pear-shaped, green,
marbled, yellow, &c. One vari
pale buff or salmon colour, and
form, grows to the weight of 11
upwards; it is known in Franc
potiron jaune, and used in soups, in
ticular from being mashed and ea
tatoes or turnips, being of a very
and peculiar flavour. (*Trans.*
Lond. vol. iii. p. 364.)

The bottle-shaped gourd (*C. la*
of little use for culinary purposes,
markable as being of the form of a
or oil-flask. In the wild state it is
2. The squash (*C. melopepo*). 3.

row (*C. succada*). Both these
ed for the fruit, which, being
en of the size of a goose's egg,
ole in salt and water, laid upon
eaten as asparagus. Of the
e are almost as many varieties
ompion, and similarly charac-
e young fruit is much used in

propagated by seed, which may
hotbed of moderate strength,
e or hand-glasses, at the end
early in April. In May they
in the open ground beneath a
o remain, or in a hotbed if at
ement, to forward the plants
ting at its close, or early in

are fit for transplanting when
four rough leaves, or when of
nth's growth. They must be
out any shelter on dunghills, or
pared as directed for the open-
of cucumbers. Some may be
eath pales, walls, or hedges, to
egularly over them, on account
mental appearance. They may
every respect like the cucum-
y do not want so much care.
e abundance of water in dry
hen the runners have extended
ey may be pegged down and
earth at a joint; this will
duction of roots, and the longer
of the plant in vigour. The
should be selected and treated
or the cucumber. It is ripe in
f September or October. (*G.*
Kitchen Garden.)

EED, COMMON, or HERB
, ASH-WEED, or GROUND
opodium podagraria.) An her-
genous perennial plant, growing
gardens, pastures, and hedges,
g in May or June. Its creep-
ach to a great extent, and are
t of extirpation. The stems
two feet in height, bearing
owded pure white flowers. The
ently aromatic, with some acri-
ich flavours the herb also par-
root has been used as a cata-
gout, whence the specific name.
are very tender, and may be
n the spring among other pot-
nutritive rather than medicinal
lities. Cattle, sheep, and goats
bly fond of this weed, but horses
Eng. Flor. vol. ii. p. 77.)

ER, JOHN, a native of Ger-
to this country in the middle of
ury, being for some time a pupil
iller. He afterwards received the appointment of gardener to the King of Naples at Caserta, through the interest of Sir J. Banks. He continued gardener at Caserta during the usurpation of Murat, but was murdered near his own house in 1816. He published

A Descriptive Catalogue of upwards of 1100 Species and Varieties of Herbaceous or Perennial Plants, divided into six columns; exhibiting, at one view, their Names, Magnitude, Height, and Situation; time of flowering, Colour of their Flowers, and the native country of each species. With a list of hardy Ferns for the Decoration of the Northern Borders, and the most Ornamental Annuals. London. 1789. 8vo.

GRAFTING. In horticulture, the operation of affixing one portion of a plant to another in such a manner as that a vital union may take place between them. Grafting has been practised from the most remote antiquity; but its origin and invention are differently related by naturalists. Grafting may be performed both with herbaceous and ligneous plants; but, in practice, it is chiefly confined to the latter, and more especially to the propagation of esteemed varieties of fruit-trees. A grafted plant consists of two parts: the stock or stem, which is a rooted plant fixed in the ground, and the scion, sometimes, but erroneously, termed the graft, which is a detached portion of another plant to be affixed to it. The operation of grafting can only be performed within certain physiological limits; but what these are, science has not yet absolutely determined. In general, all the species of one genus may be grafted on another reciprocally; but this is not universally the case, because the apple cannot be grafted on the pear, at least not for any useful purpose. In general, it may be presumed that all the species of a natural order, or at least of a tribe, may be grafted on one another; but this does not hold good universally. The reverse of this doctrine, however, viz. that the species belonging to different natural orders cannot be grafted on one another, holds almost universally true; and, therefore, a safe practical conclusion is, that in choosing a stock, the nearer in affinity the species to which that stock belongs is to the scion, the more certain will be the success.

Grafting is one of the most important operations in horticulture, as affording the most eligible means of multiplying and perpetuating all our best varieties of fruit-trees, and many kinds of trees and shrubs not so conveniently propagated by other means. Varieties of fruits are originally procured by selection from plants raised from seed, but they can only be perpetuated by some mode which continues the individual; and though this may be done by cuttings and layers, yet by far the most eligible mode is by grafting, as it produces stronger plants in a shorter time than any other methods. Grafting is performed in a great many different ways; but the most eligible for ordinary purposes is what is commonly called splice-grafting, whip-grafting, or tongue-grafting. In executing this mode, both the scion and the stock are pared down in a slanting direction; afterwards applied together, and made fast with strands of bass matting, in the same manner as two pieces of rod are spliced together to form a whip-handle. To insure success, it is essentially necessary that the alburnum, or inner bark of the scion, should coincide accurately with the inner bark of the stock; because the vital union is effected by the sap of the stock rising up through the soft wood of the scion. After the scion is tied to the stock, the graft is said to be made; and it only remains to cover the part tied with a mass of tempered clay, or any convenient composition that will exclude the air. Some of the other modes practised are termed cleft, or slit-grafting, crown-grafting, cheek-grafting, side-grafting, and grafting by approach, or inarching.

The season for performing the operation is, for all deciduous trees and shrubs, the spring, immediately before the movement of the sap. The spring is also the most favourable period for evergreens: but the sap in this class of plants being more in motion during winter than that of deciduous plants, grafting, if thought necessary, might be performed at that season.

Grafting Timber Trees.—The oak, ash, hornbeam, and hazel, may be grafted, but there is a little difficulty in grafting some of the hard-wood trees. On the oak may be worked its striped-leaved variety of *pedunculata*, and the varieties of *sessiliflora*. The Lucombe, and other oaks of that kind, require to have the Turkey oak for a stock; and the evergreen, or Ilex oaks, must have their own species. The common ash will take with the *ornus*, and any of the hardy varieties of true ashes, such as the Chinese and entire-leaved. The hornbeam may be used as a stock for *Carpinus orientalis*, and the cut-leaved sort; but the scions must be from two years old wood. The purple-leaved hazel may be grafted on the hazel stocks.

Grafting by approach, or inarching, is a mode of grafting, in which, to make sure of success, the scion is not separated from the parent plant till it has become united with the stock. Inarching is chiefly practised with oranges, myrtles, jasmines, walnuts, firs, &c., which do not flourish by the common mode of grafting.

Grafting herbaceous plants differs in nothing from grafting such as are of a woody nature, excepting that this operation is performed when both stock and scion
state of vigorous growth. The on
purpose to which this mode has been
applied is, that of grafting the finer
dahlias on tubers of the more com
vigourous-growing sorts. In the
dens, the tomato is sometimes g
the potato, the cauliflower on t
cole, and one gourd on another,
of curiosity.

Grafting the herbaceous shoots
plants is scarcely known among
gardeners; but it has been extens
ployed by French nurserymen, an
some of the royal forests of Fran
scions are formed of the points of
shoots; and the stocks are also the
growing shoots, cut or broken ove
or two below the point, where th
as brittle as asparagus. The op
performed in the cleft manner;
cutting the lower end of the sc
form of a wedge, and inserting it
or slit made down the middle of
The finer kinds of azaleas, pines
are propagated in this way in th
nurseries; and thousands of *Pi*
have been so grafted on *Pinus sy*
the forest of Fontainebleau. At
House, near Edinburgh, this
grafting has been successfully prac
Abies Smithiana, the stock being
mon spruce fir. (*Brande's Dict. o*

GRAIN. (French, *graine*;
Norv. *grion*, corn.) The general
all kinds of corn. See WHEAT, O
LEY, CORN-LAWS, &c. It means,
sense, the seed of any fruit, the
of the fibres of wood, &c.; th
the surface, with regard to rou
smoothness; or a minute particle
article I have only to insert those
regard to grain that could not
cluded under other heads. It has
culated that the total consumptio
and other grain in the United Kin
a year—of wheat 12,000,000 quar
other grain 40,000,000 quarters,
52,000,000 quarters, or per da
quarters. (*Quart. Journ. of Agr.*
1063.) Of this about 25,000,000
barley are consumed in malt by
eries and distilleries.

Dr. Colquhoun has calculated
annual consumption of grain in E
each person is as follows:—

Species of Grain	Avera each P
Wheat - -	*1
Barley - -	1
Oats - -	1
Rye - -	1
Beans and Peas -	1

cond Fiar Prices of Grain per imperial rter for the County of Haddington from 7 (at Intervals of Ten Years) to 1829.

Wheat.			Barley.			Oats.		
£	s.	d.	£	s.	d.	£	s.	d.
1	13	4½	0	16	0¼	0	13	0¼
2	4	8½	1	13	0¾	1	4	0¼
1	10	0¼	0	15	2½	0	12	2¼
0	18	10¼	0	11	5¼	0	9	1¾
1	0	0¼	0	11	5¼	0	8	1
1	8	8½	0	18	11¾	0	12	9¾
1	10	0¼	0	19	9¼	0	12	2¼
1	5	8¼	0	17	2	0	12	11
1	2	8¼	0	15	2¼	0	10	9¾
1	4	4¼	0	11	5¼	0	10	6¼
2	0	0¼	1	2	10¾	0	18	3¼
1	5	10¼	0	13	2	0	11	10½
1	4	0¼	0	11	2¼	0	9	10
1	12	0¼	0	18	9¼	0	15	6¾
1	18	0¼	0	19	1¼	0	15	9¼
2	5	6¼	1	3	7	0	19	6¾
6	6	4¼	3	4	6	2	8	11¼
4	1	1¼	2	1	3¾	1	8	10
3	1	5¼	1	8	10	1	3	6

ge Price of Grain per Quarter in Eng- and Wales, for Twenty Years, ending 0.

Wheat.		Barley.		Oats.		Beans.		Peas.	
s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
56	2	26	0	19	6	30	11	32	9
44	7	21	11	18	2	24	6	26	5
53	5	31	7	22	11	33	1	35	0
64	0	36	5	24	10	40	10	40	8
68	7	40	1	25	8	42	10	45	5
58	9	34	5	26	9	44	3	47	8
56	9	36	6	27	4	47	7	47	7
60	5	32	10	22	6	38	4	40	6
66	3	32	6	22	9	36	8	36	8
64	3	32	7	24	5	36	1	39	2
66	4	38	0	25	4	39	10	41	11
58	8	33	1	20	5	36	5	37	0
52	11	27	6	18	5	35	1	37	0
46	2	29	0	20	11	36	7	33	0
39	4	29	11	22	0	30	0	30	3
48	9	33	2	23	1	38	4	37	3
55	10	30	4	23	1	38	7	37	9
64	4	31	5	22	5	37	4	36	8
70	6	39	1	26	6	41	3	41	1
66	6	36	3	25	9	43	6	42	5

ANARY. A place where corn is . These have of necessity been con- ed in all ages of the world, and of dif- materials, according to the facilities ed for their construction by the neigh- ood in which they are placed; in nd they are commonly, for farming ses, made of wood or brick. In Sicily ublic granaries are in some places hol- out of the solid rock. According to a rn authority (*Brit. Husb.* vol. i. p. 94.), best situation for a granary is over the hing floor. It may be easily secured vermin; and requiring only six feet in t, it will not interfere materially with ays of the barn, especially if they be d through the gables. A trap-door in oor, with a roof and pulley, raises and s the load in the most easy manner, es securing it more effectually from de- ators, and strong wired windows at each entilate it sufficiently. The most general , however, of forming granaries, is to erect them of timber, and place them upon pillars of stone or wood. It has been suggested that corn kept in granaries would be effectually protected from the ravages of the weevil, by mixing with it a small quantity of common salt. See CORN-MOTH, WEEVIL, and CORN.

GRAINS, BREWERS', are very extensively used in the feeding of live stock. They consist chiefly of the husk, and other insoluble matters of the corn employed in the operation of brewing. When speaking of the large dairies of the metropolis, Mr. Youatt remarks, "The principal food of the cows in all these is grains; and as the brewing seasons are chiefly in autumn and spring, a stock of grains is generally laid in at those seasons for the rest of the year. The grains are laid up in pits lined with brick-work, set in cement, from ten to twenty feet deep, and of any convenient size. They are firmly trodden down, and covered with a layer of moist earth eight or nine inches thick, to keep out the rain and frost in winter, and the heat in summer. A cow consumes about a bushel of these grains daily, the cost of which is from fourpence to fivepence, exclusive of carriage and preservation. The grains are, if possible, thrown into the pit while warm and in a state of fermentation, and they soon turn sour; but they are not liked the worse by cattle on that account: and the air being perfectly excluded, the fermentation cannot run on to putrefaction. The dairy-men say that the slow and slight degree of fermentation which goes on tends to the greater development of the saccharine and nutritive principle, and they will have as large a stock on hand as they can afford, and not open the pits till they are compelled. It is not uncommon for two years to pass before a pit of grains is touched; and it is said that some have lain nine years, and been perfectly good at the expiration of that period. The grains from a large ale brewery are the most nourishing; those from the porter brewers, not so good; and those from the little ale brewers hardly worth having. It is found by the distillers, that rough clover chaff, mixed with grains and wash, will fatten to any extent." (*On Cattle*, pp. 255—264.) Grains fresh from the mash-tub, either alone or mixed with oats or chaff, or both, may be occasionally given to horses of slow work: they would, however, afford very insufficient nourishment for horses of quicker or harder work. Grains, in common with most vegetable substances, are an excellent dressing for grass lands, an application which is thus described in a recent communication to the editor of the *Mark Lane Express*, by Mr. W. H. Buckland of Glamorganshire.

"Having observed the remarkable luxuriance of the grass on a small portion of land upon which some brewers' grains had been scattered, I was induced to manure several meadows with grains mixed with stable-dung, and a few acres with grains only. The crop of hay is an extraordinary one off the land manured with grains and stable-dung together; but from the land manured with *grains alone*, the crop is *prodigious*. On one part of a steep declivity, where the ordinary produce has been about 10 or 12 cwt. of hay to the acre, and the quality very coarse, a good sprinkling of grains was strewed, leaving the other part of the same ground untouched. Where the grains were spread, there is more than two tons of hay to the acre, and the grass is of the finest quality; where no grains were applied, the crop is as usual, both as to quantity and quality.

In addition to the abundance of the crop, is the advantage of its earliness. On the 29th of May I mowed a field manured with grains. The grass was over-ripe, and might have been cut a week sooner. The neighbouring fields, not so manured, were full three weeks later. This is a matter of no little importance in this part of the country, where the weather is generally dry about the end of May and beginning of June, when there is no grass fit to cut; and almost invariably wet about the end of June and beginning of July, when all the farmers are busy hay-making."

GRAND JURY. The number of grand jurymen sworn at the sessions is usually twenty-three, who are taken either from the list of jurymen returned by the sheriff at the quarter sessions, or from the list of county magistrates at the assizes, the clerk of the peace calling them according to their seniority; and when they have chosen their foreman, he administers to him the following oath:—

"You, as foreman of this inquest, shall diligently enquire, and true presentment make, of all such matters and things as shall be given you in charge. The queen's council, your fellows', and your own, you shall keep secret. You shall present no man for envy, hatred, or malice, neither shall you leave any man unpresented for fear, favour, or affection, or hope of reward, but you shall present all things truly, as they come to your knowledge, according to the best of your understanding."

The grand jury are then sworn, generally three at a time, to observe and keep the same oath as their foreman.

The duty of a grand jury is not, as is sometimes erroneously concluded, to try the prisoner, but to consider, from the evidence brought before them, whether
a fair and reasonable case, as
them to call upon the prisoner
accusation. From a mistaken
duty, in this respect, much val
commonly wasted both at the
the assizes.

Persons who have been ret
sheriff as jurors, who claim a
must attend before the court
their privilege; the sheriff h
whatever may be the case,
such claim (2 Inst. 448.); and
their appearing when their nam
it will be a contempt towar
who have full power, *after the o*
has been duly summoned, to fine
(6 *G*. 4. *c*. 50. *s*. 38. *Rex*. v.
and Ald. 223.) See also JURY

GRAPE VINE. See VINE

GRASS. (Goth. *gras*; Ice
gro, to germinate, to sprout.)
herbage of the field, on which

The grasses, it has been of
said, "are nature's care." The
no class of the vegetable world
derstood as this. "Grass," s
Martyn, "vulgarly forms one
and a husbandman, when he is
his enclosure, does not dream
upwards of three hundred spe
of which thirty or forty may
under his eye. They have s
name besides the general on
these twenty years; and the f
names which have been given
from having obtained general
we may fairly assert that the k
this most common and useful t
is yet in its infancy." (*Letter*
xiii.) It is certain, however, th
fessor Martyn wrote, much ha
to add to our knowledge of the

The botanist has shown th
more than 130 distinct native
varieties of grass in Great Brit
sessing distinct properties, an
their degrees of value to the
the most worthless, to those
successful farming chiefly de
researches, too, commenced by t
of Bedford, and carried on duri
years in the grass garden at W
added very materially to our st
ledge concerning these plants;
with a public object, and unde
and skilful management of on
liest correspondents, the late
Sinclair, the results were give
the public in the *Hortus Gra*
burnensis, a valuable and elabor
which I am chiefly indebted fo
of this, and other articles upon

tical arrangement of grasses is
id unsatisfactory task, and has
attention of many botanists.
cent work upon the subject is
ostographia, published at Berlin

g the mixture of grass seeds
le for the farmer's soil, many
s must be taken into the cal-
t only the nature of the soil,
ly of water to which its habits
adapted, but also the objects
rmer has in view. Thus, the
tail (*Alopecurus pratensis*),
arly, nutritive, and productive
es more than two years to arrive
: it is therefore better adapted
t pasture than for the alternate
And then, again, the meadow
'hleum pratense), although re-
producing the most nutritious
the grasses, and that, too, in
le bulk, yields aftermath of
lue. Valuable, therefore, as it
t is of little consideration for
poses, if sown by itself; it
re be combined with other
he cock's-foot (*Dactylis glome-*
soon arrives at perfection, and
nd late a profusion of leaves,
ighly nutritive, has culms or
le value: it is a grass, there-
rofitable for feeding purposes.
e different relations, therefore,"
Sinclair, "a grass should be
efore it is absolutely rejected,
ately recommended."
ledge of the relative nutritive
ained in different grasses will,
be a highly important object
s connected with their feeding
t as throwing considerable light
rs of the different grasses to
mpoverish the soil, a question
examine more at length under
otation of Crops." A more in-
tensive knowledge, with regard
sition of plants, may be derived
examination of their external
han many persons would deem
he following are some of the
ts of the observations of Sin-

which have culms with swollen
thick and succulent, and flowers
husks, contain greater propor-
r and mucilage, than those of a
t nature.
his structure is of a light glau-
the sugar is generally in excess.
which have culms with small
s pointed, collected into a spike
panicle; leaves thin, flat, rough, and of a light green colour, contain a greater proportion of extractive matter than others.

4. Grasses which have culms furnished with numerous joints; leaves smooth and succulent; flowers in a spike or close panicle; florets blunt and large, contain most gluten and mucilage.

5. When this structure is of a glaucous colour, and the florets woolly, sugar is in the next proportion to mucilage.

6. Grasses which have their flowers in a panicle, florets pointed or awned, points of the culm smooth and succulent, contain most mucilage and extractive.

7. Grasses with flowers in a panicle; florets thinly scattered, pointed, or furnished with long awns; culms lofty, with leaves flat and rough, contain a greater proportion of saline matter and bitter extractive.

8. Grasses with strong creeping roots; culms few; leaves flat and rough; flower in a spike, contain a greater proportion of bitter extract with mucilage." (*Hort. Gram. Wob.* p. 42.)

In the first part of April 1920 grains of the leaves of the following grasses, &c. afford, according to Mr. G. Sinclair, the following proportions of nutritive matter:—

	Grs.
Meadow foxtail-grass	96
Tall oat-like soft-grass	120
Sweet-scented vernal	52
Round-panicled cock's-foot	80
Perennial rye-grass	70
Tall fescue	94
Meadow fescue	96
Crested dog's-tail	88
Woolly soft-grass	80
Creeping soft-grass	90
Meadow cat's-tail	80
Fertile meadow-grass	70
Nerved meadow-grass	76
Smooth awnless brome-grass	84
Wood meadow-grass	68
Smooth fescue	70
Long-awned sheeps' fescue	102
Darnel-like fescue	110
Creeping bent, or fiorin	42
Wood fiorin	62
Yellow vetchling	40
Rough-stalked meadow-grass	80
Broad-leaved red clover	80
White or Dutch clover	64
Common quaking grass	54
Greater bird's-foot trefoil	60
Long-rooted clover	76
Lucern	90
Bunias	100
Burnet	100
Cow parsnip	90

(*Ibid*, p. 239.)

It may not be uninteresting to the cultivator to learn of what these nutritive matters consist: the following is the result of Mr. Sinclair's examinations:—

100 grains of the Nutritive Matter of the	Mucilage, or Starch.	Sacch. Matter, or Sugar.	Gluten.	Bitter Extractive and Saline Matters.
Meadow foxtail consist of - -	64	8	-	28
Meadow fescue -	59	20	-	20
Rye-grass - -	65	7	-	28
Meadow cat's-tail -	74	10	-	16
Cock's-foot - -	59	11	-	30
Meadow-oat -	80	10	-	10
White clover (in flower) - -	77	2	7	14
Red clover (ditto) -	79	8	5	8
Tares - -	68	25	-	7
Fiorin (*Agrostis stolonifera*) - -	55	5	-	40

3000 grains of the Green Herbage of	Woody, or Indigestible Fibre.	Water.	Nutritive Matter.
Tares consist of -	557	2250	193
White clover -	470	2430	100
Cock's-foot grass -	1135	1740	125
Meadow-fescue -	1260	1590	150

(*Sinclair's Hort. Gram. Wob.* p. 240, 241.)

The chemical composition of the grasses varies very materially in the progress of their growth, a fact well worthy of the farmer's serious attention in more ways than one. "I found," says Davy, "in all the trials I made, the largest quantity of truly nutritive matter when the seed was ripe, and least bitter extract and saline matter; most extract and saline matter in the autumnal crop, and most saccharine matter in proportion to the other ingredients in the crop cut at the time of flowering. I shall give one instance:

100 parts of the soluble matter obtained from the round panicled cock's-foot grass (*Dactylis glomerata*), cut in flower, afforded, of

	Parts.
Sugar - - -	18
Mucilage - - -	67
Extract, saline matters, &c. -	15
	100

100 parts of the soluble matter from the seed crop afforded —

Sugar - - -	9
Mucilage - - -	85
Extract, &c. - -	6
	100

100 parts of soluble matter from the aftermath crop gave, of

Sugar - - -	11
Mucilage - - -	59
Extract - - -	30
	100

(*Elem. of Agr. Chem.* 477.)

The seeds of the Grasses. — The ripening of the seeds of the essential grasses (says *Sinclair*) takes place at three different periods of the season, or, if they ar
according to the time about wh
species ripens its seed, they will f
divisions or groups; the first, co
the earliest species, perfect their s
the end of June — such as the swe
vernal-grass and the narrow-leave
grass: the second, consisting of t
fescue grass, and others, about t
July; and the third, such as the f
and others, about the first or seco
September, as may be seen fro
lowing

*Table of the average Periods at
ferent Species of Grasses ripen
drawn up by the late Mr. G. Si
the Details of Ten Years' pract
vation and Experiment.*

Annual meadow-grass (*Poa annua*) fro

Sweet-scented vernal grass (*Anthoxanth*
ratum) - - -
Soft annual brome-grass (*Bromus mollis*)
Silver-hair, hair-grass (*Aira caryophylla*)
Bitter vernal grass (*Anthoxanthum amar*
Sheathed cotton-grass (*Eriophorum vagin*
Narrow-leaved cotton-grass (*E. angustif*
One-flowered melic-grass (*Melica unifor*
Spring millet-grass (*Milium vernale*)
Alpine meadow-grass (*Poa alpina*) -
Narrow-leaved meadow-grass (*P. angust*
Blue meadow-grass (*Sesleria cærulea*)
Meadow foxtail-grass (*Alopecurus praten*
Sweet-scented soft-grass (abortive ge
(*Holcus odoratus repens*) -

Barley-like fescue (*Festuca ovina hordeifo*

Small-flowered oat-grass (*Avena parvifl*
Long-flowered (*Bromus longiflorus*)
Glaucous fescue (*Festuca glauca*) -
Hungarian (*Festuca pannonica*) -
Hard wheat-grass (*Triticum nardus*)
Smooth meadow-grass (*Poa pratensis*)
Woolly soft-grass (*Holcus lanatus*) -
Creeping soft-grass (*Holcus mollis*)
Field or meadow brome-grass (*Bromus ar*
Jointed foxtail (*Alopecurus geniculatus*)
Bulbous meadow-grass (*Poa bulbosus*) -
Yellow oat-grass (*Avena pubescens*)
Blue meadow-grass (*Poa cærulea*) -
Nodding panicled bent-grass (*Bromus*
rum) - - -
Crested dog's-tail (*Cynosurus cristatus*)
Horn of plenty (*Cornucopia cucullatum*)
Round-headed cock's-foot grass (*Dactyli*
rata) - - -
Glaucous cock's-foot grass (*D. glaucescen*
Striped cock's-foot grass (*D. variegata*)
Striped American variety (*D. American*
Wood fescue (*Festuca dumetorum*)
Perennial rye-grass (*Lolium perenne*)
Russell-grass (*Lolium Russellianum*) -
Reflexed meadow-grass (*Poa distans*)
Rigid meadow-grass (*P. rigida*) -
Rough-stalked meadow-grass (*P. trivial*
Smooth-leaved fescue-grass (*Festuca glabr*
Creeping fescue-grass (*Festuca rubra*)
Common quaking grass (*Briza media*)
Melilot clover (*Trifolium Melilotus offici*
Upright brome-grass (*Bromus erectus*)
Bush vetch (*Vicia sepium*) - -
Sheep's fescue-grass (*Festuca ovina*)
Early hair-grass (*Aira præcox*) -
Water hair-grass (*A. aquatica*) -
Crested hair-grass (*A. cristata*) -
Gigantic brome-grass (*Bromus gigante*
Slender oat-grass (*Avena fragilis*) -
Eastern oat-grass (*A. orientalis*) -
Meadow oat-grass (*A. pratensis*) -
Two-rowed brome-grass (*Bromus distach*
Wall brome-grass (*B. diandrus*) -
Tongue-formed brome-grass (*B. ligustic*

	July.
ome-grass (*Bromus maximus*)	21
-grass (*B. unioloides*)	21
(*Milium effusum*)	21
-grass (*Festuca bromoides*)	21
(*F. duriuscula*)	30
ass (*Bromus cristatus*)	30
ass (*Festuca gracilis*)	30
scue (*F. ovina tenuis*)	30
ass (*F. pratensis*)	30
cue (*F. tenuifolia*)	30
(*F. vivipara*)	30
(*Phalaris arenaria*)	30
as (*Melica ciliata*)	27 — 31
rass (*Poa nervata*)	30
cue (*Festuca loliacea*)	21
t's-tail (*Phleum pratense mi-*	25
nosurus cruciformis*)	21
(*Phleum pratense*)	25
ass (*Poa nemoralis*)	30
at's-tail grass (*Phleum nodo-*	30
rass (*Poa fertilis*)	30
trefoil (*Lotus major*)	30
t trefoil (*L. minor*)	30
e (*Festuca Myurus*)	29
-grass (*Poa cæsia*)	27
-barley (*Hordeum murinum*)	30
icia Thouinii*)	30
s (*Festuca Cambrica*)	20 — 30
cia stricta*)	20 — 30
	August
(*Aira cristata*)	2
Elymus giganteus)	2
w-grass (*Poa decumbens*)	3
(*Triticum spelta*)	3
ass (*Triticum tenue*)	4
ass (*Triticum caninum*)	4
ass (*Triticum caninum* var.)	4
ss (*Agrostis vulgaris*)	4
(*Nardus stricta*)	5
re (*Ervum Ervilia*)	4
grass (*Avena planiculmis*)	6
m hirsutum)	6
(*Ervum tetraspermum*)	6
-grass (*Poa glauca*)	6
low-grass (*Poa procumbens*)	6
er (*Trifolium macrorhizum*)	6
(*Agrostis sylvaticus*)	6
-grass (*Festuca elatior fertilis*)	6
rome-grass (*Bromus multiflo-*	5
e-grass (*Elymus Philadelphi-*	6 — 20
a sordida)	6 — 20
tch (*Vicia tenuifolia*)	6
-grass (*Holcus avenaceus mu-*	7
(*Bromus rubens*)	9
ass (*Melica Bauhini*)	9
e (*Festuca alopecuroides*)	10 — 23
rass (*Elymus hystrix*)	10
ss (*Bromus sterilis*)	10
(*Elymus geniculatus*)	10
a flavescens)	20
undo Calamagrostis)	21 — 30
rass (*Hordeum pratense*)	21
ome (*Bromus angustifolius*)	24
(*Lolium tenue*)	24
rome-grass (*Bromus lanceola-*	24
chis sativa)	24
	Sept.
rass (*Bromus pinnatus*)	28 — 5
(*Agrostis canina*)	29 — 30
ent (*A. vulgaris fascicularis*)	29
ticum repens)	30
ia sylvatica)	30
	September
cia cracca)	4 — 12
(*Avena alopecuroides*)	5 — 12
ent (*Agrostis canina* var. *mu-*	5
(*Agrostis alba*)	6 — 15
tolonifera)	8
ers.	October
ass (*Arundo phragmites*)	10 — 15
foot (*Dactylis cynosuroides*)	10
(*Triticum rigidum*)	12 — 13

x others (*Sinclair's Hort. Gram.*

Of these grasses the chief and most useful species and varieties are always kept on sale by Messrs. T. Gibbs & Co., the corner of Half Moon Street, Piccadilly: these are comprehended in the following list:—

Agrostis canina.
Agrostis stolonifera.
Alopecurus pratensis.
Anthoxanthum odoratum.
Avena flavescens.
Avena pratensis.
Briza media.
Bromus arvensis.
Cow grass, or perennial red clover.
Cynosurus cristatus.
Dactylis glomerata.
Festuca cambrica.
Festuca duriuscula.
Festuca fluitans.
Festuca glabra.
Festuca heterophylla.
Festuca hordeiformis.
Festuca ovina.
Festuca pratensis.
Festuca rubra.
Festuca sylvatica.
Festuca tenuifolia.
Holcus avenaceus.
Holcus lanatus.
Hordeum pratensis.
Lolium perenne.
Phleum pratensis.
Poa annua.
Poa cærulea.
Poa fertilis.
Poa nemoralis.
Poa nervata.
Poa pratensis.
Poa trivialis.
Red suckling.
Rib-grass.
Trefoil.
White or Dutch clover.
Yarrow.

From some experiments, given in the *Trans. High. Soc.* vol. ii. p. 250., by Messrs. Lawson & Co., it would seem that the raising of the seeds of the artificial grasses is attended with considerable profit.

The late Mr. Blakie suggested a very excellent plan for saving the seeds of down grasses, or of those grasses which are peculiarly adapted for elevated dry soils (*Farmer's Journ.* March 17. 1823.); viz. to fence off a sufficient portion of these pastures, choosing such portions as have the best kind of grasses; and to mow these enclosures for seed in succession, at three, four, or more different periods of the season. "By these means," said Mr. G. Sinclair, "the seeds of the early, midsummer and late vegetating grasses will be obtained, and which could not, it is evident, be obtained by one mowing in one season. This is," he adds, "a highly valuable mode of obtaining the seeds of those grasses adapted for downs; which, to cultivate separately for the seed, would be a fruitless undertaking. Fence the selected turf well, and early in the season, and prepare for mowing by picking the stones or rubbish from the surface, and by rolling. As the seeds ripen, employ a careful bird-watcher. Mow in dry favourable weather. If the swaths are heavy, they should be turned with great caution, so as not to shake out the ripe seeds. As soon as the mowing is dry, the seed should be immediately thrashed out on a close woven cloth in the field, and on a dry day; and when a certain portion of the later grasses ripen their seed, another mowing should be effected, and so on, until all the grasses in the enclosure have perfected their seed. (*Hort. Gram. Wob.* p. 39. 40.) As every different soil," continues Sinclair, in another portion of his invaluable work, "produces grasses peculiar to itself, and as *no other* kinds can be established or cultivated upon it without first changing its nature to resemble that which produced the kind of grasses we wish to introduce; it becomes a point of the first importance in making experiments on different species of this numerous family of plants, and in stating the results, to determine with sufficient accuracy the nature of the soil or different soils employed. The basis of every improvement in the cultivation of grasses is to sow the seeds of those species only which are adapted to the soil, or to change the nature of unsuitable soils to that which is fitted for the growth of grasses most desirable to be cultivated; and unless this important point is in the first place attended to, disappointment, rather than success, may be expected to follow the labours of the farmer."

1. *Of the grasses of rich natural pastures.*— Every farmer is aware that peculiar grasses are the productive tenants of his rich natural pastures, and that if these are ploughed up, and a course of grain crops taken from the soil, a considerable period elapses before the turf with which it was formerly covered can be restored. George Sinclair carefully noted this fact, and examined not altogether unsuccessfully its cause. He observed that "the different grasses and other plants which compose the produce of the richest natural pastures are in number twenty-six, and that from the spring to the end of autumn there is not a month that does not constitute the particular season of luxuriance of one or more of these grasses; hence proceeds the constant supply of rich succulent herbage throughout the whole of the season, a circumstance which but seldom or never happens in artificial pastures, where the herbage consists of two or three plants only. The plants which usually tenant the best natural pastures are the meadow foxtail, round cock's-foot, meadow fescue, meadow cat's-tail, sweet-scented vernal grass, tall oat-like soft-grass, creeping vetch, rye-grass, field brome-grass, annual meadow or Suffolk grass, meadow oat-grass: these yield the principal grass in the spring, and a chief portion of that of the summer. Then, again, we find the yellow oat-grass, meadow barley, crested dog's-tail, hard fescue, rough-stalked meadow-grass, smooth-stalked meadow-grass, woolly soft-grass, perennial red clover, white or Dutch clover, yellow vetch or meadow lathyrus, and the smooth fescue, which yield the principal portion of the summer and autumn produce. Lastly, we find the yarrow, creeping bent or fiorin, marsh bent-grass, and creeping wheat-grass or couch, vegetating most vigorously in the autumn. Besides these," continues Sinclair, "in the richest natural
pastures are invariably found the bu
cups (*Ranunculus acris*), rib-grass or
wort plantain (*Plantago lanceolata*),
sorrel dock (*Rumex acetosa*)." Of
however, except in cases of necessity
stock will only eat the rib-grass.

To examine the nature of the c
produced on rich pasture land by a c
of grain crops, Mr. Sinclair made th
lowing valuable experiments:—

"A space of 2 square yards of ri
cient pasture land was dug to the d
8 inches; 400 grains of this soil, fro
moisture and the green vegetable
contained—

Calcareous and silicious sand -
Decomposing vegetable matter, and p
ticles of roots - -
Carbonate of lime (chalk) -
Silica (flint) - - -
Alumina (clay) - -
Oxide of iron - - -
Soluble vegetable matter, and sulphat
lime (gypsum) - -

"This soil was then cropped for
sons alternately with, 1. oats; 2. p
3. wheat; 4. carrots; 5. wheat.
then examined, to ascertain what
had undergone by bearing these c
appeared to consist of—

Calcareous and silicious sand
Decomposing vegetable matter
Carbonate of lime (chalk) -
Silica (flint) - -
Alumina (clay) - -
Oxide of iron - -
Soluble vegetable and saline matter

Loss - - -

"Thus, the earthy portion of the
undergone but little change, but it
tained a very considerable diminuti
decomposing vegetable and animal
particularly when it is considered
turf also was incorporated with
Manure was now for the first time
and, with the wheat stubble, dug
depth of six inches. The surface
made fine with a rake, and sown
mixture of the following grass seed
rate of five bushels to the acre:—
fescue, meadow foxtail, round coc
tall oat-like soft-grass, creeping ve
grass, meadow cat's-tail, crested d
yellow oat, meadow oat, hard fescue,
stalked meadow-grass, fertile mead
nerved meadow-grass, cow clov
folium medium), Dutch, or white
and fiorin, marsh-bent. These were

ugust 1813. They all vege-
the first week of October ex-
eping vetch (*Vicia sepium*),
germinate till the autumn of
e the frost set in they had a
ith a compost of rotten dung,
etable mould, laid on in a fine
and rolled, and again rolled
The plants sprang earlier
f the old pasture (a circum-
n to young plants in general).
eek of July, the produce was
ed: it amounted to one eighth
produce of the ground in its
The aftermath, however, of
rasses weighed one fifth less
the natural pasture. But, in
utting and weighing the grass
eks of June and August, and
iddle of September, the total
e three crops exceeded that
f exactly in the proportion of
(*Hort. Gram. Wob.* p. 131.)
ses which are the natural tenants
and elevated soils.—These,
Sinclair, are the sheep's fescue,
cue, purple fescue, pubescent
ous fescue, wall fescue, wall
ent, brown bent, lobed bent,
wy bent, purple bent, tufted-
aved hair-grass, feather-grass,
l, hairy oat-grass, blue melic
t mat-grass, blood-coloured
een panic-grass, barrenbrome-
brome-grass, upright annual
nodding brome-grass, Alpine
, Alpine foxtail-grass, blue
crested hair-grass, panicled
, reflexed meadow-grass, flat-
w-grass, meadowbarley, bird's-
rger bird's-foot clover, trefoil
infoin, soft brome-grass, creep-
, and white, or Dutch clover.
)

ese sandy upland soils are im-
e application of clay or marl,
capable of supporting a very
iption of grasses to these, and
arieties," says Sinclair, "should
xperience will prove that, un-
mstances, they are the best for
(*Ibid.* p. 337.):—

sheep's fescue	3 pecks.
grass	3 —
's-tail grass	1 —
rass	2 —
	1 —
meadow-grass	1 —
ed fescue	1½ —
	2 —
s-foot trefoil	1 lb.
r	3 —

3. *The grasses of bogs, or other very moist soils.* — These are commonly of the most worthless description to the cultivator: they are chiefly the marsh bent, awnless brown bent, awned creeping bent, smaller-leaved creeping bent, creeping-rooted bent, white bent, flote fescue, tall fescue, turfy hair-grass, knee-jointed foxtail-grass, water hair-grass, water meadow-grass, long-leaved cotton-grass, and the sheathed cotton-grass. (*Hort. Wob.* p. 340.)

4. *The grasses of water meadows.*—"All the superior perennial grasses," observes Sinclair, "thrive under irrigation when the meadow is properly formed; the following species of grass I have invariably found to constitute the produce of the *best* water meadows: — Meadow foxtail, round-panicled cock's-foot, field brome-grass, meadow fescue: these occupied the crowns and sides of the ridges. The furrows were stocked with the creeping bent, marsh bent, hard fescue, lesser variety of meadow cat's-tail, woolly soft-grass, rough-stalked meadow-grass, meadow fescue. A small admixture of other species were thinly scattered over every part of the ridge; these were meadow barley, yellow or golden oat, crested dog's-tail, rye-grass, sweet-scented vernal-grass, tufted vetch, with a larger proportion of the tall oat-like soft-grass. The soil of the water meadows which produced the above grasses was either a deep active peat, incumbent on a silicious sand, or a sandy loam, on a chalky or gravelly subsoil. In some irrigated meadows, where the ridges were formed nearly flat, and the soil consisted of a sandy loam on a retentive clayey subsoil, the following grasses constituted the chief produce:—Crested dog's-tail, creeping-rooted soft-grass, rye-grass, meadow barley, tall oat-like soft-grass, sweet-scented vernal, and soft brome-grass." (*Ibid.* p. 383.)

The grasses best adapted for the alternate husbandry also attracted the attention of George Sinclair; but he saw the difficulty of laying down any systematic rules which should be adapted for all soils and situations, and the demands for animal food; he hardly, therefore, made any very practical general observations. He gives us, however, among other valuable statements, the following little table of the relative value of three of the crops he had examined on similar soil: —

	Produce.	lbs. per acre.
Broad-leaved red clover	herbage	49,005
	hay	12,251
	nutritive matter	1,904
Lucern	grass	70,785
	hay	28,314
	nutritive matter	1,659
Saintfoin	herbage	8,848
	hay	3,539
	nutritive matter	345

There are also some practical directions by Mr. P. Shirreff in the *Quart. Journ. of Agr.* vol. ii. p. 242., but they are only local in their nature; and some valuable remarks by Mr. W. S. Taunton (*Ibid.* vol. iii. p. 406.) upon the grasses of the Hampshire chalk formation, and by Mr. Gorrie (vol. v. p. 515. of the same excellent periodical) upon the supposed coarse quality of certain grasses.

5. *On the grasses best adapted for pasture during the winter.* — In the fourth volume of the *Trans. of the High. Soc.* p. 31. is an essay on this subject by the late Mr. George Sinclair. The following are the grasses he recommends as being productive of the most considerable quantity of winter's grass; and the proportion of seeds which he advises to be sown to produce such a pasture: —

Cock's-foot (*Dactylis glomerata*) - -	4 pecks.
Meadow fescue (*Festuca pratensis*) - -	3 —
Tall fertile meadow-grass (*Festuca elatior* var. *fertilis*), only in very heavy soils constantly depastured with cattle.	
Meadow cat's-tail, or true Timothy grass (*Phleum pratense major*) - - -	¾ —
Broad-leaved bent, or fiorin (*Agrostis stolonifera*) - - - -	1 —
Tall oat-like soft-grass (*Holcus avenaceus*) -	2 —
Woolly soft-grass (*Holcus lanatus*), only in cases of considerable elevation and poverty of soil.	
Pacey's perennial rye-grass (*Lolium perenne*)	3 —
Burnet (*Poterium Sanguisorba*) - -	2 —
Cow-grass, or perennial red clover (*Trifolium pratense perenne*) - - -	6 lbs.
White clover (*Trifolium repens*) - -	8 —

The quantity of the grass seeds employed per acre, for permanent ordinary pasture, necessarily varies with the nature of the soil. A practical farmer gives the following as an excellent mixture (*Mark Lane Exp.* April 5. 1841); and a similar mixture has been also recommended by the Messrs. Gibbs and son, corner of Half-Moon Street, Piccadilly, who have taken more pains, I believe, in the selection and growth of the grass seeds than any other persons.

	On Light Soils.	On Heavy Soils.
	lbs.	lbs.
Clover, red - - -	4	5
— white - - -	5	6
— red, perennial (cow-grass)	3	4
Rye-grass, perennial - -	3	4
— Italian - -	3	4
Meadow foxtail - - -	2	2
Cock's-foot - - -	4	5
Fescue, meadow - -	2	3
— , hard - - -	2	1
Rough-stalked meadow-grass -	1	2
Smooth-stalked meadow-grass -	2	1
Wood meadow-grass (Hudson's Bay grass) - - -	3	4
Sweet-scented vernal-grass -	2	2
Timothy grass - - -	2	4
	38	47

6. *Transplantation, or inoculation of turf.* — This plan, which is one, in certain situations, offering considerable advantages, is described in the *Brit. Husb.* vol. ii. p. 523., and by G. Sinclair, *Hort. Gram. Wob.* p. 415. The mode of returning tillage land to permanent
pasture, called transplanting, was
invented by Mr. Whitworth of Ac
Lincolnshire; and it was first practi
extent by Mr. John Blomfield of
Norfolk. In laying down land
manent pasture by this mode, it is
that the soil should be free from
and roots of weeds, and made perfe
by a summer fallow. The autu
best time for transplanting turf,
as soon as the autumn rains have s
moistened the turf to fit it for
clean: the roots of the grasses
established before the commenc
warm weather in the spring. I
essential that the turf should be s
taken from the very best pasture,
wise weeds and inferior grasses wil
pagated. If the field, from which
is to be taken to make the new p
intended to be broken up for a
tillage crops, then the whole of
may be taken off and employed in
the new pasture to the require
But should the field be required t
in permanent pasture, a portion o
turf must be taken from the fie
sufficiency of the sward, or grass
standing for that purpose. In t
these cases, Mr. Blakie directs
plough to be used; but if that
conveniently obtained, a common
with the coulter and share made v
will answer the purpose: a wheel
preferable, adds Sinclair, to a swin
for paring turfs, because it goes
and cuts the turf more regular
turf should be cut about two inc
half thick, and seven, eight, or ni
wide, according to the nature of
gage of the plough, and the widt
wing of the share: it is sometim
cut into short lengths, previous
operation of paring; but this can
effected when the turf is moist
from stones. The cross cutting is
a scarifier, with cimeter tines, the
edges made very sharp, and face
work, and the implement heavily
so as to press the tines a proper d
the turf: but it is best in large fla
turf is then carried in broad-whe
to the field, at the rate of fifty
to an acre, placed in heaps, and then
into small pieces of about thre
square: the ground is then levell
scarifier, and the turf spread wit
over the field; the pieces of turf
placed or planted by women and
and pressed into the soil by the
wooden rammer. One acre of tur
into pieces will plant nine acres —
of turf standing nine inches apart.

- - - -	1	7	8½
t 30s. per acre - -	16	12	9¾
d. per acre.	27	6	4

improving old worn-out pasture
ibbling peas and vetches, with a
eighteen pounds of Dutch clover,
shels per acre of Bay grass) is
y Mr. Salter, *Com. to Board of*
p. 357. On the advantages of
hing, fallowing, and liming land
be again laid down to perma-
e, with an experiment on seven-
t Jedburgh, there is a paper by
art. Journ. of *Agr.* vol. i. p. 570.,
r by Mr. Sinclair (*ibid*, p. 65.).
tleman's excellent work (*Hort.*
.), I would especially commend
as it abounds with information
es. There is also a paper on the
improvement of grass lands in
uart. Journ. Agr. vol. vii. p. 547.);
improvements of this kind, the
sub-turf plough should not be
y the farmer. See IRRIGATION.
HOPPER. See LOCUST.
HOPPER WARBLER. See

POLY. One of the names of
leaved purple loose-strife (*Ly-*
pifolium.) See LOOSE-STRIFE.
WRACK, COMMON. (*Zostera*
m *zoster*, a riband to which the
a resemblance.) A very pretty
ennial plant, found in creeks and
salt water, or about the mouths
vers. It is variable in size; the
ong, slender, flaccid, and obtuse,
the most part under water, of a
colour, and bleaching very white
e. The plant is used for package,

which vary in size from that of a pea to that of a walnut, or something larger. It is often intermixed with other substances, such as sand, clay, loam, flints, iron ores, &c., from each of which it derives a distinctive appellation. See GEOLOGY.

The best kinds of manure for this sort of land are marl, or any stiff clay, cow-dung, chalk, mud, and composts formed of rotten straw from the dung-hill.

"Gravels," says Professor Low, in his remarks on soils (*El. of Agr.* p. 8.), "like sands, have all the gradations of quality from fertility to barrenness. The loose soils of this nature, in which the undecomposed material is great, and the intervening soil silicious, are held to be the worst of their kind. These are, in some places, termed *hungry* gravels, not only to denote their poverty, but their tendency to devour, as it were, manure, without any corresponding nourishment to themselves.

"The rich gravels will produce all the cultivated kinds of grain. Their loose texture renders them less suited than the clays to the growth of wheat and beans; but they are admirably adapted to the growth of barley and oats. They are quick in their powers of producing vegetation; and from this quality, they are, in some places, termed *sharp* or quick soils.

"Gravels, like sands, are suited to the culture of the different kinds of plants raised for the sake of their roots and tubers; and they are in so peculiar a degree suited to the growth of turnips, that in some parts they receive the distinguishing appellation of turnip soils."

Gravel, if mixed with stiff loam, makes, excellent and durable gravel walks for art or business of pasturing or feeding and fattening different kinds of live stock on grass-land. In order to be capable of managing this business to the greatest advantage, he should have a perfect knowledge of the nature and value of all kinds of live stock, as well as of the land on which they are to be fed, and of properly suiting them to each other. Upon these being well understood and attended to, his success must depend. According to Mr. Hillyard, a practical grazier, and the well known President of the Northampton Farming and Grazing Society, "the knowledge requisite to carry on grazing to the most advantage is not easily obtained. A man should know how beasts ought to be formed; should have a quick eye for selecting those with a frame that is likely to produce weight; and a hand that should feel the known indications of the probability of soon becoming fat."

The business of grazing is more general in some of the counties of England than in others; it is for the most part carried on in Somersetshire, Lincolnshire, Leicestershire, and the midland counties. It is a system of husbandry that can only be profitably practised in districts where the extent of pasture is considerable, or the value of the produce of grass-lands small in comparison with that of animals.

It is well observed, by an author of the last century, that the stocking of land with proper cattle is one of the nicest parts of the science of farming. Where nature is left to herself, she always produces animals suitable to her vegetation, from the smallest sheep on the Welsh mountains to the largest sort in the Lincolnshire marshes; from the little hardy bullock in the northern High-

should be divided in the following
Supposing four fields, each co
nearly equal quantity of land, o
should be kept entirely free
until the grass is got up to its f
when the prime or fatting cattle
put into it, that they may get
the food; the second best shoul
low; and after them either the
store stock, with lean sheep to
tures close down; thus making
the stock feed over the four e
this succession:—

No. 1. Clear of stock, and r
the fattening beasts.

No. 2. For the fattening bea
to No. 1.

No. 3. For the second best
forwarded successively to Nos.

No. 4. For stores and sheep
other cattle; then to be shut
grass is again ready, as at No. 1.,
tening beasts.

By this expedient the fatte
will cull the choicest parts of th
will advance rapidly toward a
turity, for they should always
bite of short and sweet grass
such cattle, the greatest care
taken not to over-stock the inc
is also advisable to divide the fatt
sure by hurdles, so as to confine
within one half of it at a time,
them the other half at the ot
they may continually have fresh

Shade and pure water are es
cessary; and where there ar
rubbing-posts should be set up
the cattle from making that use
and fences. In marsh land, whi
divided by dykes, this, indeed, s

es or other cattle, consisting of
nd inflammation of the legs.
times confined to the neighbour-
fetlocks; at other times spread-
rably further up the legs, and
n oily matter, to which the
obably indebted for its name.
ght on by sudden changes from
hot temperature: such as re-
es from grass into hot stables;
substituting a generous after
hing diet; from the negligence
n leaving the heels wet and full
l from constitutional debility.
er's horse is not so subject to
nany others, because he is not
sed so much to sudden and ex-
es of temperature, and the heels
are not thus exposed. In many
lives almost entirely out of
he is stabled, the stables of the
s are not always air-tight. The
ts way through many a cranny,
ntering at the door alone, and
on the heels. On the first ap-
grease, the heels should be well
soap and water, and an oint-
r of lead and lard applied. In
vanced stage, when cracks begin
they are but slight, a lotion of
(sulphate of copper), alum, and
ffice to dry and close them up;
are deep with an ichorous dis-
he lameness considerable, it will
to poultice the heel with linseed
rrots boiled soft and mashed.
flammation and pain have sub-
racks may be dressed with an
mposed of resin 1 part, lard 3
d together, and 1 part of cala-

Green crops are either fed off, soiled, or ploughed in for manure. (See GREEN MANURES.) When fed off, the fertilising effects of the sheep pastured upon them are very materially promoted by the addition to their food of oil-cake, or of corn, and, as a condiment, common salt,

GREENFINCH. (*Coccothraustes chloris.* The greenfinch, or green grosbeak, as it is very commonly called, from the great size of its beak, is one of our most common birds, and remains in this country throughout the year, changing its ground occasionally only to obtain a sheltered situation in severe weather. It frequents gardens, orchards, shrubberies, small woods, and cultivated lands, where these birds may be seen actively employed sometimes on the ground, at other times in tall hedges, or among the branches of trees, searching for grain, seeds, or insects, to satisfy their appetite. The greenfinch makes its nest in low bushes or hedges, and sometimes in trees; it is composed on the outside of coarse fibrous roots, with bits of wool and green moss interwoven, lined with finer roots, horse-hair, and feathers. Eggs four to six, white tinged with blue, and spotted at the larger end with purplish grey and dark brown; nine lines and a half long by six and a half broad.

The young birds are fed for a time with insects and soft vegetable substances, and as the season advances, these little families unite, and flock with buntings and finches. They feed in corn fields and stubble lands, till winter and its privations oblige them to resort to the farmer's barn-door and stack-yard. This charming little bird has a strong tinge of olive green diffused over its whole body; the wings and tail are black, but va-feeding and support of different sorts of live stock. This kind of food has lately been much more extensively employed than formerly; but its advantages are not, probably, yet so fully understood by farmers in general as they ought. A few trials will, however, show their importance and great utility, when properly made. See Soiling.

GREEN-HOUSE. In gardening, a house with a roof and one or more sides of glass, for the purpose of containing plants in pots which are too tender to endure the open air the greater part of the year. The green-house, being a structure of luxury, ought to be for the most part situated near the house, in order to be enjoyed by the family in inclement weather; and if possible it should be connected with the flower garden, as being of the same character, with reference to use. Its length and breadth may be varied at pleasure, but its height should never be less than that of the loftiest apartment of the house to which it belongs. The best aspect is to the south or south-east; but any aspect may be chosen, provided the roof is entirely of glass, and abundant heat is supplied by art. Of late years green-house roofs have been made of either cast iron or of zinc, and sometimes in the form of a dome. Both metals are preferable to wood. In green-houses facing to the north, however, the more tender plants will not thrive so well in winter: more artificial heat will be required at that season; and the plants should be chiefly evergreens, and other plants that come into flower in the summer season, and grow or flower but little during winter. In most green-houses the plants are kept in pots or boxes, and set on stages or shelves, in order that they may be near the roof, so as to receive the direct influence of the rays of light immediately on their passing through the glass. An orangery differs from a green-house in having an opaque roof, and in being chiefly devoted to plants which produce their shoots and flowers in the summer season in the open air; and they are set in the orangery merely to preserve them through the winter. Such a structure might with more propriety be termed a conservatory; but custom in the present day has applied this term to structures having glass roofs, in which the plants are not kept in pots, but planted in the free soil, and in which a part of them are encouraged to grow and flower in the winter months. There are some interesting papers on the subject of green-house plants by Mr. Towers, author of the *Domestic Gardener's Manual*, in the *Quart. Journ. of Agr.* vol. v. p. 65., vol. vi. p. 48. (*Brande's Dict. of Science and Art.*) See Conservatory and Orangery.

GREEN MANURES. The use of green
manures early attracted the attentio
cultivator. Xenophon recommende
plants to be ploughed into the soil,
that crops should be raised for that
for these, he says, "enrich the soil
as dung." And the lupin is nam
excellent manure by very early agr
writers. The white lupin is even no
in Italy for the purpose of being
into the soil, an operation gener
formed in October.

The white lupin, which is extensi
ployed for this purpose in Tusca
leguminous annual plant, well know
gardens, growing in sandy and loa
the height of two or three feet, wi
of equal strength with the bean, a
somewhat similar blossoms and pod
produce is so bitter, that it is unf
nourishment of either man or beas
rives to a considerable size in t
of October, when it is ploughed
soil; it abounds with gluten, to
fact, its fertilising effects have be
attributed.

Green manures, although in som
rendered subservient to the enrich
soil, as soon as man began to till
and dig in the weeds of his lan
remnants of former crops, have n
systematically employed by the far
has ever been more desirous of
as food for his stock, the vegetabl
of his land, than to bury it in th
promote the future productiven
soil. Yet, whenever green succ
stances, such as weeds, river collec
weed, &c., have been used, the
always been most satisfactory. T
faction of the vegetables, and th
that case emitted, appear to be
casions highly invigorating and
to the succeeding crop. During t
tion, the presence of water is essen
cessary, and is most probably de
The gases produced vary in differe
those which contain gluten emit
onions, and a few others, evolve ph
hydrogen, carbonic acid gas, and ca
hydrogen gas, with various vegetabl
are almost always abundantly form
these gases, when mixed with th
very nourishing to the plants grow
it. The observations of the farm
us that they are so. He tells us
green manures cannot be employ
fresh a state; that the best corn
where the richest turf has precede
that where there is a good produ
clover, there will assuredly follow
cellent crop of wheat: he finds
when he ploughs in his crop of b
to enrich his land, that this is mo

hat they contain the largest
easily soluble substances, and
ves are most active in forming
ter. Green crops, pond weeds,
' hedges or ditches, or any kind
table matter, require no pre-
them for manure. The de-
lowly proceeds beneath the soil,
atters are gradually dissolved,
t fermentation that goes on,
e want of a free communication
render the woody fibre soluble
ioning the rapid dissipation of
r. When old pastures are
nd made arable, not only has
enriched by the death and slow
plants which have left soluble
soil, but the roots and leaves
s living at the time, and oc-
rge a part of the surface, af-
e, mucilaginous, and extractive
h become immediately the food
nd the gradual decomposition
ly for successive years." (*Agr.*
) Nothing will aid the prac-
o much in understanding the
n manure, as a knowledge of
t elements of plants. Woody
sugar, gum, are compounds of
ogen, and oxygen; the fixed
le oils, wax and resin, are con-
arbon, with the elements of
excess of hydrogen; vegetable
gluten contain nitrogen as an
it is never altogether absent in
in their solid or fluid contents.
ng upon these facts, it follows
elopment of a plant requires
f substances containing carbon
and capable of yielding these
e growing organism; secondly,

loads of farm-yard dung per acre, and dibbled it with wheat on the 15th of November. The result was, that the sea-weeded portion gave three times the produce of any equal part of the field." (*My Essay on Salt*, p. 48.)

No one more perseveringly advocated the employment of green manures than the late Mr. Knight. In his paper on the question, he supported his views by some ingenious experiments, and used every argument that could fairly be employed in their favour. "Writers upon agriculture," he observed, "both in ancient and modern times, have dwelt much upon the advantages of collecting large quantities of vegetable matter to form manures; whilst scarcely any thing has been written upon the state of decomposition in which decaying vegetable substances can be employed most advantageously to afford food to living plants. Both the farmer and gardener, till lately, thought that such manures ought not to be deposited in the soil until putrefaction had nearly destroyed all organic texture, and this opinion is, perhaps, still entertained by the majority of gardeners; it is however, wholly unfounded. Carnivorous animals, it is well known, receive most nutriment from the flesh of other animals when they obtain it most nearly in the state in which it exists as part of a living body; and the experiments I shall proceed to state, afford evidence of considerable weight, that many vegetable substances are best calculated to reassume an organic living state when they are least changed and decomposed by putrefaction." The allusion to carnivorous animals is misplaced; as green food must be soluble, and in a decomposing state, before it can be taken up by plants: but this does not weaken the argument in favour of its utiroots of grasses mixed with a small quantity of earth, and this was sufficiently covered with a layer of mould which contained the roots only of grasses, to prevent, in a great measure, the growth of the plants which were buried. The pot, which contained about one sixteenth of a square foot of mould and living vegetable matter, was placed under glass, but without artificial heat, and the plant appeared above the soil in the end of April. It was three times during the summer removed into a larger pot, and each time supplied with the same matter to feed upon, and in the end of October its roots occupied about the space of one third of a square foot. Its height above the surface of the mould being then nine feet seven inches. In the beginning of June, a small piece of ground was planted with potatoes of an early variety, and in some rows green fern, and in others nettles, were employed instead of other manure; and subsequently, as the early potatoes were taken up for use, their tops were buried in rows in the same manner, and potatoes of the preceding year were placed upon them, and buried in the usual way. The days being then long, the ground warm, and the decomposing green leaves and stems affording an abundant moisture, the plants acquired their full growth in an unusually short time, and afforded an abundant produce, and the remaining part of the summer proved more than sufficient to mature potatoes of any early variety. The market gardener may probably employ the tops of his early potatoes and other green vegetable substances in this way with much advantage.

"In the preceding experiments the plum stone was placed to vegetate in the turf of the alluvial soil of a meadow, and the potatoes grew in ground which, though not rich, was not poor, and therefore some objections may be made to the conclusions I am disposed to draw in favour of recent vegetable substances as manures. The following experiment is, I think, decisive. I received from a neighbouring farmer a field naturally barren, and so much exhausted by ill management, that the two preceding crops had not returned a quantity of corn equal to that which had been sown upon it. An adjoining plantation afforded me a large quantity of fern, which I proposed to employ as a manure for a crop of turnips: this was cut between the 10th and 20th of June, but as the small cotyledons of the turnip-seed afford little to feed the young plant, and as the soil, owing to its extreme poverty, could not afford much nutriment, I thought it necessary to place the fern a few days in a heap to ferment sufficiently to destroy life in it, and to produce an exudation of its juices, and it was then co
in rows to the soil, and the turnip-
posited with a drilling machine ov

"Some adjoining rows were
with the black vegetable mould
from the site of an old wood pil
with the slender branches of trees
stage of decomposition; the quanti
in each row appearing to me to exc
than four times the amount the
mould, if equally decomposed, wo
yielded. The crop succeeded in b
but the plants upon the green f
with more rapidity than the ot
even than those which had been
with the produce of my fold a
yard, and were distinguishable i
tumn from the plants in every oth
the field by the deeper shade of
liage. I had made, in preceding y
similar experiments with small tr
cularly those of the mulberry wh
fruit in pots) with similar resu
think it unnecessary to trespass o
of the society by stating these ex
and conceiving those I have st
sufficient to show that any given
of vegetable matter can general
ployed in its recent and organ
with much more advantage tha
has been decomposed, and no inc
part of its component parts have
sipated and lost during the prog
putrefactive fermentation." (*Tr*
Soc. vol. i. p. 248.) In an articl
subject, M. Knoles of Secheim w
"My vineyard has been manure
years on the branches cut from
without receiving any other ma
yet more beautiful and richly l
could scarcely be pointed o
branches are pruned from th
August whilst still fresh and r
are traced into the soil, after bei
small pieces. At the end of f
not the smallest trace of the
found." (*Zeitschrift. fur die landh*
lichen Venime des Grosherzoythu
July 9. 1840.)

When green vegetable subst
buried in the soil they first lose t
colour, speedily wither, and th
faction soon commences. It is
however, for this purpose, that
should be present, and that the te
of the soil should not be less than
If the atmosphere has access to
table matter the putrefaction pro
more rapidity, but its presence
sential. Putrefaction cannot,
proceed if water is absent, and h
been concluded that water is d
during the process. The smell

acid gas is emitted, and the whole
gradually reduced to a dark vege-
ald. This black substance is an
fertiliser; plants grow in it with
uriance. The soils of some of the
wly inclosed American lands owe
ertility to the abundance of this
mould which they contain. These
merican soils from which we are
ty successive good crops of wheat
obtained. There are some lands
undreds of Essex, in Kent, and
es, whose luxuriant unfailing pro-
ardly credible; alternate crops of
l beans have been obtained from
a time immemorial. (*Johnson, On*
, p. 168.) Vegetable mould, as
from the trunks of oak trees, has
amined by MM. Saussure and
by distilling it they obtained from
s (*Rec. sur la Veg.* p. 162.)—

	Cubic inches.
tted hydrogen - -	124
c acid gas - - -	34
	Grains.
ontaining acetate of ammonia	53
umatic oil - - -	10
l - - - -	51
- - - - -	8

effects of cultivation, exposure to
of the atmosphere, and the roots
, this mould becomes gradually
l in the soil, and the land is of
ensibly impoverished. On this
e alkalies operate very powerfully,
tirely dissolving it, and hence one
of soda and potash as fertilisers.
so a continued source of carbonic
h it emits slowly; hence it might be
that in a good fertile soil there is
phere of carbonic acid, which is

bays and creeks. Its habits are very similar to those of the redshank, with which it associates in autumn. It is extremely shy and vigilant, insomuch that one can very seldom shoot it, unless after it has deposited its eggs. The eggs are of a pale yellowish green colour, marked and blotched with dark brown and light purplish grey, 2 inches long, by 1⅜ inch broad. These birds feed on small fish, worms, insects, besides crustaceous and molluscous animals. The beak of the greenshank is about two inches long, nearly black. The general colour of the plumage of the upper surface of the body is ash brown; tail feathers, front of the neck, breast, and belly, white; legs and toes, olive green. The whole length of the adult bird is about twelve inches. (*Yarrell's Brit. Birds.* vol. ii. p. 549.)

GREEN-WEED. (*Genista*, from the Celtic *gen*, a small bush.) Of this genus of shrubs there are three native species common to Britain, which are free flowering, exceedingly ornamental plants; and well adapted, from their low growth, for the front of shrubberies. 1. The dyer's green-weed, or wood-waxen (*G. tinctoria*), which grows in pastures, thickets, and the dry borders of fields, flowering in July or August; blossoms of a uniform bright yellow. It has lanceolate, smooth, deep shining green leaves; round striated branches, erect, without thorns. The woody root is extensively creeping. The whole plant affords the dyer a good yellow colour, and, with woad, a good green. Ray says the milk of cows feeding upon this green-weed is rendered bitter, and that this flavour is communicated to the butter and cheese.

2. Hairy green-weed. (*G. pilosa.*) This shrub is of more diminutive stature than

There are several varieties, such as the *Italian*, the *Oriental*, and the *Highland* greyhound; the last of which is now become exceedingly scarce. A good greyhound ought to have a long and rather large body, a neat pointed head, sparkling eyes, a long mouth, with sharp teeth, small ears, formed of a thin cartilage; a broad and strong chest; his fore legs straight and short, his hind legs long and limber; broad shoulders, round ribs, muscular buttocks, but not fat, and a long tail, strong and full of sinews. (*Treatise on Greyhounds.*) As it is out of our province, in a work of this nature, to treat at large of coursing and its agents, we must refer the sportsman who wishes for detailed information on the points of a good greyhound, and on breeding, feeding, &c., to that excellent manual of reference for all matters relating to the chase, *Blaine's Encyclopedia of Rural Sports*, a very learned and carefully arranged work, digested and compiled by a master hand.

GREY MILL, or GREY MILLET. Local names for the common gromwell.

GREY WAGTAIL. See WAGTAIL.

GRIFF. A provincial word signifying a narrow valley, with a rocky fissure-like opening at the bottom; a sort of dingle.

GRIP. A small gutter, or ditch, cut across a field, to drain it. When cut for draining, it is mostly called a water or draining furrow.

A good method of draining meadow or sward-land, by grips, is that of cutting out the pieces in a somewhat wedge-like form, taking off the bottom part, and then replacing them, by which means, a hollow is left below, for permitting the water to flow off.

millstones and grindstones, pav

GRITS. See GROATS.

GROATS. In agriculture, a
grains formed from oats after
husks or shells taken off the gr
crushed, they are called Emb
Gruel made from groats is a
nutritive, easily digested food,
for cases of fever and inflamm
ounce of groats should make
gruel; the mixture should be
stirred during the boiling; and
the clear liquor poured off fro
ment. Sugar or lemon juice m
if circumstances admit of such

GROMWELL; GREY MIL
thospermum, from *lithos* a stone,
a seed. The little nuts or seed
tremely hard, and having a surfa
as a polished pebble.) Of this
perennial plant there are four
species.

1. The common gromwell (
gromill, grey-mill, or grey m
has various local names, whic
dry, gravelly, or chalky soils, an
amongst rubbish and ruins, b
buff flowers, in May and June.
is tapering, strong, and whitish.
herb rough with minute, close,
tles. The stem is annual, nea
high, branched and leafy. The
sessile, alternate, greyish gree
lanceolate. The seeds are grey,
of porcelain polish, and a ston
whence they have been falsely
contain calcareous earths, effer
acids. These seeds afford exc
which might in times of scar
verted into bread.

2. Corn gromwell. See B

EAK, GREEN. See GREEN-

EAK, THE PINE. (*Loxia enu-*
The pine grosbeak, or pine bull-
t is frequently called, closely re-
e common bull-finch in the form
, and in other generic characters,
rees with the crossbills in many
ts, as well as in the general co-
d changes of its plumage. It is a
bird in this country, and but few
of its having been obtained are
wn or recorded. The food of this
seeds and berries; it frequents
ts, builds a nest of small sticks,
ng of feathers, and usually places
anch of a tree, a few feet only
ground. It lays four or five white
it an inch long, by ten lines in
The whole length of the bird is
es. The general colour of the
ermillion red, the belly French
rrell's Brit. Birds, vol. ii. p. 8.)

D. Provincially, a grass-land
ying out of the way of floods; and
ten used in contradistinction to

D IVY. See ALEHOOF.

DSEL, or RAGWORT. (*Se-*
n extensive genus of plants many
ies of which are very ornamental.
enus Sir J. Smith includes ten
indigenous, four only of which,
come properly under the head
The remainder I have sent over
rr, by which name they are gene-
n.

groundsel, or Simson (*S. vul-*
ws almost every where in cul-
waste grounds, in rubbish, dry

is a common weed on barren heaths, and newly enclosed moor land in the north. In habit it is taller than either of the foregoing species, closely resembling the next species, mountain groundsel. All the groundsels are annual; this species flowers in September and October. Root of several stout fibres. The herb is downy, rather glutinous, with a slightly aromatic odour, partaking of the scent of fennel.

Mountain groundsel. (*S. sylvaticus.*) This species grows in bushy, heathy places, on a gravelly or sandy soil, flowering in July. The root and herbage are so like those of the last, which is perhaps equally common, that the two species have by most botanists been confounded. They are both downy, unpleasantly scented, and agree in their upright, wand-like, furrowed stem, clothed with numerous leaves, beset with small, short, axillary branches, panicled, corymbose, and many flowered at the summit, three or four feet in height. The calyx scales are fringed, black and withered at the tips, the outer ones broad, blunt and short. (*Eng. Flora*, vol. iii. p. 427.)

GROUSE. By the word grouse we in general language are most apt to associate our ideas with the common muir fowl; but in the technical terms of ornithology the generic name of grouse (*Tetrao*) is restricted to those bearing the form of the European wood grouse, dusky grouse of America, &c. It is a large family of birds, of a very round powerful form, which frequent heathy forests in preference to the wild and open muirs, perch and often roost on trees, where young shoots and tender bark also supply them with food, and although the legs are plumed with soft feathers, the toes are have killed fifty brace of birds with a single-barrelled gun between sunrise and sunset. (*Sportsman* for August, 1841.)

The black grouse (*Tetrao tetrix*), inhabiting in small numbers a few particularly wild localities in some of the southern counties of England, is much more numerous in the north; and from Northumberland throughout the greater part of Scotland, is found in considerable quantities where well wooded and mountainous districts afford shelter and winter food. The females make a slight nest on the ground, frequently under shelter of some low thick bush, in which they deposit from six to eight eggs; these are yellowish white, spotted and speckled with orange brown; two inches in length, by one inch five lines in breadth. In the summer, these birds live upon seeds, the tender shoots of heath, leaves, and some insects. In autumn they feed on berries of various sorts, occasionally visiting corn-fields and stubbles; in winter they will feed on the tender shoots of pines and firs. The adult male has a semilunar patch of naked skin over the eye, of bright scarlet. The general colour of the plumage is black. The tail consists of eighteen black feathers, of which four or five of those on the outside are elongated and curve outwards. The whole length of the bird is twenty-two inches. The female of the black grouse, usually called the grey hen, is seventeen to eighteen inches in length. The general colour of the plumage is pale chestnut brown, barred and freckled with black; the dark bars and spots being larger and most conspicuous on the breast, back, and wings.

The red grouse. (*Lagopus Scoticus.*) This handsome species is confined to the British islands, and inhabits wild and extensive

about fifteen inches and a qua
the British islands it now only
highest ranges of hills, Nor
Westmoreland, and the central
parts of Scotland. The ptarmig
in spring, and lays eight or t
quently on the bare ground, a
The eggs are yellowish whi
blotched and spotted with dar
inch eight lines long, by one i
broad. The food of these bir
rious sorts of alpine berries,
tender shoots of alpine plant
in winter has almost all the
white, which changes to a g
over the eye is a patch of na
(*Yarrell's Brit. Birds*, vol. ii. p
See CAPERCALLIE.

GRUB. The common na
or maggots, hatched from the
tles. Under the name of gent
a principal bait to the angler f
of fish. The grub produces t
is by some called the rook-w
rooks are particularly fond
newly brought into cultivatio
most subject to the grub. T
destroying it is by good
ploughings, and the applicati
pretty large proportions in
most active state, or commo
gation is also very beneficial,
destroy grubs. See INSECTS.

GRUBBER, or CULTIV
HARROW and SCARIFIER.

GUANO. The name of
cently imported for the first
country, which has long bee
employed by the cultivators o
tilise their sterile sandy plac
which occasionally there is a

ome twenty years since, fifty vessels
nnually loaded with the guano at
alone, each trader carrying from
o 2000 cubic feet. The guano
d, according to Liebig (*Organic*
81.) on the surface of these islands,
a of several feet in thickness, and is,
the putrefying excrements of in-
ble sea-fowl that remain on them
the breeding season. It is used by
ners of Peru chiefly as a manure for
ize or Indian corn, and it is said
nes in the small proportion of about
per acre. "The date of the disco-
the guano and of its introduction
anure," says Mr. Winterfeldt (*Brit.*
Mag. vol. vi. p. 411.), "is unknown,
h no doubt exists of its great anti-
In many parts of America, where
is volcanic or sandy, no produce
be obtained without the guano. It
en calculated that from 12,000 to
cwts. are annually sold in the port of
do for the use of the country round
of Arequipa. In the province of
a and in the vallies of Tambo and
the consumption should be something
s wheat, all kinds of fruit, trees and
with the single exception of the su-
ne, are manured with the guano;
s not the case with the district of
a, where maize and the potato
quire it. In the district of Arequipa
of guano is spread over an extent of
uare yards (about an English acre);
Taracapa and the vallies of Tambo
tor, 5 cwts. are required. The land
anured in Arequipa produces 45
f potatoes, and 35 for 1 of maize,
heat manured with horse-dung pro-
nly 18."

e are, it seems, three varieties of
which bear on the coast of Peru dif-
prices. "The white guano is consi-
he most valuable, as being fresher and
It is found on nearly all the islands
he coast. The red and dark grey are
2s. 3d. the cwt.; a higher price is
or the white on account of its greater
y; it is sold at the port of Mollendo
d. per cwt., and at times, as during
r, it has obtained as high a price

ppears, in the state in which it has
tely introduced into this country, to
e brown or fawn-coloured powder,
g a strong marine smell: it blackens
heated, and gives off strong am-
al fumes. When nitric acid is mixed
, uric or lithic acid is produced. It
n analysed by various chemists. In
n analysis of a very elaborate descrip-
s published by MM. Fourcroy and
Vauquelin; they found in it a fourth of its weight of uric acid, partly saturated with ammonia and partly with potash. Some phosphate of lime and ammonia, and small quantities of sulphate and muriate of potash, a little fatty matter, and a portion of sand. It has been more recently analysed by Mr. Hennell of Apothecaries' Hall, who found in guano —

	Parts.
Bone earth - - -	30·5
Sulphates and muriates - -	3
Uric or lithic acid - - -	15
Carbonate of ammonia - -	3
Matters volatile at 212°, consisting chiefly of water and carbonate of ammonia - - - -	12
Other organic matters - -	36·5
	100

It has also been analysed by Mr. Brett of Liverpool, who found in 100 parts —

	Parts.
Earthy insoluble salts, chiefly phosphate of lime - - -	29·2
Soluble salts, fixed alkaline, sulphate, and muriate - -	2·5
Organic matter - - -	68·3
The organic matter consists of	
Lithic acid - - -	16·1
Ammonia - - -	8·7
Other organic matter and moisture -	43·5
	*68·3

The composition of guano varies, however, considerably. According to the analyses of MM. Voelckel and Klaproth, the varieties which they examined contained —

	Voelckel. Parts.	Klaproth. Parts.
Urate of ammonia - -	9	16
Oxalate of ammonia - -	10·6	0·0
Oxalate of lime - - -	7	12·75
Phosphate of ammonia - -	6	0·0
— ammonia, and magnesia	2·6	0·0
Sulphate of potass - - -	5·5	0·0
— soda - - -	3·3	0·0
Chloride of sodium (common salt) -	0·0	0·5
— ammonia - -	4·2	0·0
Phosphate of lime - - -	14·3	10
Clay and sand - - -	4·7	32
Undetermined organic substances, of which about 12 per cent. is soluble in water, a small quantity of soluble salt of iron, water - -	32·53	28·75

In a few words, it may be regarded as a compound of urate of ammonia and other salts. There is no doubt but that it is a very powerful manure; the very composition of its salts would indicate this fact. Thus, uric or lithic acid, which is a fine white powder, nearly insoluble in water (1720 parts of water only dissolving 1 part of uric acid), is composed, according to

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* For these I am indebted to Mr. M'Donald, of St. Mildred's Court, London, a considerable importer of the guano.

Dr. Prout (*Thomson's Chem.* vol. ii. p. 187.), of —

	Parts.
Hydrogen	0·125
Carbon	2·250
Nitrogen or azote	1·750
Oxygen	1·500
	5·625

Urate of ammonia and urate of potash are fine white powders, also very insoluble in water: of the phosphate of lime, of the guano, the earthy salt, and most valuable portions of bones, it is unnecessary to comment; I have, in my work "On the Fertilisers, p. 136," endeavoured to show how essentially valuable this salt is to all the farmer's commonly cultivated crops. The use of the dung of birds is not a modern improvement, for that of poultry has been adopted as a manure from a very early period. M. P. Cato, the earliest of the agricultural writers, in his work, (lib. lxxxvi.) commends the use of pigeons' dung for meadows, corn lands, or gardens. And John Worlidge, in 1669, was warm in the praise of the dung of fowls. "Pigeons' or hens' dung," he says (*Myst. of Agr.* 71.), "is incomparable: one load is worth ten loads of other dung, and is therefore usually sown on wheat or barley that lieth far off and is not easy to be helped." And he says, in another place, "A flock of wild geese had pitched upon a parcel of green wheat, and had eaten it up clean, and sat thereon, and dunged it several nights; that the owner despaired of having any crop that year; but the contrary happened, for he had a far richer stock of wheat there than any of his neighbours had."

In some experiments made by Mr. Skirving of Walton near Liverpool in 1841, the guano was tried at the rate of two or three cwts. per acre, as a manure for Swedish turnips and Italian rye-grass, with very considerable success; it appeared to be equally, or rather more, efficacious than twenty cubic yards per acre of farm-yard manure.

The most elaborate set of experiments upon the guano with which I am acquainted were made, in 1810, for potatoes and mangel wurzel, at the Island of St. Helena, by the late General Beatson; and they are the more valuable from being comparative. The soil on which these experiments were made was rather stiff, being composed of blackish mould, intermixed with friable fat clay. The following table gives the results of every experiment: 35 loads of horse dung litter per acre were used, 35 of hogs' dung litter, and 35 bushels per acre of the guano.

1. With potato seed the size of

planted whole —

Six inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

Three inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

2. Large potatoes, cut in pieces.

Six inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

Three inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

3. From middle eye of potato

out.

Six inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

Three inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

4. With small potatoes, planted

Six inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

Three inches deep.

Guano
Horse dung
Pigs' dung
Soil simple

The total comparative produce

potatoes from these manures

fore —

Guano, or sea-fowl dung, at 35 per acre
Horse dung, 35 cart loads per acre
Hogs' dung, 35 cart loads per acre
Soil simple

With mangel wurzel the

acre on a similar soil was as

	Leaves. tons.	Roots. tons.
le - - - - -	38	19¼
ıg and ashes, 360 bushels per - - - - -	131	66½
bushels per acre - -	153¼	77¾

guano, or sea-fowl dung, adds Gene-
son, which is found in considerable
es upon Egg Islands, was first re-
ded to my notice by Sir Joseph
President of the Royal Society.
nishes," says he, "the loading of an
number of vessels that are con-
employed in bringing it from small
o the main land on the western
South America, where it is sold
ributed for the purpose of manure,
h it answers in a degree infinitely
to any other article we have the
ge of. A handful is considered as
t for several square yards of land,
luce of which is exuberant, in con-
of the force of this application."
ccuracy of this valuable communi-
as been most amply confirmed by
riments in the culture of potatoes,
as upon grass lands. Thirty-five
of the guano, or three cart-loads,
appear to me equivalent in effect
ty loads of good rotten dung. I
nagine that abundance of this most
manure might be had from many of
s and islands on the coast of Scot-
he effect of the guano upon grass
comparatively greater than in the
xperiment. From what cause this
it may be difficult to explain; but
riestley found, by experiment, that
es throve best when they were
grow in air made putrid by the
sition of animal and vegetable
es, it may be inferred that the very
effluvia which issue from the sea-
ıg or guano, together with its being
washed among the roots of vege-
y the first falls of rain, are circum-
that may possibly render its effects
-dressing greatly superior to those
ces when it is mixed with the soil.
29th July, 1808, I marked out a
n the lawn in front of Plantation
which measured one rod in breadth
lve rods in length; this was divided
lve equal parts, or square rods, and
d progressively from 1 to 12. The
as reduced to a powder and sifted,
n No. 1. a quart of this powder was
trewed by the hand: this is at the
ive Winchester bushels per acre —
160 square rods, or an acre, would
quired that number of quarts, or
five bushels. In the same manner,
ad two quarts, No. 3. three quarts,
n to No. 12., which had 12 quarts,
rate of 60 bushels per acre. From the 29th of July there were daily drizzling rains until the 5th of August, when the effect of this invaluable manure began to appear. On the following day the whole extent of the twelve rods became highly verdant, and exhibited such a contrast to the unmanured part of the lawn, that it had the appearance of having been newly turfed with a finer kind of sod. The effect gradually increased, and in the first week of October, that is, in a little more than two months, the higher numbers from 6. to 12. having from thirty to sixty bushels per acre, excited the surprise of every person who saw them, being covered with the most exuberant grass that can be imagined, and having more the resemblance of a crop of young wheat very thickly sown, than of any grass I ever beheld. This is more remarkable, as at that time the copious rains which fell in August and the spring season had made no visible effect on the adjoining part of the lawn. It was from a frequent and careful inspection of the above experiments that I have estimated thirty-five bushels of guano per acre to be equivalent in effect upon grass lands to seventy loads of well rotted dung. I have been informed that guano is sold at Lima, and at other towns on the coast of Peru, for a dollar a bag of fifty pounds weight, and that it is much in use there for manuring fruit trees and gardens. It is certainly one of the most powerful of manures, and therefore it is necessary to be cautious in using it. I have observed, when too much is laid on grass, that it burns and destroys it. I would therefore recommend to those who may try it on fruit trees, to begin with not more than three quarters of a pint to each tree, and to trench it about a foot deep all round the roots. If the first application be found insufficient, a second or third may be given at intervals of two or three months; or a better mode, perhaps, of determining the quantity of guano proper for each fruit tree would be to select about a dozen trees of the same kind and size, and to vary the quantities by an easy progression, from three quarters of a pint to one or two quarts or more to each tree. — (*Com. Board of Agr.* vol. vii. p. 225—240.

The guano is entirely a new fertiliser to this country. About twenty casks were imported, in 1840, by Mr. Myers of Liverpool; and this year (1841) one or two cargoes have arrived from the Pacific. The enterprise which has thus led him to bring so many thousands of miles this long-employed manure of South America, is certainly highly to the credit of an English merchant. That it may succeed in adding fertility to the soils of our country will be the ardent wish of every true Englishman; that it pro-too, of adulterations: the price has already tempted the small dealers to mix it with other substances.

From some recent notices of it in the *Farmers' Magazine* for December, 1841, I find that Mr. Smith of Gunton Park, Norfolk, applied 200 lbs. to an acre, and on the same field, on an equal space of land, fifteen bushels of bone-dust. Both were drilled into the ground with seed wheat. The bone-dust gave four and a half quarters of wheat, the guano six quarters two bushels one and a half pecks.

Mr. Love of Shoreham, Sevenoaks, observes, "I mixed 14 lbs. in the first instance with two bushels of ashes, and although the weather was very dry, I could perceive a marked difference in the growth of the plants a few days after they made their appearance. Encouraged by my success, I then mixed 28 lbs. with fifteen bushels of ashes, and applied it for turnips by sowing broadcast on the land, and harrowing it in lightly. As we had frequent showers at the time, the seed soon vegetated, and the plants grew away from those manured with dung and mould. In each case I applied it at the rate of 2 cwt. to the acre."

Mr. John Crane Nott of Hallow, Worcestershire, remarks, "I applied it to my hop-grounds, and, in order to give it a fair trial, I put about a pint to every alternate hill in each row. The effect was most extraordinary: those hills on which the guano was applied were most luxuriant, while the adjoining ones, not so manured, were sickly and weak.

GUARDIANS *of the Poor* are appointed under the 4 & 5 W. 4. c. 76.: they are elected by the rate-payers and owners of property in the parish. Their number,

Europe, and is very common in
and most of our still waters; m
cularly such as have any run thro
The most tempting bait for a gu
worm; next to that, a gentle o
and after that, pastes. The gu
valuable live bait, probably the
in all the list of living fish-baits.
Encyclo. p. 1019, 1042.)

GUELDER-ROSE, COM
WATER ELDER. (*Viburnu*
A hardy, beautiful, and well-kno
almost a tree in some soils, b
large round white flowers, like
in June and July, whence it is
called the "snowball tree." It is
planted in shrubberies, along wi
and laburnum, grouping elegant
various purple hues of the form
"golden" chain of the latter; b
all mere summer beauties. The g
thrives in every kind of soil; but
it prefers a good strong one.
propagated by layers or suckers.

The Mealy Guelder-rose, or
Tree (*V. lantana*), grows wild in
hedges, on a chalky or limeston
sometimes to the height of eightee
feet; the branches have leaves
stalks and flower-stalks clothed w
mealy pubescence. The compre
are in an early state red on the
yellow on the inner, finally bl
little mealy astringent pulp. T
attract birds. The leaves turn
red in autumn. This shrub
worth cultivating for ornament,
any particular use except that
the root serves to make birdlime
of holly is much better. The you
and rind of the trunk may be

ts. In their wild state these
tiply prodigiously, and would
merable, if they were capable
cold and moisture. The fe-
at two months old, and brings
elve, or fourteen young ones,
in the course of the year,
tion of three weeks. Guinea
ll kinds of herbs, but are par-
l of parsley, as also of apples
its.

N. A provincial name for
es. See GRIPES.

military art, a weapon of de-
r this general term, most of
f fire-arms are included, the
rtar being almost the only ex-
the sportsman a good fowling
pon of much consequence. The
d seventeenth centuries had
d ere the use of fire-arms was
erfected to be extended to the
e the long-bow and the cross-
mpletely superseded. There
kinds of guns, including the
gle and double barrelled gun,
n, &c.; but as the form and
guns and their appurtenances
ather beyond our province, we
ose who wish for information
s works on the subject, and
o that excellent work *Blaine's*
of Rural Sports. &c.

, THE,—or Egyptians, as they
es,—are described pretty cor-
ckstone as being a strange kind
impostors and jugglers who
en notice of about the beginning
nth century. Munster and
ossary, p. 193.) fix the time of
pearance to be the year 1417,
rts, real or pretended, from the
gismund, king of Hungary.
ppeared in Bohemia, they were
ians by the French; the Dutch
Heydens, heathens; in Portugal
itanns was the appellation by
ere known; in Italy, Hungary,
, they were *Tziganyo*; and in
ganeh. Pope Pius II., who
mentions them in his history,
d vagabonds then wandering
milies over Europe under the
ri, and whom he supposes to
red from the country of the
dern Circassia. In the course
rs they gained such a number
, who imitated their language
ion, and betook themselves to
of chiromancy, begging, and
t they became troublesome and
able to most of the states of
ence they were expelled from
France in the year 1560, and from Spain in 1591. In England, in 1530, by the statute 22 Henry 2. c. 10., they are described as "outlandish people," who pretended "that they by palmestry could tell men and women's fortunes;" wherefore they are directed by the act to avoid the realm; and by the 1 P & M c. 4., and the 5 Eliz. c. 20., it was declared to be felony for them to remain in England; and according to Sir Matthew Hale, under these now repealed brutal statutes, thirteen gypsies were executed at one Suffolk assizes, a few years before the Restoration. (*Black. Com.* vol. iv. p. 195.) They may yet be punished by a magistrate, under the statute 5 Geo. 4. c. 83. as idle or disorderly persons. An anonymous author, who wrote an account of the gypsies in Great Britain in 1612, speaks of them as having a leader, "*Giles Hather*, who was termed their king; and a woman of the name of *Calot* was called queen. These, riding through the country on horseback, and in strange attire, had a prettie train after them." In the reign of Henry VIII., gypsies, who had previously been encouraged to visit this country, became very troublesome, and many of them were re-shipped to France at the public expense. In Scotland they were more tolerated. In 1553–4, we find a writ in favour of their leader, John Faw, who is styled Lord and Earl of Upper Egypt, pardoning him for the murder of Norman Small; and forty years afterwards, a writ of Privy Council was issued supporting the same individual in the execution of justice upon his company of folk according to the laws of Egypt, in punishing certain persons who had rebelled against him. Both in England and in Scotland the number of gypsies has greatly diminished, and their habits and modes of living are much altered. They are extremely illiterate, very few being able to read; and are almost as ignorant of religion. They marry by merely pledging to each other without any ceremonial, and in general their young females are most abandoned and dissolute. This is not, however, remarkable, when we consider that they associate only with their own tribe, that they have been always oppressed, are outcasts, brought up to idleness, and have had no opportunity of knowing the distinction between good and evil. Many plans have been suggested to improve and ameliorate the condition of the gypsies: nothing is so likely to effect this good work as giving the parents the means of education and religious instruction for their children, and enticing them to send them to the parochial schools, where they should be received. In the language of Mr. Borrow, whose work I have recommended below, I

may add, "Education, however slight, never yet made an individual reckless, but has sobered many. Instead of persecuting them as thieves and vagabonds, the farmers would be greatly benefited could they induce the gypsies to settle in villages, and would they find employment for them." Such an idea is not visionary. "The Wallachian gypsies," says Dr. Clarke in his Travels, published in 1816, "are not an idle race. They might be described as a laborious people; and the greater part of them honestly endeavour to earn a livelihood." To those who are curious to inquire into the history of this singular race, I recommend *Hoyland's Historical Survey of the Customs, Habits, &c., of the Gypsies*, York, 1816.; and *Borrow's Zincali, or Account of the Gypsies of Spain*, 2 vols. London, 1841. The Rev. G. Crabb, of Southampton, is one of their warmest advocates, and has published some interesting accounts concerning their habits, &c.

GYPSUM, AS A MANURE. It is useless to search in the works of the early agricultural writers for any notice of the employment of gypsum as a manure. It is true that Virgil speaks of the value of a very impure variety of it, when he is commending the use of ashes to the Roman farmers. The early inhabitants of Britain thus used it; the farmers of Lombardy did the same: but ages elapsed before even chemists were able to distinguish this salt from limestone, or other calcareous matter. Its uses, in its simple state as a manure, were first noticed, according to Kirwan, about the middle of the eighteenth century, by a very able German clergyman of the name of Meyer, who tried with success various experiments with a mineral substance found in his neighbourhood, which was long afterwards shown to be an impure sulphate of lime. The name of plaster of Paris, by which this substance is commonly known, arose from its abounding in the neighbourhood of that capital, where it is burnt into a powder, and used as a stucco. The composition of sulphate of lime, when pure, is—

	Parts.
Sulphuric acid - -	43
Lime - - -	33
Water - - -	24
	——100

But the gypsum of commerce is usually united with a portion of silica and carbonate of lime. It is thus combined in its native state. According to Chaptal and Buchholz, gypsum consists of—

	Parts.
Sulphuric acid - -	32 or 43
Lime - - -	30 or 33
Water - - -	38 or 24

There is perhaps no artificial
decided in its effects upon som
readily obtainable by the farm
plentiful in this country, as gy
mode of action, too, is easily
for it acts as a direct food for
is not what is sometimes called
to vegetation, and has a very sli
tion for the moisture of the atm
neither promotes the decompos
organic matters of the soil, nor
decomposing substances, does it
gases of putrefaction for the su
plant. There are, in fact, onl
monly cultivated crops which c
sum in any sensible proporti
which, in consequence, it is a
viz., lucern, sainfoin, red clove
and turnips. Now these are
crops to which the farmer fin
soils, gypsum to be a fertilising
Wheat, barley, oats, beans, and
contain a trace of this salt; an
tells you that gypsum is of n
these crops, however the appl
be varied. I have little doub
whatever other imaginary pow
nure has been asserted to
gypsum only operates as a di
constituent of plants. That it ca
by its attraction for atmospher
I some time since determined
experiments; for 1000 parts
dried, when exposed to air sat
moisture for three hours, onl
parts; while, under the same cir
a good arable soil, worth two
acre, gained 14 parts; and whe
with other manures, the disp
still greater: thus, soot gaine
and horse-dung 145 parts. T
a promoter of putrefaction, I
tained by mixing this salt with
mal and vegetable substances;
in every case, rather to retard t
the spontaneous decomposition
The housewives consider *hard*
commonly owes its properties
sence of this salt, to be a gr
ener of tainted food than soft w
also, in some experiments with
thought that the addition of
rather retarded putrefaction.

There is no reason to believe
proportion of sulphate of lim
certain plants, is as essential to
as the presence of the other ear
pure earths. Thus, those plants
this salt never grow well on lan
not contain it; those in which
lime is found never flourish i
which this salt is absent.
abound with nitrate of potash

as the sun-flower and the nettle, always nish in soils free from that salt; but n watered with a weak solution of it, r growth is very materially promoted; the saltpetre is then found in them, as rn upon analysis, in very sensible pro- ions. The same remarks apply to the rth of those plants which contain com- salt, or phosphate of lime: the effect e same, the result invariable.

iebig contends that the nature of gypsum ists in its giving a fixed constitution to nitrogen, or ammonia, which is brought the soil, and is indispensable for the ition of plants. He says that 100 lbs. of um gives as much ammonia as 6250 lbs. rse's urine would yield to it. 4 lbs. of um, he affirms, increases the produce of eadow 100 lbs. The decomposition of m is slow, which, he says, explains the n why the action of gypsum lasts for l years. (*Organic Chemistry*, p. 57.)

t this appears to me to be a very un- ctory explanation of the phenomena; anting that ammonia is as ever present water &c. as M. Liebig believes (of I have very considerable doubts), lowing that the ammonia does decom- he gypsum in the soil, and form sul- of ammonia, (of which there is no ce), even then this mode of explaining rtilising effects of gypsum will not be ctory; for sulphate of ammonia, which ebig supposes to be thus formed by ion of the ammonia with the sulphuric f the gypsum, is a manure to several crops besides the grasses, crops to the application of gypsum is, as every r well knows, utterly useless. It is herefore, by the formation of sulphate monia, I think, that gypsum operates ertiliser.

ave noticed, in applying gypsum to s, that the weather at the time of ding it has a very material influence the result of the experiment. Its are never soon apparent when it is in dry weather; but if the season is so that the white powdered gypsum es to the leaves and stalks of the young the good effect is then immediate. bservation was made, many years since, rthur Young, by Mr. Smith, and by merican farmers: it is a well-known ith the sainfoin growers, of the Berk- and Hampshire chalk formation; the cultivators of the gravels and loams rrey and Kent; and on the lucern ds of the alluvial soils of Essex and lesex. The farmers of the United , when dressing their turnips with m, always found it answer best when in rainy weather

The result of the analysis of the clover and sainfoin grasses shows that an ordinary crop of these usually contains from 1½ cwt. to 2 cwt. per acre of sulphate of lime. Now this is precisely the proportion of gypsum which the best cultivators find to be attended with the maximum benefit; those of Kent and Hampshire find it useless to apply more; but then they all agree that the annual repetition of the dressing, as long as the grass is suffered to remain on the ground, is attended with renewed benefit. It is here again that the experiments of the chemist and the farmer mutually confirm and illustrate each other; the very quantity of sulphate of lime which the first shows to be carried off the land in the clover, is precisely that which the latter returns to it in his dressings with gypsum.

One of the chief reasons why gypsum has not been universally employed by all cultivators of the artificial grasses arises perhaps from the fact that many good soils naturally contain sulphate of lime in sufficient abundance for the service of the plant; and, in consequence, to such lands the application of gypsum is useless — it is an attempt to supply a deficiency which does not exist. I have invariably found in those soils to which gypsum is not a manure an abundance of this salt. It is not, however, necessary for the farmer to have his soil analysed to determine the probable advantages of applying gypsum to his clover and other grasses; there are several easy observations which will readily indicate to him the nature of the case. Thus, when he finds that those fields which once produced luxuriant crops of red clover or sainfoin will no longer yield them in abundance; if he notices that the young plants spring up very numerously, but die away as the summer advances; if he finds that his fields will only grow clover successfully once in eight or twelve years, and that his neighbours tell him his land is tired of clover, or "clover-sick;" if he notices that even the application of farm-yard compost hardly adds to the luxuriance of his grasses; he may then safely conclude that his crops have gradually exhausted his land of sulphate of lime; and he may, with every confidence of success, apply a dressing of gypsum, at the rate of 2 cwt. per acre, taking care to choose a wet morning for the application; and this may be done at any season of the year, but it is best either in April or the first days of May. These facts I can attest from the results of my own observations and experience. In an old grass paddock, of about 70 acres, in the vale of Kennett, in Berkshire, the grass had for many years gradually become less and less productive, and this in spite of all kinds of applications; the earths (such as clay and chalk), farm-yard compost, &c., had been liberally and repeatedly spread, without producing any thing like a luxuriant crop: but it was found at last that the peat ashes of the banks of the Kennett, when spread at the rate of about 40 bushels per acre, produced the very best results — an excellent crop, both in weight and in colour; certainly more than a ton of hay per acre beyond what the soil yielded before. The fact was now evident that it was gypsum that the soil needed; for as these peat ashes contain about 12½ per cent. of sulphate of lime, more than 2 cwt. of gypsum was conveyed into the land in them; it constitutes, in fact, by far the chief fertilising ingredient in these peat ashes, the remainder being about 40 per cent. of sand, and the rest chalk, red oxide of iron, and a small quantity of common salt.

If this conclusion, therefore, was correct as to the gypsum being the only valuable portion of the peat ashes, it was certain that an application of 2 cwt. per acre of gypsum to the same land would produce similar beneficial results; and, upon a trial, it was found that benefits fully equal to any yielded by the application of the peat ashes resulted. Two cwt. per acre of gypsum, in fine powder, was spread on a portion of the grass, with the most excellent effect: the grass not only grew with greatly increased vigour, but a quantity of white clover and other grasses made their appearance on the portion dressed, in so marked a manner as to attract the attention of the tenant to the fact. The soil on which these experiments were tried consists of —

	Parts.
Organic matter, chiefly vegetable	3·5
Soluble matters	3
Carbonates of lime and magnesia	19
Oxide of iron	2·75
Alumina	8·5
Sand and gravel	62
	98·75

This is about 10 inches deep, and it rests on a thin stratum of gravel, and then chalk.

There is another fact which clearly supports these conclusions; viz. the great use of common coal ashes as a top-dressing to clover, sainfoin, and lucern; there is no manure universally in the possession of the farmer, in fact, equal to them for immediate effect upon those grasses. Now, coal ashes usually contain about 10 per cent. of sulphate of lime; and therefore a dressing with 50 bushels of coal ashes per acre is equal to an application of about 5 bushels of gypsum; the remaining portion of the ashes consists principally of about 10 per
lime and sand, and a small portion
oxide of iron and alumina: so
gypsum is here again evidently th
ingredient — the other constitue
being nearly inert substances.
experiments and observations h
confirmed by many others within
two years; for gypsum is evidently
gradually into use as a manur
grasses. Mr. James Barnard, an
and extensive farmer of Little B
Hampshire, in a recent communic
describes to me his experience
sum (December, 1839.): —

"The soil of my farm is of a
ture, and would be very stiff bu
number of stones there are in it
sown gypsum six or seven years,
on clover or sainfoin without s
proof of its efficacy, having usu
half a ton more of hay per acre
But the effect in 1838 was won
put on a bag (2¼ cwt.) per acre,
year old piece of sainfoin, on
May, with the plants very for
leaving the ground and coming
the gypsum had so increased the
the grass by the 9th of the sa
that when crossing the land wi
we observed the difference from
fields to the other; and at harve
extra produce of hay was quite o
acre. I then laid the field up,
again in October; when the ef
gypsum was still more apparent, t
1¼ ton of hay per acre from the
portion of the field, and scarce
the remainder of the land. C
sainfoin twice in one year, and
mous difference in the produce,
great many persons to look at the
all declared they had never see
before. On the same piece, this ye
I did not use gypsum, thinking it
good enough without, and the
was quite as great. I mowed
gypsumed portion, but there w
to cut on that which had not th
I can even see the effect where, t
ago, the gypsum was spread. I al
a strip or two in every field to
effect. There is one thing more
observe, that I never put on gyps
the last week in April, or the firs
and choose, if possible, a moist m
have not found much good effec
application on either chalk or
soils."

The expense of the applicati
gypsum is about 7*s*. per acre; this
being usually sold in London
2*l*. 10*s*. per ton, at Reading a

1s. 9*d.* per bushel. In the mid-
ies it may be had at a still more
rate; thus, in Derbyshire, it is
that the farmers' cheese-room
commonly formed with it; it
o, in the north of England. The
e produce of the gypsumed over
ned land is very great, — it of
ies in amount. I have seen it
produce of clover hay, and give
copious crop of lucern; but this
iably cut green for soiling.
th, of Highstead, found still
efit from the use of gypsum to
leys; for where the simple soil
ton only per acre of hay, the
he same soil to which 5 bushels
gypsum had been applied yielded
e first yielding only 20 lbs. of
the latter produced 105 lbs.
oo, first noticed — what my own
s have confirmed — that cattle,
always prefer the grass growing
umed portion of the field to any
same remark is made by those
coal ashes on their grass leys:
shes of Berkshire produce the

eral introduction, then, of gyp-
top-dressing for the artificial
h I have mentioned, is certainly
no mean interest to the farmer,
he cultivates the poor inland
gland, where artificial manures
and the carriage of even the
ble is expensive; for gypsum
n this respect, two advantages
which do not belong to any
of the saline manures: its first
ng; and its carriage light, since
ill convey sufficient gypsum to
acres of grass. It is a manure,
ounds in all parts of England,—
unty is destitute of it in some
her; and there is no extensive
e found in which large breadths
not benefited by its judicious
(*Journ. Roy. Ag. Soc.* vol. ii.
Smith's Essay, *Com. Board of*
p. 262.; and Dr. Fothergill, *ibid.*

LCON. See FALCON.

H.

r HACKNEY. In horseman-
ral term for a road horse, which
ays convey any sense of inferi-
er to horses let out for hire. It
often used in that sense.
E. A board set with sharp iron
combing or pulling out hemp.

Also the name of an artificial fly used by anglers.

HÆMANTHUS. (From *haima*, blood, and *anthos*, a flower, some of the flowers being of a blood colour.) A genus of fine bulbous plants. All the species succeed well in sandy loam, mixed with a little peat. They may be increased by offsets. (*Paxton's Bot. Dict.*)

HAGSNARE. A provincial word signifying a stool or stub, off which coppice-wood has been cut.

HAIL. (Germ. *hagel.*) A well known meteor which occurs chiefly in spring and summer, not unfrequently accompanied with thunder. It is formed of rain or atmospheric vapours, congealed by cold in the upper regions of the atmosphere, and falling to the ground in small roundish masses, or *hailstones*. On examining attentively the interior structure of hailstones, they are usually found to contain an opaque nucleus of a spongy or porous texture, resembling hardened snow, surrounded by a layer of ice of greater or less transparency. Sometimes several transparent layers are distinguishable, and sometimes the layers are alternately transparent and opaque. Hailstones have also been observed having a radiated structure. Their form is exceedingly various; in general it is roundish, but sometimes pyramidal, angular, or even thin and flat, with irregular surfaces. The usual size of hailstones is about a quarter of an inch in diameter; but they are frequently of much greater magnitude, and instances are on record in which the dimensions would appear incredible, if they were not attested by observers of known veracity. Halley relates that, on the 9th of April 1697, there fell in Flintshire hailstones which weighed 5 oz. On the 4th of May 1697, Robert Taylor, in Hertfordshire, observed hailstones which measured 14 inches in circumference; that is, nearly 4 inches in diameter. Parent, on the 15th of May 1703, found them at Iliers as large as his fist. On the 11th of July 1753, at Toul, some were collected by Montignot measuring 3 inches in diameter. Volta affirms that on the night of the 19th August 1787, in a hail-storm which ravaged the city of Como and its environs, some of the stones were found to weigh 9 oz. In the hail-storm which traversed the whole of France and the Netherlands on the 13th of July 1788, M. Tessier relates that hailstones were picked up which weighed 8 oz. And Dr. Noggerath informs us that, on the 7th of May 1822, hailstones fell at Bonn, weighing from 12 to 13 oz. From these relations, we may form some idea of the destruction occasioned by a severe hail-storm in a cultivated country.

Of the different circumstances accompaas much as they produce a great obscurity. It has been remarked that they have a peculiar grey or reddish colour, and that their lower surfaces present enormous protuberances, while their edges exhibit deep and numerous indentations. Hail is always accompanied with electric phenomena. Various hypothesis have been proposed to explain the physical cause of hail, and the phenomena by which it is accompanied. The theory requires the solution of two questions; first, how the cold which causes the congelation of the aqueous particles is produced? And, secondly, how a hailstone, after attaining a sufficient size to fall through the air by its own weight, remains suspended a sufficient length of time to acquire a volume of twelve or fifteen inches in circumference? And both these questions are attended with very considerable difficulty; and after all that has been written on the subject, the theory of hail is still involved in great obscurity.

Certain districts of England are peculiarly subject to the ravages of hail-storms; of this kind is the district between Dunmow, in Essex, and the hills of Hertfordshire. The devastation and ruin caused to the farmer by these storms has caused the establishment by the Farmers' Insurance Society of a branch for the insurance against hail-storms. (*Brande's Dict. of Science; Pouillet's Elemens de Physique*, t. ii.)

HAIR. (Germ. *haare.*) The characteristic covering of the mammiferous class of animals. It consists of slender, more or less elongated, horny filaments, secreted by

the same chemical compositio
formation, and general structur

In the spine of the porcupin
secretes a fluted pith, and the ca
it with a horny sheath, the tra
which allows the ridges of the
to be seen. In the spine-like
the walrus, as well as the bristle
the twofold structure of the
conspicuous; but in the finer
as of the human head and beard
pith can only be demonstrated
verse sections, viewed with a
Some kinds of hair, as of the
the mane and tail of the horse, a
and grow continuously by a p
tivity of the formative capsule
other kinds, as the ordinary hair
cow, and deer, are annual, an
shed at particular seasons. In
horns are shed contemporaneou
deciduous hair.

Many quadrupeds, especially
climates, have two kinds of hair
coarse kind, forming their visi
covering; and a shorter, finer
abundant kind, which lies close
and called "fur." With respect
Eberle has proved that the shea
is vascular, and the substance o
formed by the secretion of horn
the surface of the vascular pulp.

The organisation of the hair
allow of its undergoing cert
when once formed, according to
health and general condition o
the frame, and even to be affe

hich easily loses its curl, is that which
t gelatinous. Vauquelin discovered
nds of oil in hair: the one colourless,
air; the other coloured, and imparting
uliar tint to hair. Black hair also con-
on and sulphur. The following is his
is:—1. An animal matter, constituting
atest part. 2. A white solid oil, small
ntity. 3. A greyish-green oil, more
ant. 4. Iron; state unknown. 5.
of manganese. 6. Phosphate of lime.
onate of lime, very scanty. 8. Silica.
phur. Leuwenhoeck (*Phil. Trans.*)
ooke (*Micrographia*, p. 156.) have
ed their microscopical observations

an hair makes a very considerable
n commerce, for wigs, &c. The hair
s is extensively used in the manufac-
chairs, sofas, saddles, &c.; while
r or wool of beavers, hares, and
&c., is much employed in the ma-
re of hats, &c. The refuse hair of
t animals, particularly the short hair
les, and that of hogs, when it can be
d in sufficient quantity, will be found
as a fertiliser; a fact that might
be imagined when it is known that its
l properties closely approximate to
horn. (*Brande's Dict. of Science*;
ch's *Com. Dict.*; *Thomson's Syst. of*
p. 480.)

R GRASS. See Aira.

ROUGH. A local name for goose-
cleavers. See Hariff.

ES. A word provincially applied
copse or draught-irons of a plough.
ughs.

TER. A rope so formed as to be
the heads of horses or other animals.
r to lead or tie them up. It likewise
a head-stall of leather, mounted with
l sometimes two straps, with a second
band, if the horse is apt to slip his

M. (Dutch, *hammen*; Fr. *jambon*.)
merce denotes the thigh of a hog or
alted and dried, so as to preserve it
ate possessing a pungent and agree-
avour. York, Hants, Wilts, and
rland in England, and Dumfries and
ay in Scotland, are the counties most
for producing fine hams. Those of
l are comparatively coarse, and with-
vour. (See Bacon.) The hams of
al, Westphalia, and Virginia are ex-
ly flavoured, and are in high estima-
The method of curing hams in the
celebrated districts, is to rub them
rd with bay or other salt; then leave
n a stone bench, in order that the
may discharge itself. In a few days
lting process is repeated; about half an ounce of saltpetre (nitrate of potassa) being added to each ham. When they have continued about a week longer on the bench, or in the salting-tub, among the brine, they are commonly hung up to dry in the sides of large open chimneys; some have them exposed to the smoke of wood, peats, coals, or other sorts of fuel, while others carefully avoid having them smoked. And when not sold sooner, they are continued in these situations till the approach of warm weather, when they are packed up in casks with straw, or the seeds of oatmeal, and consigned for sale. Hams lose about 20 per cent. of their weight in drying.

Hams may be cured in order to resemble, in taste, those of Westphalia, by the following process:—Cover a young ham of pork with dry salt; let it be for twenty-four hours to draw off the blood; then wipe it perfectly dry, and take one pound of brown sugar, a quarter of a pound of saltpetre, half a pint of bay salt, and three pints of salt; incorporate these ingredients in an iron pan over the fire, and stir them continually till they acquire a moderate degree of heat. In this pickle the ham must be suffered to remain for three weeks, frequently turning it, when it should be suspended in a chimney for drying by means of smoke from no other but a wood fire. The smoke from oak saw-dust or shavings is the best for imparting a fine flavour. This smoke contains imperfectly formed pyroligneous acid, which is the agent that communicates the flavour to the Westphalia hams. In Dumfriesshire the pickle for hams is sometimes made with one half ale, which renders the hams shorter, and adds greatly to the richness of their flavour. The imports of bacon and hams, principally the latter, amount to 1350 cwt. a year. The duty is very heavy, being no less than 28*s*. a cwt. (*M'Culloch's Com. Dict.*) See Swine.

HAMES. The iron or wooden harness by which draught-horses are attached to the carts, &c.

HANBURY (REV. WILLIAM). Rector of Church Langton, Leicestershire. He died in 1778. He was exceedingly fond of planting. He planted fifty acres of nursery ground, the produce of which he dedicated to the improvement of the church and parish. It was instituted, however, in the first instance, for the encouragement and improvement of the art of planting. He wrote,

1. An Essay on Planting, and a Scheme to make it conducive to the Glory of God, and the Advantage of Society. London. 1758. An 8vo. pamphlet. 2. The Gardener's New Calendar. London. 1758. 8vo. 3. A complete Body of Planting and Gardening, containing the Natural History, Culture, and Management of Deciduous and Evergreen Forest Trees, with practical Directions for raising and improving Woods. As well as

a general System of the present Practice of the Flower, Fruit, and Kitchen Gardens. (*G.W. Johnson's Hist. of Gardening.*)

HAND. The measure of the fist when clenched; it is equal to four inches. The height of horses is computed in this way. A horse fifteen hands high stands five feet at the shoulders.

HAND-HOEING. See Hoeing.

HAND-WEEDING. See Weeding.

HARD-FERN, NORTHERN. (*Blechnum boreale.*) An indigenous fern, growing in rough, heathy, or stony ground, and sometimes in moist, shady hedge-bottoms. The black and scaly root is tufted with many stout fibres. The numerous fronds are also tufted, stalked, erect, straight, lanceolate, smooth, deep green; a foot or more in height; the leaflets are linear, entire, and scarcely dilated at the base. Some of the species belonging to this genus are very interesting ferns, which delight to grow in the openings of rock-work, in sandy loam and peat mixed: they divide readily at the roots, and may also be raised from seeds. (*Smith's Eng. Flor.* vol. iv. p. 316.; *Paxton's Bot. Dict.*)

HARD-GRASS. (*Rottboellia*, named by Linnæus in honour of C. F. Rottboell, a Danish botanist.) This is the *Ophiurus* of some botanists, but I adopt the classification of Smith. Curious annual grasses, growing in any common garden soil. The sea hard-grass (*R. incurvata*) is found growing in various places on our sea coasts, particularly in salt marshes. It is an annual, and flowers in August. The root is fibrous and downy; the stems numerous, a span long, spreading, round, partly procumbent, leafy, smooth, jointed, and bent. Leaves of a deep glaucous green, narrow, acute, striated, rough on the upper side and at the edges. The spikes are terminal, solitary, incurved, cylindrical, very smooth. All the glumes are destitute of awns. (*Eng. Flor.* vol. i. p. 175.)

HARE. (*Lepus timidus.*) The hare is naturally a timid animal, and extremely swift in motion when pursued by dogs. Hares are dispersed over almost every climate, and consequently the varieties are extremely numerous; and the sizes, forms, and habits, adapted to the physical wants of the family, greatly multiplies their diversities. Although hunted in all countries, being prolific in the extreme, their species does not apparently diminish in number. They begin to breed in the first year, and the female generally produces four or five leverets, after a gestation of about thirty-one or thirty-two days; and she is supposed to breed four or five times in the year. Unlike dogs, the eyes of these animals are
open at their birth; and after being
for about three weeks they are
to their fate. Hares in a state of
are believed to live from nine to
years. The hare is known to have
favourite object of the chace more th
thousand years ago.

Taking or killing hares or conies
rens, &c., in the night-time.—It is,
7 & 8 Geo. 4. c. 29. s. 30. enacted, tha
person shall, in the night-time, take
any hare or coney in any warren or
lawfully used for the breeding or
of hares or conies, whether enclosed
every such offender shall be guil
misdemeanour; and if any person
lawfully and wilfully in the day-ti
or kill any hare or coney in any
ren or ground, or shall at any tim
use therein any snare or engine
taking of hares or conies, every
fender being convicted thereof
justice of the peace, shall forfeit
such sum of money, not exceedi
pounds, as to the justice shall see
provided always, that nothing her
tained shall affect any person takin
ling in the day-time any conies on
bank or river bank in the county of
so far as the tide shall extend,
one furlong of such bank.

HAREBELL SQUILL, or WII
ACINTH. See Squill.

HARE'S TAIL GRASS.
ovatus.) A mere annual weed, gr
any soil and situation, but partic
open sandy fields near the sea;
in June. The root consists of sever
fibres; stem round, from four to twel
in height, with four or five joints
striated, and smooth at the top;
ceolate, acute, many-ribbed, downy
sides, wavy on the edges, sometim
near the base; sheaths inflated,
downy; stipules oblong, embracing,
spikes many-flowered, and woolly
abundant soft hairs of the caly
grass serves, like the *Stipa penna*
corate flower-pots in winter; to
foreign *Briza maxima* is a welcome
(*Smith's Eng. Flor.* vol. i. p. 167.)

HARE'S EAR. (*Bupleurum.*)
natural and remarkable genus, on
of the leaves being for the most p
entire. The species indigenous
islands are all annuals: they are
aromatic, and acrid. 1. Common
or thorow-wax (*B. rotundifolium*),
ishing in corn-fields, especially
soil; flowering in July. The root
and tapering; the stem erect, roun
branched alternately in the upper
somewhat corymbose. Leaves

lternate, broadly ovate, scarcely
often purplish, and the margin
ucous. Umbels of yellow flowers
nd compound. The partial bracteas
as long as the flowers, ovate,
lowish-green, and bristle-pointed.
-leaved hare's-ear (*B. odontites*).
the rocks of the Devonshire coast;
ing; stem wiry, from one to five
height; leaves linear lanceolate,
n one to two inches long, lower-
ed, somewhat spathulate; flowers
ured, with a tinge of red. Like
its genus, this herb is astringent,
bitterness. 3. Slender hare's-ear
imum). Grows in muddy salt
Root zigzag; stem slender, erect,
th, from three to twelve inches
es linear lanceolate, glaucous;
itary, of about three small yel-
ers, which blow in August and
. The annual species of hare's-
require sowing in the open
y in spring; the perennial kinds
eased by offsets or seeds. (*Eng.*
p. 92—95.; *Paxton's Bot. Dict.*)
EAR (SHRUBBY). (*Bupleu-*
sum.) An evergreen, native of
of France, growing five or six
and bearing a yellow flower in
ugust, which is well suited as
ntal plant for shrubberies. It
opagated by cuttings under a
m seed.
F, Goose-Grass, Cliders,
r Catchweed. (*Galium aparine.*)
nnual plant, with a fibrous root,
hedges almost every where. It
d even in Nepal. The flowers are
and buff-coloured, few together,
leafy stalks, and blowing from
gust. The root is fibrous. The
ed, brittle, supporting itself upon
s; often three or four feet long;
gles beset with hooked prickles,
also abundant on the edges and
e leaves, by all which the herb
he hands and clothes of those
it, as well as to the coats of ani-
likewise the seeds. The fruit is a
e, beset with minute, short hooks.
ed juice of the herb is reckoned
tic; but this is doubtful, as well
aginary virtues in cancer which
attributed to it. The roasted
aid to be no bad substitute for
which they are botanically re-

wered goose-grass is one of the
rough-fruited common bedstraw
). (*Smith's Eng. Flor.* vol. i.
10.)
ERS. A breed of dogs kep

principally for hunting the hare. There are three prominent varieties of the harrier, — the old southern hound, the modern harrier, and the beagle. Subordinate divisions occur, and a cross breed is used in hunting the otter. The modern harrier is little more than a dwarf fox-hound. The size and form of the harrier, like those of the fox-hound, should be adapted to the nature of the country hunted over. Some sportsmen have a *penchant* for packs of undersized harriers; and a gentleman of the name of Harding used to hunt the open grounds about Dorchester with about seventeen couple, which were not more than sixteen or seventeen inches high. (*Blaine's Rural Sports*, p. 404.)

HARRIERS. (*Circus.*) A kind of hawk, of which two British species may be described.

1. The marsh harrier (*C. rufus*), though frequently called a buzzard, is, in conjunction with the species next to be described, immediately distinguished from the true buzzards by the more elongated and slender form of the body, the lengthened, taper, and naked legs, the still greater softness of the plumage, and by the circular disk of short feathers which surrounds the face.

The marsh harrier, as its name imports, is generally found on low and level lands, or uncultivated heaths and moors. Its flight, though slow, is smooth, performed with ease, but near the ground; and from the regular manner in which the species of this genus traverse the surface, looking for prey like a dog hunting for game, they have probably acquired the name of harriers. The marsh harrier is said to roost on the ground; and may be seen sitting on a stone or low bush, seldom on a tree, looking out for objects for food, which it strikes when on the ground; and is not very particular in its choice, feeding on young rabbits or other small mammalia, birds, preferring water birds, reptiles, and, according to some authors, occasionally taking perch and other kinds of fish. The nest is formed on the ground, of small sticks, rushes, or long grass. The eggs are three or four; white, two inches one line long by one inch six lines broad.

The whole length of a marsh harrier is from twenty-one to twenty-three inches, depending on the sex of the bird.

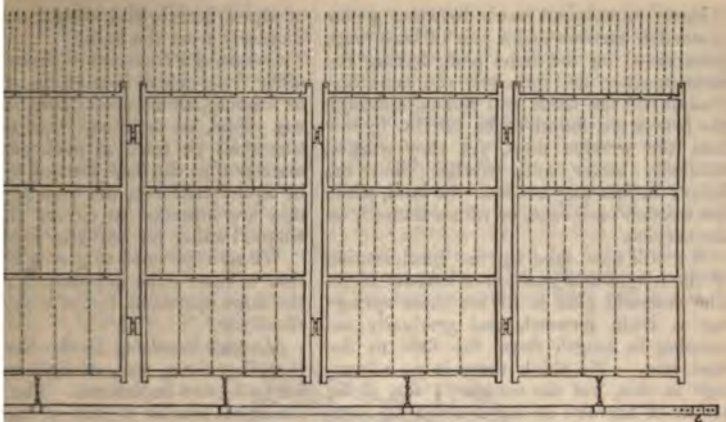
Duck hawk, harpy, and white-headed harpy, are names occasionally bestowed on the marsh harrier. The general colour of the plumage is reddish-brown; the head and nape of the neck being yellowish-white, tinged with rufous brown.

2. The hen harrier (*C. cyaneus*). In this species the old male, from his almost uniform ash-grey colour, is called provincially the dove hawk, or blue hawk, and, on account

purposes. This instrument succeeds to the plough in the natural order of description, and in the uses to which it is applicable. Its purpose is to pulverize the ground which has been moved by the plough, to disengage from it the weeds and roots which it may contain, or to cover the seeds of the cultivated plants, when sown. The form of the plough has been very different in different ages and countries, and there is little resemblance between the rude machines of the ancients and some of those which are now employed; but the harrow seems to have been nearly of the same form from the earliest times to which we are able to trace it on sculptures, medals, and other remains of antiquity. It is a much more simple machine than the plough, and may even be held to be imperfect in any form in which it can be made; yet it is an instrument of great utility in tillage, and no other has yet been devised to supersede its use, or to equal it, for many of the purposes to which it is applicable. (*Quart. Journ. of Agr.* vol. i. p. 503.)

There were various stages in the gradual introduction of the modern harrow. The first implement used by men, for the purpose of covering seed, is generally the branch of a tree; to these soon succeed more desirable substances, such as beams of wood; and then, again, two or more beams are fastened together: spikes, or teeth, are a much later improvement. Even now, in India (and there the natives but rarely alter their modes of culture or their implements), an instrument is used which is intended to produce the combined effects of the roller and the harrow. This, according to Mr. G. W. Johnson, " is nothing more in form than an English ladder made of bamboo, about eighteen feet

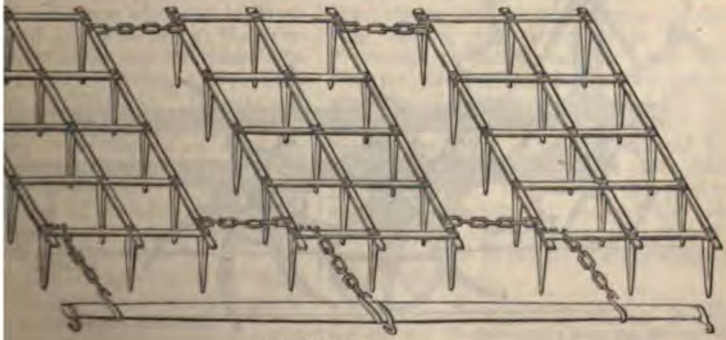
operation on the farm,—not s
haps, on account of the quant
requisite for the draught (th
sometimes considerable), as f
with which the operation is, or
accompanied; and yet it is fr
to the charge of mere boys, a
performed by the worst horses
If we examine a field, one half
been harrowed by weak ineff
and whose pace was conseque
the other half by an adequate
swiftness of animal power, we
former will be rough and unfini
ter, comparatively firm and le
pleted in what would be called
like manner. Scarcely any thi
is more unsightly than the wa
traces of inefficient harrowing
rality of harrows appear to
and clumsy to admit of that d
out which the work cannot b
and though it is evident that
demand different implements
tionate weight and power, yet,
part, harrows have been rath
under weighted, particularly
ployed after a drill, or to bury
kind. Harrowing has been
garded as an operation which
tended with considerable hors
our attention has been turn
quiry, whether this labour
greatly reduced by lightening
Many, we think, would be su
amount of reduction of which
at least, are capable, and where
to see how effective a gang
small-toothed harrows may be
noticed the perfect manner
corn is covered by a comm



GANG OF HARROWS. Scale half an inch to a foot.]

the manner shown in the an-
e.

e observed that the above four
e amply sufficient to cover a
ow stetch or ridge of 108 inches,
ill be wide enough for a three-
ch of 90 inches, exclusive of a
on of the furrows. If for some
e teeth be found too thick, every
may be taken out; but for
rposes this will hardly be ne-
he two horses require, on this
kept quite level; for if one is
go in advance of the other, a
ne is produced, by which the
be made to follow each other,
cutting fresh ground. We are aware that, by the usual construction of harrows, a diagonal line of draught is required, in order to throw the teeth into a proper working position; but we are strongly inclined to the opinion, that the due execution of the implement ought to depend on its construction, and not on any particular mode of working it. Besides, the system of keeping one horse in advance of his partner is bad in principle; it is an unequal division of labour, the fore-horse being compelled to do more than his share of the work, which, under any circumstances, is always heavy enough. We have stated that the above set of harrows are of wood. Their extraordinary lightness renders this necessary; but, for general purposes, we prefer those made of iron, the weight of which can be increased to any reasonable degree without adding much to their substance. This is important in working tenacious clays, which, by adhering to the clumsy wooden balks, considerably increase the labour, and at the same time impede the proper execution.



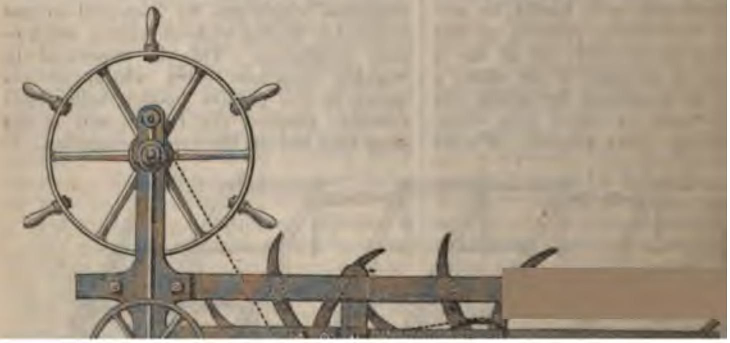
IRON HARROWS.

The common plan is to set them springing a little forward, and gradually increasing in length from the fore to the hind row. We think there is no advantage in this, but the contrary; for, if the action of harrows so constructed be carefully examined, it will be found the reverse of what it ought to be, — the hind part will be thrown up, and the fore teeth, short as they are, will have to do all the work. In some experiments made with harrows, the fallacy of the idea, that an inequality in the length of the teeth was essential to the proper working of harrows, was made evident. For this purpose, a harrow was constructed on the old-fashioned plan of unequal and springing teeth in front; the whole of the teeth pointing *backwards* instead of *forwards*. Nothing could work better: there were no chucks and snatches, but all went on smoothly and steadily. We do not, from this circumstance, recommend harrows to be so constructed, but we have no doubt that each harrow should have all its teeth

the same operation, but of a
character.

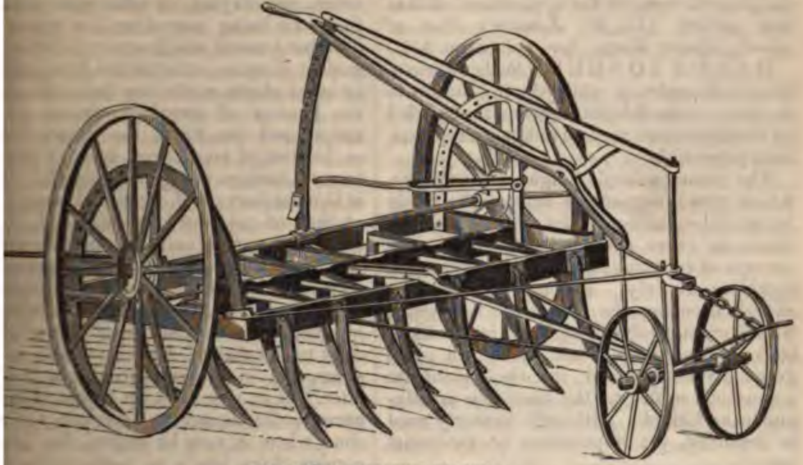
Morton's Revolving Brake-Ha
is an ingenious, and, on light s
very effective implement. The
somewhat similar to that of the
machine; except that in place o
it goes to the very bottom of
bringing up a far greater quant
than any fixed harrow could
to accomplish. One of these im
some years ago in use on Lor
estate, at Holkham, and many
with its singular capabilities
and pulverizing the soil. It s
admirably calculated for its in
pose; and we have no doubt, th
tity of rubbish it brings up to
must supersede the necessity
ploughing; still, with all its m
not appear to have made much
gland, for, with the above exce
not remember to have seen one

Vaux's patent Revolving Harr
cultural Purposes.—Of this im



join a sketch, taken from the specification is patent obtained in 1836, by which its struction and mode of working will be rly seen. It has this important feature, t one part of the apparatus, by its rotatory tion, serves to clear the other part.

Biddell's Extirpating Harrow.—This is a implement, somewhat on the principle Biddell's scarifier, and invented by Arthur ldell of Playford. It is intended for aking up land when it is too hard for the iest harrows, and for bringing winter ws into a state of fine tillage. In work- summer lands, by the shape of its teeth, calculated to bring to the surface all grass and rubbish; it will also be found generally useful for accomplishing fine tillage. The tines may be either used with points or with steel hoes; and with the latter the skimming, or, as it is frequently called, the "broad-share" process, may be quickly accomplished. The weight is not found to be a disadvantage, but the contrary; and being borne on high wheels, it does not require so much horse-labour as might be supposed. It is at present but in limited operation, although highly valued by those who have made use of it. The following is a sketch of this harrow obtained from one in use.



BIDDELL'S EXTIRPATING HARROW.

. Amos, in an essay on agricultural ments in the *Com. to Board of Agr.* -p. 461., describes a new set of harrows rrowing moist land without the horses ing it; but their construction does not r of sufficient merit to entitle them to e in the present day.

RTE (WALTER), was born at Kent- in Buckinghamshire, about 1697, and in 1768. He was educated at Marl- ugh School and at St. Mary's Hall, Ox- where, in 1720, he took his Master's de- : he became Vice-Principal of the Hall, a canon of Windsor. He was also of St. Austle and St. Blaze, Cornwall. published "A History of Gustavus phus," several poems, &c., but is re- d here as being author of "Essays on andry, and a Treatise on. Lucern. V. H., Canon of Windsor. Plates. 1764 1770."

ery reader must agree with Dr. John- in considering these essays "good." *W. Johnson's Hist. of Gard.*)

RTLIB (SAMUEL), came to England about 1630, though Warton places his arrival ten years later, which is certainly an error, as he is known to have been intimate with Archbishop Usher and Joseph Mede, long previous to that year. He was the son of a Poland merchant, settled at Elbing in Prussia. He carried on an extensive agency business, and assisted in establishing the embryo of the Royal Society. He wrote several theological tracts; and was intimate with Milton, who dedicated to him his "Tractate on Education," on which topic likewise Sir William Petty corresponded with him. Towards the close of his days he became poor, and applied to the parliament for relief. Cromwell allowed him an annuity of 100*l.* The time of his death is not recorded. He was the esteemed associate of the talented men of his time. He deserves our attention from being a great promoter of the art of cultivating the earth. He wrote,

1. A Legacy; or an Enlargement of the Discourse of Husbandry used in Brabant and Flanders. 1650, 1651, and 1655. 4to. He also edited a work, the MS. of which was given to him by the Hon. Colonel John Barkstead,

Lieutenant of the Tower, the author of which was an old clergyman, at Loving-land, near Yarmouth; it is entitled, 2. A Designe for Plentie, by an universall Planting of Fruit Trees; tendered by some Wel-wishers to the Public. 4to. No date. 3. Concerning the Defects and Remedies of English Husbandry, in a Letter to Dr. Beati. London. 1651. 4to. An edition in 1659 is entitled "The Compleat Husbandman; or a Discourse of the whole Art of Husbandry," &c.

"The famous work," says Weston, "attributed to Hartlib, and called 'The Legacy,' was only drawn up at his request, being corrected and revised by him. It consists of one general answer to the query—What are the actual defects and omissions, as also the possible improvements, in English husbandry? The real author was R. Child; it contains the contributions of most of the persons eminent for agricultural skill at that period. (*G. W. Johnson's Hist. of Gard.*; *Quart. Journ. Agr.* vol. xii. p. 312.)

HART'S TONGUE. (*Scolopendrium*, from *scolopendra*, a centipede, in allusion to the appearance of the underside of the fronds.) Of this fern there are two indigenous species, both perennials.

The common hart's tongue (*S. vulgare*), which grows frequent on moist rocks, shady banks, old walls, the insides of wells, deserted mines, or other caverns, where there is a current of cold damp air. It is a perennial, flowering in July. The root is tufted or slightly creeping, the fronds are numerous, tufted, erect, twelve or eighteen inches high, stalked, lanceolate, acute, of a full grass green. When bruised, the whole plant has a nauseous scent: to the taste it is mucilaginous and acrid. Although formerly used in medicine, yet it possesses no medicinal powers.

The scaly hart's-tongue, or rough spleenwort (*S. ceterach*), is less common, and grows on limestone rocks or old walls. The root is fibrous, black, and tufted. The fronds are from three to six inches high, of a deep, slightly glaucous, opaque green. (*Eng. Flor.* vol. iv. p. 314.)

HART-WORT. (*Tordylium.*) Of this genus there are two native species, both uninteresting annuals.

1. The small hart-wort (*T. officinale*) is met with sometimes in cultivated fields, but very rarely in England; being generally confounded with the greater hart-wort. The root is small and tapering, the stem generally branched, a little spreading, from ten to fourteen inches high, clothed with soft deflexed hairs. The leaves rough and hairy, simply pinnate. The stalks are surmounted by dense umbels of crowded white flowers.

2. The great hart-wort (*T. maximum*), is found growing occasionally on banks and waste grounds. It is larger in habit than the preceding; the stem rising three or four feet high, blowing reddish flowers. (*Eng. Flor.* vol. ii. p. 103.)

HARVEST. (Germ. *herbst.*) In
culture, the period at which any
reaped. The term is more common
plied to the crops of corn or hay,
it might, with propriety, be applied
potato crops, or to hops and other
products.

HARVEST-HOME. A sort of
given by the farmer, after harvest,
labourers and others that have
cutting and securing the crops. Th
is sometimes also applied to the
use of on the occasion.

HARVESTING. The operation
ling, cutting, rooting up, or gather
crops, and drying, or otherwise
them for being stored up for
The first harvest which occurs in Bri
similar climates is that of the forage
or other plants made into hay; the
the harvest of cereal grasses, or
crops; and the third, the potato
or harvest of root crops, such as
carrots, turnips, mangel-wurzel, &c.
is also the harvest of occasional cro
as that of rape-seed, turnip-seed,
woad, hemp, flax, and various other
The commencement of harvest is
regulated by the state of the wea
varies in different seasons, even
weather is favourable, from the
July to the end of August; while,
years, and in exposed situations,
later. It is, therefore, an object
ance to the farmer to ascertain
time when it may be begun, for
employ extra hands to perform th
and as it only lasts during a comp
short period, they receive high
are maintained at heavy cost. I
attended with the most anxious
for it is a business which cannot
moment neglected; and the man wh
to get it rightly managed, must sup
it, without intermission, from the da
day until its final close. He should
ously get rid of all other work, a
every preparation for the due perf
of this; the barns should be th
swept out, both roof, walls, and flo
stack-frames repaired, and every to
be in complete condition. The str
should be in readiness for tying the
as well as the ropes for securing the
and arrangements should be mad
house for the regular supply of wh
to be furnished to the labourers,
every unnecessary delay may be
The strictest order should also b
tained; but the work will never
performed, unless it be conducted w
fect good temper. Fortunately, th
do not usually ripen at the same

1; that of rye being the earliest, and about a fortnight later; some of the species of oats and barley come in be- the rye and wheat; but barley more ally comes afterwards, followed by of the later kinds of oats. Grain, if aped until the straw is wholly yellow, e more than ripe; as the ear generally, t in late seasons, ripens before the en- the straw, and it is observable that st reaped usually affords the heaviest e fairest sample.

indications of ripeness in corn are d simple. When the straw exhibits ht golden colour from the bottom of em nearly to the ear, or when the gins to bend gently, the corn may . But, — as the whole crop will not ally ripe at the same time, — if, on g through the field, and selecting the st heads, the kernels can be separated he chaff when rubbed through the it is a sure sign that the grain is then its milky state, and may be reaped fety; for although the straw may be o some distance downwards from the t if it be quite yellow from the bot- wards, the grain then wants no fur- ourishment from the earth, and, if y harvested, it will not shrink. These will be found to sufficiently indicate eness of wheat, barley, and oats; but rye arises from the straw losing some olden hue, and becoming paler.

usual practice in England is to cut ll corn before it is quite ripe, and to t in shocks, or, in the case of barley, ledge, until the grain is perfectly d and hardened; and the same prac- evails in Scotland. Experience, how- as occasioned a remarkable distinction mode of harvesting barley in the two ns of Great Britain, just mentioned. gland, barley is usually cut with the , treated like hay in the saving, and ose into the rick or mow. In Scotland cut, as in Ireland, generally with the g-hook, and when sufficiently dry, l up and stacked. The cause of this nt treatment is, the difference of cli- There is an article by Mr. Geo. ens, *Quart. Journ. of Agr.* vol. iii. 3., on the method of preserving corn ctised in Sweden, which may be con- l with advantage by the farmer. The n alluded to is that of fixing fifteen or n sheaves of corn on high stakes placed ground, which is said to dry the corn enefit the grass. (*Brande's Dict. of e*; *Brit. Husb.* vol. ii. p. 186.; *Pract.*) See Barley, Reaping, Wheat, &c.

RVEST-MOON. That lunation harvest time, when the moon at full rises nearly at the same hour for several nights.

HARVEST MOUSE. (*Mus messorius.*) The smallest of British quadrupeds is supposed to be the harvest mouse, hitherto found only in Hampshire, and which is so diminutive, that two of them put into a scale just weighed down one copper halfpenny. One of the nests of these little animals was procured by Mr. White. It was most artificially platted, and composed of wheat blades, and perfectly round, about the size of a cricket ball. It was so compact and well filled, that it would roll across a table without being discomposed, though it contained eight young ones. This wonderful cradle was found in a wheat field suspended in the head of a thistle. See Fieldvole.

HASEL, HAZEL, or STOCK NUT. (*Corylus avellana.*) This small bushy tree is common every where in our hedges and copses, and also grows wild in most parts of Europe. The leaves are two inches wide, doubly serrated, light green, downy, especially beneath. The catkins are barren, clustered, or panicled, greyish, long, and pendulous, opening in the early spring, before the leaves appear, and, indeed, formed during the preceding autumn. The ovate scaly buds, containing the fertile flowers, become conspicuous at the same time by their tufts of crimson stigmas. The nuts, two or three from each bud, are sessile, roundish-ovate, half covered by the jagged outer calyx of their respective flowers, greatly enlarged, and permanent. The wood of the hasel-tree is used for making hoops, for casks, hurdles, crates, springles to fasten down thatch, fishing-rods, &c. It is also reported to make excellent charcoal for drawing, of the preparation of which, and of the whole history of this plant, Dr. Hooker gives a full account, annexed to an admirable figure. It was formerly much used for making gunpowder. (*Eng. Flor.* vol. iv. p. 157.) See Filbert.

In the country where yeast is scarce, they twist the slender branches of hasel together, and steep them in ale yeast during its fermentation; they are then hung up to dry, and at the next brewing are put into the wort instead of yeast. The chips of this wood are used to fine wines. (*Phillips's Fruits.*)

HATCHING. See Incubation.

HATTOCK. A shock of corn, consisting of six, eight, ten, or twelve sheaves, so set together that they may be protected from the effects of the weather. This is generally accomplished by two of the sheaves, which are termed hooders, being opened in the middle, and placed over the others but the coving chaff is very good manger-meat; and even the stalk, if bruised and cut, and then steamed, would be found useful in a farm-stable.

Pea haulm is very generally given as rack meat to cart-horses, instead of hay, for which purpose it is well adapted, being succulent and nutritious, and nearly as much relished as hay; although it may not go quite so far, yet there is great saving in its use. But both these and all other kinds of straw haulm should be given as fresh as possible from the flail, for they grow brittle, and lose a portion of whatever sap they possess, by exposure to the air; if long kept, they grow musty, and in that state neither are wholesome nor will be eaten by horses. Pea haulm should be given cautiously, as it is flatulent, and apt to occasion colic: it is also said to be productive of bots; but that, if true, is not so peculiar a property as to prevent its use. Sheep are extremely fond of haulm; so much so, indeed, that it is by no means uncommon for farmers who keep large flocks to grow pease chiefly with a view to it as winter food in pinching seasons; the seed being, in that case, generally sown broadcast, both to preserve the succulence of the haulm, and to save the trouble of the drill culture. (*Brit. Husb.* vol. i. p. 133.; vol. ii. pp. 219. 463.) See Pease and Beans.

HAVER. A name given to oats (particularly to wild oats) in some parts of the kingdom; hence, haver meal is meal made from oats by grinding and sifting through a proper sieve for the purpose. In some parts of Scotland, a thick oat cake is used, and called *a haver meal bannock*.

HAWFINCH. (*Coccothraustes vulgaris.*) This bird was formerly considered

chestnut brown; sides of the
and belly, pale nutmeg brown.
length of the bird is full
(*Yarrell's Brit. Birds*, vol. i.

HAWKBIT. (*Apargia.*)
herbaceous plants of easy
indigenous species, are as follo

1. Rough hawkbit (*A. hispi*
plentifully in pastures, especia
or lime-stone, flowering in
tapering, long and slender, exte
ish. Leaves lanceolate, oblon
irregularly dentated, clothe
sides with prominent hairs.
drooping in the bud, erect wh
bright yellow, smaller than
dandelion. Down sessile,
unequal.

2. Deficient hawkbit (*A. hir*
flowering in July and Aug
than the last, growing on
and commons. The root ab
tapering; leaves slightly dent
small, yellow, but red underne

3. Dandelion hawkbit (*A. ta*
species is mostly confined to t
of Scotland and Wales, where
moist situations, flowering in
stalks, one or more, are erect, a
three to six inches high, swell
hairy at the top.

4. Autumnal hawkbit (*A.*
This species is a very common
some weed in all meadows and
varies very much in luxurianc
found thriving in extremely
newly turned up. The root is
very long simple, lateral fi
several, almost entirely radic
deeply and unequally toothed
The stalks are several, ascendi

sustaining itself in the air in the
, by means of a short but rapid
ie wings, while its powerful eyes
urface beneath for mice of dif-
es, which form by far the most
part of its food. It has ac-
name of windhover from this
naining with outspread tail sus-
he air, the head on these occa-
pointing to windward; and it
d stone-gall, which Mr. Mudie
ould be written stand-gale from
abit. It is sometimes known as
hawk. Besides mice, it occasion-
n small birds, and coleopterous
ir larvæ, and earthworms. In
kestril frequently takes posses-
nest of a crow or magpie, or else
gh rocks, or on old towers and
g four or five eggs of a dark
wn, about one inch seven lines
inch three lines across. The
h of the kestril is from thirteen
ches, depending on the sex. The
our of the plumage is reddish
, the beak blue, the legs and toes

in (*F. æsalon*) is the smallest of
out it is also one of the most ac-
autiful. Although little larger
kbird, such is its power and de-
, that it can kill a partridge at a
ce. The more common food of
is small birds.

in occasionally builds on rocks,
ommonly makes its nest on the
ying four or five eggs, mottled
h brown, and measuring one inch
in length, by one inch three lines

The merlin measures from ten
nches in length. In North Wales

miniature. In most of the wooded districts the sparrow-hawk is a common and well known species; bold, active, vigilant, and destructive, a dangerous enemy to small quadrupeds and young birds, upon which they subsist, and are so daring during the season in which their own nestlings require to be provided with food, as frequently to venture among the outbuildings of the farm houses, where they have been observed to fly low, skim over the poultry yard, snatch up a chick, and get off with it in an instant. The sparrow-hawk lays four or five eggs, generally in the old or deserted nest of some other bird. The eggs are about one inch seven lines long, by one inch four lines broad, pale bluish white, blotched, and spotted with dark red brown. The adult male measures about twelve inches in length; the female is usually three inches longer than the male. The general colour of the plumage is a rich dark brown; the breast, belly, and throat, lighter, striped with dark transverse bars. (*Yarrell's Brit. Birds*, vol. i. p. 48—65.) See **Buzzards**, **Falcons**, **Harriers**, and **Kites**.

HAWK'S BEARD. (*Crepis.*) The indigenous species of this genus are:—

1. Stinking hawk's-beard, (*C. fœtida*). A rare biennial plant, found on dry chalky ground. The root is tapering, the herb light green, moderately hairy all over, very milky with a strong smell of bitter almonds; stems several, spreading, a foot or more in height. The flowers, which are pale yellow, of a delicate red underneath, droop in the bud, and, after expansion, close very early in the day.

2. Small flowered hawk's-beard (*C. pulchra.*) This is also a rare species, found occasionally on rocky hills in Scotland. The

dish underneath. (*Smith's Eng. Flor.* vol. iii. p. 370.)

HAWKWEED. (*Hieracium*, from *hierax*, a hawk, being supposed to sharpen the sight of birds of prey.) A very numerous perennial genus, generally inhabiting mountainous or woody situations. They are, for the most part, pretty flowering plants, with yellow blossoms, but a great number are mere weeds. The herbage, in general, is milky, and more or less bitter; but these qualities are, in some instances, hardly perceptible. The dwarf herbaceous kinds are remarkably adapted for rock work, or the front of flower borders, the taller kinds at the back: they may be increased by seeds, or divisions. The annual species need only be sown in the open border.

Sir J. E. Smith describes no less than eighteen distinct indigenous species, which it would carry me too far into detail to particularise. (*Eng. Flor.* vol. iii. p. 354—370.; *Paxton's Bot. Dict.*)

HAWKWEED, SMOOTH SUCCORY. See HAWK'S-BEARD.

HAWTHORN, WHITETHORN, or MAY. (*Mespilus oxyacantha.*) A common small tree, or shrub, but beautiful in its appearance, and fragrant in odour. The hawthorn grows almost every where in thickets, copses, hedges, and high open fields. The wood is very hard, with a smooth, blackish bark, and, like the whitebeam hawthorn, (*Pyrus aria*), is converted into axle trees and handles of tools. The branches have lateral sharp awl-shaped thorns. The leaves are alternate, deciduous, on longish slender stalks; smooth, deep green, veiny, an inch or two long, tapering at the base, or wedge-shaped, and more or less deeply three-lobed,

ble recommendation to the sh
its buds are of a fine yellow i
and its fruit, which is of the co
gold, hang on the branches nea
of the winter, giving great v
plantation. Evergreens shoul
planted without a few of these
intermixed, to enliven them i
months. The hawthorn is pecul
for small lawns or paddocks,
trees cannot be admitted. W
singly, the hawthorn often re
height of twenty-five or thirty
trunk from four to eight feet
rence.

In husbandry, these shrub
quicksets; and when kept w
form hedges, scarcely less impr
those composed of holly. Th
hedges and trimming of trees
advantageous to the farmer,
adds nothing to the beauty of r
Hawthorn hedges appear to ha
use about the time of Charles II
observes in his *Sylva*, "I have
a gentleman who has consideral
his revenue, by sowing haws o
ing nurseries of quicksets, whic
the hundred, far and near. T
mendable industry, and any ne
ner of ground will fit this
(*Smith's Eng. Flor.* vol. ii. p.
lips's Sylva Flor. vol. i. p. 260.

HAY. (Germ. *hew*, Du.
kind of grass cut and dried a
cattle. Hay constitutes the c
dence of the farmer and othe
food for their horses and cattl
of hay within the bills of mo
thirty miles [illegible]ound the cities

etropolis for the sale of hay and straw,
echapel. Smithfield, and the Hay-
et. (*M'Culloch's Com. Dict.*)

ien horses are fed on hay, it is a matter
pute whether the light and apparently
grass of uplands, or that of more fertile
l meadow ground, or the rich produce
artificial grasses, is to be preferred.
ust, however, depend on the quantity
with which they are supplied. When
abundantly furnished there can be
ubt that the former will be found
for their general health, and espe-
for their wind; but as farm horses
ally limited in their consumption of
and the slowness of their movements
the clearness of their wind a matter
paratively little moment, the other
ill be found the best adapted to sup-
eir strength. In gentlemen's sta-
other than meadow hay is generally
d; and it is in all respects the best.
mers find more profitable uses for it
feeding of fatting stock and cows;
ver, either alone or with rye-grass,
, or tare hay, though coarser, an-
every necessary purpose for farm
more especially when cut into chaff,
ed along with straw. Sainfoin is
ly esteemed the first, and clover the
quality, but tare hay, if well made,
hearty food. Old hay, as having
undergone that slow process of fer-
on by which the sugar that it con-
developed, is far more nutritive and
me than new hay. Mow burnt hay
injurious to horses than to any other
domestic animals, and is a fruitful
of disease. (*Brit. Husb.* vol. ii.
148.; *The Horse*, p. 357.)

an excellent plan, especially when
been exposed to continued wet wea-
add to it a portion of common salt.
only induces live stock to consume it
idity, but it prevents mouldiness or
urning; it is usual to put about half
l of salt to every load of hay; it may
ad by hand, or through a sieve. Mr.
, of Ingatestone, in Essex, has em-
it for thirty years; his plain unvar-
statement need not be supported by
er. He says, "I use about a quarter
ck at each laying, thinly spread, which
is about four bushels to a stack of
loads. I am fully satisfied that
the quantity would be much better.
articularly wet season, a few years
I used twelve bushels to a stack of
oads, the whole of which was con-
by my own horses, and I never had
n better condition. I am so fully
ced of the benefit of salt to hay, that
it is allowed duty free, I shall use it
in all seasons." (*Johnson on Salt*, p. 100.) The avidity with which animals consume salted hay, is not so generally known as it ought to be; I will give, therefore, a fact related to me a short time since by Mr. Law, of Reading. Mr. Green, of Wargrave, in Berkshire, had, in the season of 1824, a parcel of sour rushy hay from a meadow on the banks of the Thames, which both he and his men despaired of rendering of the least value; it was, therefore, stacked by itself, and well salted; the quantity supplied was large, but Mr. Law did not know the exact proportion. When the period arrived that his sheep wanted a supply of hay, Mr. Green directed his shepherd to use the salted inferior hay first, and, to his surprise, the sheep consumed it with the greatest avidity. The stack being finished, the shepherd was directed to supply them now with the best hay he could find of other stacks of fine meadow hay. He came, however, the next morning to his master, and made the following remark: — "We, sir, must have made a great mistake, and forgotten which stack we salted, for our sheep will not eat the hay which we think the best."

HAY-BIRD. See Willow-wren.

HAY-BOTE. A term applied to a kind of feudal right, by which a tenant for life or a term of years has a liberty of taking bushes, wood, &c., for repairing fences, gates, and the like. It also signifies the liberty of cutting wood for rakes and fork-handles, used in making hay, &c.

HAY-MAKING. The operation of cutting down, drying, and preparing grasses and other forage plants for being stacked for winter use. The plants are mown down at the time when they are supposed to contain, diffused throughout the whole plant, a maximum of nutritious juices; viz. when they are in full flower. Too often this period is exceeded, and the nutritive property of the plant suffers; for it is a well-known fact that the saccharine juices of a plant disappear in the progress of the ripening of the seed. Dry weather, and, if possible, that in which sunshine prevails, is chosen for this operation; and the mown material is spread out, and turned over two or three times in the course of the same day in which it is cut. In the evening it is put into small heaps. In the morning of the second day, these heaps are spread out, and turned over two or three times; and in the evening they are formed into heaps, somewhat larger than they were the day before. If the weather has been remarkably warm and dry, these heaps, in the course of the third day, are carted away and made into a stack; but if the weather has been indifferent, the process of opening out the heaps and exposing them and changing a part of the parenchymous matter into sugar, on the same principle as is effected by malting barley. This sweet taste renders the hay more palatable to horses. The best general directions for haymaking will be found in the following extract from *Middleton's Agricultural Survey of Middlesex*, although the various kinds of hay, and different soils and situations with which the farmer is connected, are so very numerous, that such directions can, of necessity, have only a very general application. Some articles, which may be consulted with advantage, will also be found in the *Quart. Journ. of Agr.* vol. ix. p. 35., by Mr. Towers. "On an improved Method of making Clover Hay," in *Trans. High. Soc.* vol. vi. p. 55.; *Brit. Husb.* vol. i. p. 487.; and *Com. to Board of Agr.* vol. vii. p. 93.

Mr. Middleton observes, when speaking, be it remembered, of haymaking, in Middlesex, "In order that the subject may be more clearly understood, I shall relate the particular operations of each day, during the whole process, from the moment in which the mower first applies his scythe, to that in which the hay is secured, either in the barn or in the stack:

"*First day.* All the grass mown before nine o'clock in the morning, is tedded (or spread), and great care taken to shake and strew it evenly over all the ground. Soon afterwards it is turned, with the same degree of care and attention; and if, from the number of hands, they are able to turn the whole again, they do so, or at least as much of it as they can, till twelve or one o'clock, at which time they dine. The first thing to be done after dinner is, to rake it into what are called single windrows, that is, they all

workpeople are at dinner. Aft
first thing to be done is, to rak
into double windrows; in doing
two persons rake the hay in op
tions, or towards each other,
means form a row between th
the size of a single windrow.
double windrows are about
feet distant from each other;
the grass into single windro
double windrows are put into b
and, lastly, the single windrow
grass-cocks. This completes
the second day.

" *Third Day.*—The grass
spread on the second day, and a
in the early part of this day,
tedded in the morning; and th
cocks are to be spread into sta
fore, and the bastard-cocks int
less extent. These lesser sta
last spread, are first turned, the
were in grass-cocks; and next
turned once or twice before t
o'clock, when the people go
usual. If the weather has prov
fine, the hay which was last nig
cocks will this afternoon be in p
be carried. It seldom happens
ther, but that it may be carried
day. But if the weather should
trary, have been cool and clou
it probably will be fit to carry.
the first thing set about after
rake that which was in gra
night into double windrows; t
which was this morning spre
swarths, into single windrows.
the hay which was last night
cocks is made up into full-siz

e described, and are continued daily
the hay-harvest is completed.
n the course of hay-making, the grass
d, as much as possible, be protected,
night and day, against rain and dew,
cking. Care should also be taken to
rtion the number of hay-makers to
f the mowers, so that there may not
re grass in hand, at one time, than can
naged according to the foregoing pro-
This proportion is about twenty hay-
rs (of which number twelve may be
n) to four mowers: the latter are
imes taken half a day, to assist the
r. But in hot, windy, or very dry
er, a greater proportion of hay-
s will be required, than when the
er is cloudy and cool.
is particularly necessary to guard
t spreading more hay than the number
ds can get into cock the same day,
re rain. In showery and uncertain
r, the grass may sometimes be suf-
o lie three, four, or even five days in
But, before it has lain long enough
me yellow (which, if suffered to lie
would be the case), particular care
be taken to turn the swaths with the
f the rakes. In this state it will cure
ch in about two days, as only to re-
being tedded a few hours, when the
r is fine, previous to its being put
er and carried. In this manner, hay
e made and stacked at a small ex-
and of a good colour; but the tops
ottoms of the grass are insufficiently
ted by it."
Y-RAKE, or HAY-SWEEP. An
nent contrived for the purpose of
ing and conveying hay to the stack
easy and expeditious manner after it
en put into rows. See RAKES.
Y-KNIFE. A sharp instrument em-
for cutting hay out of the stack.
Y-RICK. Mr. Chambers (*Com. to*
of Agr. vol. vii. p. 374.) describes
proved hay-rick which admits very
the cool air to check the ferment-
A channel or gutter, a foot wide
eep, is cut through ground marked
r the rick, and two across, which is
en yards by nine. Two chimneys are
duced, like the common hay funnels,
these go full home to the earth, which
drawn up as the rick is forming, and
hannels previously covered with fag-
except where the chimneys are placed,
them open at all points; and let the
blow from what quarter it may, the
nt is uninterrupted.
YWARD. (Fr. *haie*, hedge.) An
anciently appointed in the lord's
to take care of the cattle of a manor,

and prevent them from injuring the hedges or fences.

HAZEL. See HASEL.

HEAD-LAND. A term applied to the lands or ridges in fields, on which the plough turns in cultivating them. As much soil is continually accumulating on them, by means of the frequent ploughing of the field, it is a common plan to form them into composts with lime or other manures.

HEART'S EASE. See VIOLET.

HEAT. In horsemanship, a term used on the turf, to denote a certain distance which a horse runs on the course. A race may consist of one or more heats, and "the best of three heats" are common at most races; but there is never more than one heat for a race at Newmarket. See TEMPERATURE.

HEATH. In a general sense the term *heath* is applied to waste land in which the prevailing plants consist of one or more of the common species of heath.

HEATH, HEATHER, or LING. (*Calluna* and *Erica.*) A very large and varied genus of plants. The following are the species indigenous to Great Britain:—

1. Common heath (*Calluna vulgaris*, Sal. The *Erica communis* of Linnæus). This plant covers many hundreds of acres in the Highlands of Scotland, in Ireland, and in similar climates on the Continent. It attains in many places the height of three or four feet; and is much used for thatching houses, making besoms, and for a variety of other purposes. The tender tops form a substitute for mattresses in Highland cottages; and they are also eaten green and in a dried state by horses, cattle, and sheep, in countries where the grasses and clover do not begin to grow till late in the spring. The tender tops also furnish food for grouse.

Sir J. E. Smith describes three other species of heath indigenous to these islands:

1. Cross-leaved heath. (*Erica tetralix.*) In this shrub the roots are creeping, stems erect, from four to six or eight inches high. Leaves crowded, spreading four in a whorl, revolute, downy, glaucous beneath. Flowers remarkable for their delicate wax-like hue of every shade of rose-colour, sometimes snow-white, on hairy cottony stalks collected into a dense, round, terminal cluster, all elegantly pendulous to one side. It is wonderful that this most elegant and not uncommon plant is scarcely delineated at all by the old authors, nor by any of them correctly.

2. Fine-leaved heath (*E. cinerea*), found plentifully on dry turfy heaths every where. It grows on a stem a foot high, or more, with numerous upright, round, hoary, flowery, and leafy branches. The flowers

are crimson, everlasting, with a tinge of blue or grey, occasionally pure white.

3. Cornish heath (*E. vagans*), growing abundantly in Cornwall: stem woody, two feet high, copiously and determinately branched, with a smooth pale deciduous bark; leaves evergreen, smooth.

Mr. Hogg (*Quart. Journ. of Agr.* vol. vi. p. 42.; and vol. viii. p. 496.) contributes some observations on the uses and management of heath; but these articles being somewhat diffuse, and confined in a great measure to the use of heath as a protection for moor fowl and other game, I can here do no more than merely refer to them. Mr. J. Hall (*Com. Board of Agr.* vol. vi. p. 381.) speaks favourably of the advantages to be derived from heath in the feeding of stock, and also asserts that an infusion of the finer parts of heath, when cut young and in bloom, is preferable to tea.

HEATH GRASS. (*Triodia decumbens.*) The genus to which this species belongs consists of hard, rigid, perennial grasses, with leafy stems. Inflorescence variously panicled. The decumbent heath grass grows frequent in spongy bogs, and on barren, sandy, mountainous ground. The root is very slightly creeping, with strong fibres. The whole plant is harsh and rigid, lying close to the ground, except when in flower. The stem is from four to twelve inches long, jointed, bent, leafy, and very smooth. The leaves are linear, striated, rather glaucous, smooth, except towards the points, where the rib and edges are very rough. (*Smith's Eng. Flor.* vol. i. p. 131.)

HEATH, SEA. (*Frankenia.*) Of this maritime decumbent genus of plants there are two species, natives of these islands.

1. The smooth sea-heath (*F. lævis*) is a perennial, flowering in July, found common on muddy salt-marshes, chiefly on the eastern shores of England. It has a woody root; the stems are quite prostrate, forked, slightly downy, with leafy, partly ascending branches. The leaves are somewhat glaucous, about a quarter of an inch long, revolute, fringed at the base, convex, and smooth above. The flowers spring from the forks of the stem, partly terminal, sessile, solitary, and flesh-coloured.

2. Powdery sea-heath. (*F. pulverulenta.*) This is a very rare species, much resembling the last, but annual, and flowering in July. The root and stems the same as the former: the leaves, which are smooth and green above, are hoary, as if powdery, beneath; opposite or four together, single ribbed, and revolute. The flowers are pale red. (*Smith's Eng. Flor.* vol. ii. p. 186.)

HEATHY LAND. Ground which is covered with heath. In many districts of the kingdom there are immense tract
kind of land, that, in their present st
of little value, except for the supp
few sheep; but which, by proper cult
might afford useful crops. They, h
differ much in the nature of the soil
best mode of reclaiming these land
draining, deep trenching, or ploughi
spreading upon them any calcareous
such as lime, chalk, or marl. And it
desirable, in many instances, to provi
shelter by plantations of timber tre
PLANTATIONS.

HEDGE. A living wall formed
plants, sown or planted in a line, an
clipped in such a manner as to form
pact mass of any degree of width
that may be required, either for the
of shelter, separation, or defenc
fences most generally used in ag
are made of the whitethorn, becau
spiny branches, and forms a strong
against cattle. Fences for the pu
shelter and separation are chiefly
gardening, and for the most part ar
of evergreen shrubs, such as the ho
box, &c.; or sub-evergreens, suc
privet; of flowering shrubs, such a
donia japonica; or of deciduous
trees, with persistent leaves, suc
hornbeam and beech.

In the management of hedges of
scription, an important point is to k
thick, and impervious to wind or
near the ground; for which pur
section of the hedge requires to
broader at the base than at the top,
that the exterior leaves in every p
hedge may enjoy in an equal degre
fluence of light, air, and perpendicu
Mr. Stephens (*Quart. Journ. of A*
p. 574.) gives some very detailed
tions "On the Planting and Manag
Thorn Hedges;" but as these ext
upwards of fifty pages, we can onl
mend the farmer, who needs inf
as to the formation of quickset
to consult the above article; Mr.
little work *On Hedges;* and som
on raising and managing hedges
Trans. High. Soc. vol. iv. p. 353. to
Messrs. Montgomery, Grigor, an
son. In the same volume, p. 336.
an essay on the cultivation of the
elder (*Sambucus nigra*) for hedg
John Sinclair also recommends the
as a substitute for thorn in hedges.
Journ. of Agr. vol ii. p. 408.) It i
prickly shrub, growing wild in vari
of South America, and which has
tensively used for fences by the
farmers who have settled near B
An "Old Hedger," in the *Quart.*

vol. v. p. 505., also gives the result of
xperience and practice in hedge-making.
late Francis Blakie of Holkham saw the
rtance of the farmer paying more at-
on than is customary with him to the
ation of fences, and the management of
erow timber; and in his excellent little
on this subject, he told him (and his ex-
nce was of perhaps the most difficult of
ils upon which to rear good hedgerows),
ere may be some difference in opinion
the best method of planting and rearing
set (whitethorn) hedges, but I think
can be none in respect to the propriety
oroughly cleaning and preparing the
d in the first instance; and all ex-
nced men will agree, that it is not ad-
e to plant a new hedge upon the same
where an old one had been recently
ed up, unless under unavoidable cir-
ances, such as boundary fences, &c.;
at case the ground should be well
ed, fallowed for a year or two, and
fresh earth or compost added. The
the ground is prepared, the sooner
he hedge arrive at maturity, and the
will be its duration. The practice
county (Norfolk), even on our light-
ls, is to put the quicksets (here called
) horizontally into the side of the
raised from a four or five feet wide
of a proportionate depth; and I have
seen whitethorn hedges raised quicker
ter than in this county, and all upon
rinciple. I must, however, acknow-
that although the Norfolk farmers
generally excel in raising hedges, they
o frequently err in the future manage-
of them: youth is succeeded by in-
ies; there is no prime of life."

ere is another error which frequently
where quicksets are planted on the
of banks: that is, in not varying the
t of the line of quick in the bank, ac-
ng to the nature of the sides. On the
gement of hedgerow timber, the di-
ns of Blakie are equally excellent: he
"It is not necessary for me to parti-
ise all the varieties of forest trees
lly planted in hedgerows. It is suffi-
in exemplification, to say, beech, ash,
firs are not only ruinous to fences, but
also otherwise injurious to farmers;
oaks, narrow-leaved elm, and black
an poplars do comparatively little in-
; and as to the age of plants, it surely
be obvious, that a thrifty transplanted
ery tree of three years' growth is more
y to succeed, when properly planted in
dgerow, than a puny yearling, drawn
f a seed-bed, with its root like a piece
hipcord; or a tender sapling of six or
years' growth, drawn out of a thick wood, whence it had not been previously transplanted.

"In planting, the usual practice is, to lay the roots of the forest tree plants horizontally into the bank along with the whitethorns, and to cut their heads or tops off close to the ground, in the same manner as the thorns: a moment's reflection will show the absurdity of this practice. A surface-rooted plant, like the whitethorn, will thrive if laid into the bank horizontally, or nearly so; but a deep-rooted plant, such as the oak, is not likely to thrive if treated in that manner. The roots of oaks strike deep into the ground; consequently the plants should be set perpendicular, and their heads or tops *should on no account* be cut off at the time of planting. But suppose that an oak plant, when laid into the bank horizontally along with the quicksets, does grow, and even prospers for a time, which it may do, when the extremities of the roots are bent downwards by the pressure of the earth in the bank above, and the plant, in consequence, finds nourishment and support from the earth below; the top of the plant will then grow up among the row of thorns, and be protected by them until the hedge is cut (which, in process of time, it must be): the oak plant will then be left exposed, and as the stem will have bent upwards, at a sharp angle from the face of the bank, the top of the tree (when agitated by the wind) will act as a powerful leverage, and have the effect of twisting and breaking the crooked roots of the plant in the bank.

"These remarks are, in some degree, applicable to all forest trees planted in hedgerows, but more particularly to deep-rooted ones. The method which I recommend for planting forest trees *generally* in hedgerows, but more particularly oaks, is as follows: let the quicksets be laid in, and the bank finished in the usual way; then select good transplanted trees of two or three years' growth, *fresh drawn from the nursery*. The broken roots and tips of the long fibres may be cut off; then push the spade down perpendicularly into the bank between the roots of the quicksets; press the spade from side to side, so as to make a cleft opening, into which put the root of the plant as deep as it had before stood in the nursery; tread the earth firm to the root, and face the bank up, as before; leave the tops of forest-tree plants uncut at the time of planting, unless when they are bushy-headed, and without leaders or top-shoots; in that case, a few of the larger side shoots may be *cut in*, that is, the extremities of the branches shortened. It is a most pernicious practice to cut the tops of young forest trees at the time of planting, and should only be adopted *pruning* is practised, it is generally performed in a very injudicious manner. Young hedgerow trees seldom require much attention in training until the hedge is cut the first time; the trees should then be examined; if they appear crooked, stunted, and unthrifty, they should be cut off close to the face of the bank, in the same manner as the thorn plants are. The oak stubs may be expected to throw up several strong shoots from each plant in the following season; and in a year or two afterwards, the best young shoot on such stub should be selected to remain, and all the others be slipped, or cut off close to the stub; the reserved shoots, or (as they may be called) regenerated plants, may then be expected to become timber trees.

"When an unthrifty young tree is to be cut off, as here recommended, particular attention should be paid to *the method of cutting*. The stroke from the workman's billhook or hatchet should always be *upwards*, or *from the stub*, and never *downwards*, or *to the stub*; whenever the latter practice is followed, the stub is left shattered, the wet penetrates through the clefts into the stool, or crown of the roots, canker is produced, and the tree rots. No good timber can be expected to grow from diseased roots.

"There may be said to be four different sorts or methods of pruning now in practice; these I designate under the styles or titles of—*first*, natural pruning; *second*, close pruning; *third*, snag pruning: and *fourth*, cutting in, or foreshortening. The three latter more immediately apply to hedgerow trees; but I will review the four, and in this review I wish fir trees to be understood as excepted.

desired object, by the assistanc
nature ceases to operate in
wished for.

"*Close pruning* answers to
tent. The operation is perform
the side branches off close to t
tree, when it is expected that
the timber will heal over the
become united. If this oper
pleted when the branches a
mere saplings, the tree in a vig
state, and a few only of the br
in one season, the object will
without injuring the growth
But the system, from having
derstood, has been misapplied
to an alarming extent, doin
injury, not only to individua
country at large. Immense
large boughs have been amput
trunks of trees, in the *vain ho*
ber growing over the wounds
with the stumps of the boug
body of the tree; the bark
does indeed sometimes gro
wounds, but the stumps of the
closed *go to decay*, become a
bole of the tree, and the result
It is the ready extension of
the wounds in trees which
means of misleading so man
cause, as they see that the bar
take it for granted that the wo
so also; and so, in fact, the gr
the tree will do, but the stum
putated arm becomes a dead s
cannot unite with a living
whole, it is a dangerous practi
boughs close to the stems of
larly old and unthrifty trees.

e, but the heart-wood of those stumps
rs, and has a similar effect to the stumps
ughs in old trees, which do not throw
oung shoots.

oreshortening, or *cutting in*, is an ap-
d method of pruning, and is admirably
ed to training hedgerow trees, to
it the landlord, without doing much
y to the tenant. This operation is
rmed by shortening the over-luxuriant
branches, but not to cut them to a
, as in snag pruning; on the con-
the top only of the branch should be
f, and the amputation effected imme-
y above where an axillary (side shoot)
s from the branch on which the oper-
is to be performed: this may be at
istance of two, four, or any other
er of feet from the stem of the tree;
uppose the axillary branch which is
when the top of the branch is cut off)
over-luxuriant, or looks unsightly, it
also be shortened at its sub-axillary
h, in the same manner as before de-
d.

he branches of trees pruned in this
r are always kept within due bounds;
o not extend over the adjoining land
injury of the occupier, at least, not
he stem of the tree rises to a height
f the reach of pruning), when the top
es can do comparatively little injury
e land. By adopting this system of
g, the bad effects of *close* and *snag*
g will be avoided; the country will
amented; and the community at large,
l as individuals, benefited." (*Blakie,
edges and Hedgerow Timber.*) See
s and Hawthorn.

DGE-BIRDS. I have treated, in
urse of this work, in separate articles,
different British birds; but it may not
of place to bring together, under one
a short review of the popular opinions
ained as to the benefits or injuries de-
from the more common hedge-birds.
for this purpose, I shall avail myself
e arrangement adopted in a series of
ent articles in the *Quart. Journ. of Agr.*
ii. pp. 42. 184. 284. As the subject
ally divides itself into three parts, in-
ch as birds are decidedly destructive,
lly destructive, or not destructive at
ough alleged to be so, it will be con-
nt to treat of the three kinds in this
, beginning with the last, of whose
and food gardeners and farmers (it is
sed) know much less than they do of
wo first.

Non-destructive Hedge-birds.

the outset, it is necessary to remark,
nany birds, not in the least destructive to the ordinary crops of a farm, often commit considerable depredations in orchards and gardens; nay, the latter, so far from being injurious to agricultural crops, may prove of no little service, as we shall afterwards see.

1. *Insectiverous Hedge-birds, which do not eat Fruits or Seeds.* — The hedge-birds which live exclusively on insects and never touch fruits, much less seeds of any kind, are but few in number, and, like the larger carnivorous animals, are thinly scattered, with rare exceptions, live solitary, and do not assemble in flocks. One of the most exclusively insect-eating birds, not uncommon in most parts of the empire, is the gold-crested wren (*Regulus cristatus*, Ray), the smallest of the birds of Europe. No farmer, I should think, would be apt to accuse the gold-crested wren of injuring his crops; but when a gardener, unacquainted with its habits and food, sees it flitting about among his espaliers, his wall-trees, or his rose-bushes, he will be apt to think it is busy eating the blossom-buds, as some other birds are well known to do; while, on the contrary, it is doing him essential benefit, by picking up every straggling plant-louse (*Aphis*), and bud-weevil which they can meet with.

The species which come nearest to the gold-crest, in appearance and habits, are the wood-wren (*Sylvia sybilatrix*, Bechstein) and the willow-wren, or hay-bird (*S. fitis*, Bechstein). The chiff-chaff (*S. loquax*, Herbert) also ranks with these, as an insect-eating bird, but is less common. The wood-wren is most frequently found among "hedgerow elms," as Milton calls them, and other tall trees in hedges. The hay-bird, again, delights in small copsewood, and in what may well be termed copsewood hedges, so common in England. The chief food of these three species consists of small flies or caterpillars, such as roll up the leaves of trees and shrubs, particularly the rose-leaf roller (*Lozotænia rosaria*), or "worm i' the bud," together with the most destructive species of plant-lice (*Aphides*). When the birds are plentiful, accordingly, they may prove of no little service to the farmer in thinning, on their first appearance, wheat-flies, the blue-dolphins, the hop-flies, and the turnip, or the pea-plant lice. This is of great importance, for one of these insects, killed early, will prevent the breeding of several thousands. After the breeding has proceeded to the second and third generations, our little birds are too few in number, even with their voracious appetites, to keep them down. The nightingale (*Philomela luscinia*) does considerable service to the cultivator, by devouring numbers of beneficial in clearing the corn-crops from insects, without levying any contribution for its services. The wagtails, particularly the yellow one (*Motacilla flava*), feed wholly on insects, particularly gnats, midges, and other flies that tease cattle. They will also follow the plough to feed upon the worms and grubs turned up in the furrows; and in this way, no doubt, thousands of wire-worms, and other destructive vermin, are effectually destroyed. The tree-pipet, or titlark (*Anthus arboreus*), and the meadow-pipit (*A. pratensis*), are common hedge-birds, which search busily after the autumnal hatches of caterpillars and grubs, or the smaller flies and beetles which they find among the herbage. The cuckoo, the common fly-catcher, and the flusher, or lesser butcher-bird, may be classed among the insectivorous feeding birds. To these, many other hedge-birds might be added, such as the night-jar, the sedge-bird, the wry-neck, the creeper, and the bottle-tit, none of which are in the least destructive; while, from their feeding exclusively, or nearly so, on insects, they are of much service in diminishing the numbers of such as are injurious to field and garden crops.

2. *Insectivorous Hedge-birds which partially eat Fruits or Seeds.* — Under this division may be arranged the common wren, the hedge-sparrow, or dunnock, the red-breast, the redstart, the tom tit, the cole-tit, the marsh-tit, and the greater-tit. The weeds and insects which these birds destroy, will, however, certainly more than compensate for the few heads of grain, the flower seeds, or small fruit, which they may occasionally pilfer.

II. PARTIALLY DESTRUCTIVE HEDGE-BIRDS

Amongst the birds which fa
sidered under this division, so
and wary as rarely to approach
all of them do more or less in
in the open fields. The great
those to be enumerated ar
grain-eaters, and make no ret
depredations by destroying in
they, no doubt, contribute to k
diffusion of weeds by the qu
seeds which they devour. T
lows: — the goldfinch, the ye
the cirl-bunting, the reed-bunt
bunting, the sky-lark, the woo
nets, the chaffinch, the mount
bull-finch, the house-sparrow,
sparrow. Besides the abov
several other birds which com
tions on field and garden cro
well come under the designatio
at the head of this article. F
example, and other game birds
on hedges, and cannot be t
birds; and the magpie, thoug
hedge-bird, does little inju
though it is otherwise destructi
and the rook also merit especi
these must be remarked upon i
(*Quart. Journ. of Agr.* vol. vi

HEDGEHOG. (*Hystrix*
well-known and unmeritedl
quadruped, against which man
judices are often entertained,
he sucks cows, steals chicken
eggs, and perpetrates sundry
mities of which he is entirely
lives chiefly on insects, snails,
sometimes rats and mice, and
he can find on the ground
and hybernates during the wint

most interesting facts in the
y of the hedgehog is that an-
31, by M. Lenz, and which is
ed by Professor Buckland.
he most violent animal poisons
upon it; a fact which renders
value in forests, where it ap-
oy a great number of noxious
Lenz says, that he had in his
e hedgehog, which he kept in
and which soon became very
iliar. He often put into the
ders, which it attacked with
ng them indifferently by the
dy, or the tail, and did not
ed or embarrassed when they
lves around its body. On one
enz witnessed a fight between
and a viper. When the
e near and smelled the snake,
animals the sense of sight is
he seized it by the head, and
tween her teeth, but without
do it much harm; for, having
s head, it assumed a furious
attitude, and, hissing vehe-
ted several severe bites on the
he little animal, however, did
m the bites of the viper, or
l to care much about them. At
e reptile was fatigued by its
gain seized it by the head,
und between her teeth, com-
fangs and glands of poison;
ouring every part of the body.
, that battles of this sort often
he presence of many persons;
es the hedgehog has received
vounds on the ears, the snout,
the tongue, without appearing
any of the ordinary symptoms
the venom of the viper.
elf nor the young that she was
g seemed to suffer from it.
tion agrees with that of Pallas,
us that the hedgehog can eat
dred cantharides, without ex-
ny of the effects which this in-
wardly produces on men, dogs,
German physician who made
a particular object of study,
ng dose of prussic acid, of ar-
m, and of corrosive sublimate,
h, it is said, did it any harm.
vol. ii. p. 553.; *Farmer's Mag.*;
t. of Science.*)

MUSTARD. (*Sisymbrium.*)
nposed for the most part of
nual and biennial plants, flou-
e open ground in any soil. The
pecies are three, all annuals.

mmon hedge mustard (*S. offici-*
ng in waste ground, by roadsides, and on banks; very common; flowering in June and July. According to Haller, hedge mustard springs up wherever houses have been burnt. The herb is of a dull green, minutely hairy or downy; the stem solitary, two feet high, erect, with numerous horizontal branches, leafy, round, clothed with fine deflexed bristles. Leaves lyrate, their lobes runcinate, unequally toothed; the upper ones narrowest. The flowers are pale yellow, small, in little corymbose heads, soon becoming very long, straight, close clusters of erect tapering pods, finely downy, rather more than half an inch long, on very short stalks. Seeds not numerous, about six in each cell. This species was once used as a stimulating expectorant, but it is now deservedly out of favour.

2. The broad hedge mustard, or London rocket (*S. Irio*), grows chiefly about London, and in habit is somewhat like the preceding species; but the herbage is of a lighter green, and entirely smooth. The leaves are pinnatifid, runcinate, acute, the upper lanceolate, with hastate base; the seed-pod is two inches long, rugged when ripe; the seeds are very abundant. It is sometimes used as a heating pot-herb.

3. Fine-leaved hedge mustard, or flixweed. (*S. Sophia.*) In this species the root is small and tapering, and the whole plant of a slender delicate structure; stem branched, bushy, erect; flowers small, greenish-yellow. Pods an inch long, numerous, erect, bearded. (*Smith's Eng. Flor.* vol. iii. p. 196.)

This is one of the plants which defeats the opinion that popular names are never imposed without good reason. The plant was formerly supposed to be a cure for fractured limbs, hence its name, *Sophia chirurgorum;* an opinion only demonstrative of the contemptible state of surgery at the period when the name originated. Its medicinal powers as an antidysenteric rest on equally mistaken observations.

HEDGE-KNIFE. Of this implement, for trimming hedges, there are two sizes, to be used either with one or both hands. The smaller one is a common and well-known implement. The larger-sized knife should have the blade twenty inches long by two and a half broad, and the handle three feet. It is slightly curved at the point.

HEDGE PARSLEY. (*Torilis.*) Of this useless weed there are three common species; the upright hedge parsley (*T. anthriscus*), the spreading hedge parsley (*T infesta*), and the knotted hedge parsley (*T. nodosa*). They are annual plants, growing by waysides and the borders of fields; varying in height from six inches to three feet. The flowers are small, white or flesh-coloured, blowing in June; the umbels lateral and the same kind of soil. (*Paxton's Bot. Dict.*)

HELLEBORE. (*Helleborus*; from *helein*, to cause death, and *borus*, food; the poisonous qualities of this genus being well known). These plants thrive well in any common soil, growing best under the shade of trees, and are readily increased by divisions or seeds. There are but two species found wild in England.

1. The green hellebore (*H. viridis*), which grows in woods and thickets on a chalky soil, blowing drooping green flowers in April and May. The root is fleshy, black, with numerous long stout fibres, very acrid and purgative. The stem is erect, round, and forked, a foot and a half high; the smooth herbage is altogether annual, of a deep but bright green. The flowers are few, terminal, and axillary, stalked, drooping, and consisting of green expanded petals, which blow in April and May. The fruit consists of three to four short wrinkled capsules.

2. The stinking hellebore (*H. fœtidus*), also known under the various names of bear's-foot, bitter-wort, ox-heel, &c., like the last species, grows in meadows, shady places, and hedges, particularly on a chalky soil; producing numerous, green, panicled flowers, somewhat tinged with purple at the edges, which blow from February to April. The flowers stand each upon a single bare stalk. The whole plant is taller and more branched than the foregoing; the herbage is perennial, and of a more lurid green. The leaves are large, pedate, each rising singly from the root, on a footstalk of six inches in length; and they are divided into seven or nine lanceolate serrated leaflets, or divisions. A decoction of it is, by country people, employed as a cathartic, but

cattle, to keep open issues;
plenty of swelling, and rarely
on to gangrene: the root of
lebore (*Veratrum album*) is
more active in its operation.
bore was formerly used in the
and in some maniacal cases w
is produced except by
means; but these remedies h
into disuse. White hellebor
alkali very closely resembli
namely *veratria*, which is a
gative. The white hellebore
as a sternutatory, and in i
Barbarous nations use the j
their weapons for war or
caustic powdered capsules and
American hellebore (*V. vir*
ployed by the monks to kill
(*Eng. Flor.* vol. iii. p. 57.;
Encycl.; *Brande's Dict. of S*

HELLEBORINE. (*Ep*
epipegnus, to coagulate; allud
posed effect on milk.) The
plants, thriving well in the flo
in pots, in a mixture of peat
sparingly watered when in a
They are increased by division
Six native species are enume
rennials; none of them are ve

1. Broad-leaved helleborine
growing in shady mountaino
thickets. Root moderately
simple downy radicles; stems
two feet high, round, copiously
broadly ovate, acute, bright
ribbed and plaited longitudi
the stem; cluster of many altern
purple flowers, on short parti
linear lanceolate, floral leaves.

helleborine (*E. palustris*), grow-
ry places or swampy meadows,
a chalky or gravelly soil. In
e first species, but the stem not
e or fifteen inches high; the
wer and not plaited, the lower-
clining to ovate; the rest lan-
ring to a point. Flowers fewer,
ery handsome, being white, ele-
ed, and variegated with crimson.
white helleborine (*E. grandi-*
his species the root is creeping;
foot high, smooth like the rest
; leaves rather elliptical than
lasping, acute, many-ribbed, not
a fine green; the flowers are
ge, and handsome, of a pure
but perfectly inodorous at all

-leaved white helleborine (*E.*
found in mountainous woods,
The root is rather clustered
g, with oblong or somewhat cy-
hy knobs; stem above a foot
om top to bottom; leaves lan-
ted, twice the length of the
pecies, yet scarcely half so
ers scentless, pure white, except
tuberance on the tip.
helleborine (*E. rubra*). This
y rare, but found occasionally
ntainous woods. The root is
leshy, gradually creeping, with
res; stem above a foot high,
h a few scales at the bottom,
higher up several lanceolate ta-
d leaves, above which the stem
ss downy. The flowers are of
se colour, and very handsome.
g. *Flor.* vol. iv. pp. 40-46.;
Dict.)
K. (*Conium maculatum.*) This
biennial plant is very common
chards, and waste ground, espe-
wns and villages. The root is
whitish, and fleshy; from six to
s long, not unlike a young pars-
lk grows from three to five feet
es an inch thick, round, hollow,
cous, polished, copiously spotted
remaining long bleaching in the
gh the autumnal months. The
rge, and repeatedly compound,
ith lanceolate, pinnatifid leaflets,
en bruised. The umbels are ter-
ery numerous, with the general
nsisting of three to seven leaf-
ial one of only three lateral leaf-
elule bearing many small white
e fruit is ovate, compressed on
ach mericarp (half fruit) having
but no secondary ridges; it has
t taste, but scarcely any odour.

The idea that it resembles aniseed is a mistake. At all periods of its growth, hemlock is sufficiently crisped, and shows maculæ on some part or other of the stem, and smells like cat's urine when bruised; but climate seems to have considerable influence on this plant, for in the south of Europe it is a dangerous poison, while in Russia and the Crimea it is innocuous and eatable.

The whole plant is poisonous, but it is a very useful medicine when duly prepared and cautiously administered. Dr. Christison, in an elaborate essay (*Trans. Roy. Soc. Edin.* vol. xiii.), has endeavoured to prove that this plant was not the state poison of the ancients, nor that with which Phocion was poisoned. But, as the plant grows abundantly near Athens, and the symptoms described resembled those of conium, where it operates as a poison, we must regard the evidence against the common opinion as incomplete. As the common hemlock, however, is one of the most deleterious vegetables of this climate, I advise the reader to refrain from meddling with it medicinally, and to entrust its preparation to professional hands. If inadvertently taken, it requires similar antidotes and treatment with the hellebore, which is spoken of in a preceding article.

For medical purposes, the leaves should be collected when the plant flowers; if intended for powder, they should be carefully dried at a temperature not exceeding 212°; if for extract, the juice should be squeezed out by moderate pressure, and evaporated in a water or steam bath, to a proper consistency. The expressed juice of hemlock inspissated without heat, is perhaps the best preparation; but, as its activity is liable to vary, it should be given with caution. The virtues and activity of hemlock depend on a peculiar volatile alkali, named *conia*, in combination with an acid. The quantity of this secretion, it may be readily supposed, will vary with soil and climate. An average dose of the dried leaves is five grains; an over-dose produces giddiness, wandering of the mind, dilated pupil, convulsive motions of the muscles of the face, and the other symptoms of the narcotic class of poisons.

Hemlock is a powerful narcotic, and often serviceable as a substitute for, or accompaniment to, opium. In allaying morbid irritability of the system, attended by any local or general excess of vascular action, as in certain stages of phthisis, in the coughs that are apt to hang about patients who have suffered from pulmonic inflammation, in glandular tumours, and unhealthy sores, hemlock is often preferable to opium. It has also been found very useful in chronic rheumatism, and occasionally in the treatment of whoopthat has been said as to the external as well as internal application of hemlock. (*Smith's Engl. Flor.* vol. ii. p. 65.; *Brande's Dict. of Science*; *Willich's Dom. Encyclo.*)

HEMLOCK, THE LESSER. See Fool's Parsley.

HEMLOCK, THE WATER. See Cowbane.

HEMP. (Dan. *hamp. Cannabis sativa.*) A very valuable plant of the nettle tribe, *Urticaceæ*, which came, it is believed, originally from India, but has long since been naturalised in various parts of Europe. The chief cultivation is now, for the most part, confined to the Russian empire, where it is grown by the peasants in small plots. It there forms an article of export of very considerable commercial importance. Of 530,820 cwts. of undressed hemp, imported into this country in 1831, 506,803 came from Russia, 9,472 from the East Indies, 7,405 from Italy, 2,262 from the Philippine Islands, 2,248 from the United States. (*M'Culloch.*) As Great Britain is principally dependent on other countries for a supply of hemp, it follows as a natural consequence, that, in periods of war, its price is very considerably increased. (*Com. Board Agr.* vol. iv. p. 187.) The hemp plant is grown in some parts of Lincolnshire, Suffolk, and Norfolk, and in Ireland (where it reaches a height of six or seven feet); but it is not nearly so much cultivated in the British islands as formerly, and it is believed by some of the best of the English farmers to be a crop that cannot be profitably grown in this country, although the quality of the best British hemp is much superior to that of Russia. In Oriental countries it sometimes attains a height of

an excellent fuel; and the fine
from the seed, is peculiarly
burning in chambers, as it is
pid, and possesses no smell.
able property of hemp is, that
expels vermin from plantations
if it be sown on the borders
planted with that vegetable,
will infest it. (*Willich's Dom.*
possesses the anomalous prop
ing, without degenerating, fo
years, on the same ground,
land is well manured. It is w
a smothering-crop, for its co
kills every thing that is att
sown with it. It may be grow
lowing rotation, as suggested
Low:—1. Fallow; 2. Wheat
4. Hemp; 5. Oats. The land
hemp should be brought,
ploughings, into a fine tilth
may be sown in April or M
to three bushels per acre, e
cast, and hoeing out the plants
of sixteen or seventeen inch
drill, at a distance of thirty in
autumn, the plants are pull
plants first, and the female
seven weeks afterwards, whe
ripened their seed. Thus th
harvests of the hemp crop. Th
are readily known by their f
and yellowish colour. They
in small bundles and carried
where they are to be steeped.
flax, poisons the water in which
The same process is followed
male plants are pulled; only
they are steeped, have their
out.

; it is then bound up into bundles, and
ed to market. (*Low's Prac. Agr.*
8.) There is a paper on a species of
an hemp by Mr. A. Hunter (*Trans.*
. *Soc.* vol. iii. p. 87.); others on the cul-
on of hemp in America, by Mr. W.
e (*Ann. of Agr.* vol. xxiii. p. 1.); in
(*ibid.* vol. xvi. p. 439., and vol. ii.
3.), and in Catalonia. (*Ibid.* vol. viii.
1.) It seems that 100 parts of Indian
eed yield 20 to 25 per cent. of oil.
. *Agr. Asiat. Soc.* 1838, p. 69.) (See
.)

mp being an article of extensive uti-
arious plants have been tried as sub-
s; among which are the Canada
-rod (*Solidago Canadensis*), a peren-
ant that might easily be cultivated in
n; its stalks are numerous, straight,
row above five feet in height; they
very strong fibres, if treated in the
manner as hemp. The sun-flower
nthus) also affords single filaments or
which are said to be as thick, and in
pects as strong, as small pack-thread.
brous stalk of the common nettle
a dioica) has been advantageously
actured into cloth. Others of the
tribe, such as the Chinese, or white-
nettle (*U. nivea*), and the Siberian,
p-leaved nettle (*U. cannabina*), yield
and durable fibres; and the Syrian
w-wort (*Asclepias Syriaca*) is another
textile plants; but no conclusively
tory experiments of their culture
to have been made.
rious common plants," says Professor
(*El. of Prac. Agr.* p. 351.), "yield
of sufficient toughness to be made
read; as the Esparto-rush (*Stipa te-*
ma), which is used in Spain for ob-
g coarse thread; the common broom
us scoparia); the Spanish broom
ium junceum); different species of aloe,
veral plants of the lily tribe. The
r regions of the world abound in
possessing a fibrous structure of the
which renders them capable of being
yed in making ropes, thread, and

MP AGRIMONY. (*Eupatorium*
binum.) A rough perennial herb,
ng in watery, boggy places, especially
the banks of rivers, with a tufted,
hat creeping root, with many long
. Stems several, two or three feet
branched, downy, often brown or
sh, filled with pith. Leaves on short
, deep green, downy, but rather rough
touch. The flowers form dense, pale,
sh corymbose tufts, at the top of the
nd upper branches. The whole herb
htly aromatic. Some species of agrimony are used in gargles, and as tea. See AGRIMONY. (*Smith's Eng. Flor.* vol. iii. p. 400.)

HEMP-NETTLE. (*Galeopsis.*) A genus of annual weeds common in corn fields, flowering in July, August, and September. Dr. Smith describes four native species.

1. Red hemp-nettle. (*G. ladanum.*) The root is twisted, or zig-zag with many fibres; the stem a foot high, with several opposite branches, crossing each other in pairs, leafy, red, roughish with deflexed hairs; the leaves spreading, lanceolate, sometimes almost linear, furrowed on the upper disk with veins, which are prominent on the under. The flowers are in dense whorls, and rose-coloured, variegated with crimson and white. This species is very variable in the foliage.

2. Downy hemp-nettle. (*G. villosa.*) This plant is larger and paler than the foregoing, and the leaves are clothed with a soft velvet-like downiness, which distinguishes this species from every other. The flowers are large, of an elegant pale sulphur colour, with a yellow palate, and bluish upper lip, which is cloven, and sharply notched.

3. Common hemp-nettle. (*G. tetrahit.*) This species is met with very frequently in cultivated ground, the stem rising from one and a half to two feet high, rough with copious, deflexed, very sharp prickly bristles. The leaves are ovate, large, dark green, coarsely serrated, closely hairy on both sides, strongly scented when bruised, but not aromatic. The numerous flowers in dense whorls are white, variegated with purple and dark lines. The flowers vary somewhat in size and colour, being occasionally quite white.

4. Large-flowered hemp-nettle. Bee nettle. (*G. versicolor.*) This species is like the last in general habit, but with paler and broader leaves. The flowers are much larger, yellow, with red or orange marks on the palate. (*Smith's Eng. Flor.* vol. iii. p. 92.)

HENBANE. (*Hyoscyamus niger.*) This annual herb abounds about villages, roadsides, and among rubbish, and flowers in July. The root is spindle-shaped, the stem bushy; the leaves sessile, soft, and pliant, sharply lobed, downy, and viscid, exhaling the powerful and oppressive odour, which is emitted by all the rest of the plant. The flowers are numerous, of an elegant straw colour, pencilled with dark purple veins. They are all on one side of the spike, each accompanied with two floral leaves. The seeds are numerous, in a two-celled capsule, seated in the persistent calyx, which has a cover like that of a box, and which drops off when the seeds are ripe. The capsules and seeds of henbane, smoked like tobacco, are a rustic remedy for the tooth-ache; but convulsions and temporary delirium are said to be sometimes the consequences of their use. Neither horses, cattle, swine, nor sheep, will touch this plant, and it is not relished by goats. The whole plant is fatal to poultry, whence its common name; it intoxicates hogs; but cows, horses, dogs, and goats are able to bear a tolerable proportion before they are affected. The leaves are active only in the second year of the plant: if scattered about buildings, they are said to drive away mice and rats. If more than a small portion of the leaves should have been accidentally swallowed, brisk emetics ought instantly to be taken; and after discharging the contents of the stomach, it will be necessary to administer emollient and oily clysters, to repeat them as often as they are ejected, and to drink as large portions of vinegar, or lemon juice diluted with water, as the stomach is able to support.

Henbane owes its medicinal properties to an alkali, *hyoscyamia*, which can be obtained in a separate state. It is crystallisable. Besides this alkali, the plant yields by destructive distillation an empyreumatic oil, which is a powerful narcotic poison. Notwithstanding these virulent properties, henbane has been professionally administered with considerable success in many obstinate diseases. The expressed juice of the leaves, evaporated to the consistency of extract, has long been used as a narcotic, an antispasmodic, and a soporific. It has a nauseous, bitterish taste. From two to five grains of the extract of henbane are often found equivalent to about one grain of opium, and where the latter disagrees it often produces quiet; in many cases henbane and various forms of opium may be combined. Henbane is apt to produce giddiness; but it does not constipate the bowels, and it has a diuretic tendency. (*Smith's Eng. Flor.* vol. i. p. 314.; *Brande's Dict. of Science.*)

HENBIT, THE GREAT, or HENBIT DEAD NETTLE. See DEAD NETTLE. Henbit is also one of the common names of the fetid black horehound (*Ballota nigra*).

HENBIT, SMALL. See SPEEDWELL.

HEN HARRIER. See HARRIERS.

HEPATICA, or LIVERWORT. (*Anemone hepatica.*) Miller mentions five sorts: the single blue (*nobilis*), the double blue (*plena*), the single white (*alba*), the single red (*vulgaris*), and the double red (*rubra*). These beautiful and early perennials produce their flowers in February and March, before any leaf appears. The double sorts
remain longer in flower than the si
ones. The single flowers produce seed ev
year; the seed should be sown in pots or bo
of light earth in August, to receive only t
morning sun till October, when the pla
must be placed in as sunny a spot as p
sible through the winter. The seedli
may be transplanted the following Au
into the borders, and left there undistur
Hepaticas do not bear transplanting w
and the roots should only be parted on
three or four years. The hepatica lov
eastern aspect, and a loamy soil. They
three years before they flower handso
See LIVERWORT.

HERBACEOUS. (Lat. *herba.*) In
scribing the texture of bodies, denotes t
being green and cellular, as the tiss
membranous leaves. It is also applie
such perennial plants as lose their stem
nually, while their roots remain perm
in the ground.

HERBAL. (Lat. *herbarium.*) A
lection of dried plants, such as the ol
tanists termed a *hortus siccus* or dry ga
It is also applied to books which con
methodical arrangement of the classe
nera, species, and varieties of plants, tog
with an account of their properties.
herbals are formed by glueing to she
paper twigs and other parts of plants pr
flat, and dried in bibulous paper or o
wise. If well prepared, they are as u
to the botanist as living plants; but
necessary to have some practical skill t
able to employ them advantageously.
best method of making a *hortus sic*
herbal, is to place the plant to be dried
tween paper of a soft and spongy, un
texture, under a light pressure. On
following day the plant should be spre
as natural a form as possible, between
of fresh, dry, blotting paper; and a pre
greater than before employed. In a
it will be sufficiently dry for pasting
half sheet of white paper; to which the
of the plant, its habitat, and the natural
with the date, may be appended. The la
public herbaria are those of the muse
Paris, the imperial collection at Vi
the royal of Berlin, and that of the Br
museum, London, formerly Sir Jo
Banks's. Nothing certain is known o
extent of these collections, but they pr
contain in some cases as many as
species. The herbarium is not an attra
part of public museums; but a very
portant one for numerous purpo
science, both practical and specul
(*Brande's Dict. of Science.*)

HERB BENNET. See AVENS.

HERB CHRISTOPHER. See B
BERRIES.

RARDE. See Goutweed.
PIOUS. See Cudweed.
RIS. See Paris Herb.
BERT. See Crane's Bill.
WO-PENCE. See Loose-

ax. hŷpð.) A number of beasts
ogether. It is particularly ap-
k cattle. Herd or herdsman
y signified a keeper of cattle,
rth of England it is still used.
CH, CONRAD, was born in
e counsellor to the Duke of
ed in 1576. He wrote several
orks as well as "Rei Rusticæ
r," which was published in 1570,
Rusticarum et Operarum per
ses Digesta," in 1595. He
mmand our attention in this
Rei Rusticæ," had not been
Barnaby Googe. Googe was
in Lincolnshire, educated at
ge, Cambridge, studied at Sta-
don, and, through the influence
e Sir William Cecil, became
ensioner to the queen. In
d his "Eglogs, Epitaphs, and
ich is a very rare book. In
nslated and published "the
ife," from the Italian, by Pa-
His translation of Heresbach
n 1578, though the preface is
it is entitled "Foure Bookes
ie, containing the whole Art
Husbandrie, Gardening, Graf-
nting, with the Antiquitie and
n thereof." It was reprinted
ervase Markham, with addi-
arkham.
is in dialogue.—The first book
sbandry or farming, and gives
ch of the buildings, practice,
of the country gentlemen of
that it applied to those of this
ars evident from the few inter-
ch may be detected as inserted
Book the second is a dialogue
asybulus and Marius, of gar-
ds and woods, opening with a
f the antiquity of horticulture.
ird is "of feeding, breeding,
ttle;" the fourth, "of poultry,
d bees." Upon the whole, the
inly, as he makes one of the
y in the dialogue, on a subject
ghly entreated of by others,"
by implication more perfectly
It is a book replete with just
and though short and imperfect,
an any work that had preceded
t is superior in the details of
o Parkinson's *Paradisus*, that
re than half a century subsequently. Too much however is taken from Greek and Latin authors, rather than from contemporary practitioners. Theophrastus, Cato, Columella, Pliny, &c. are continually quoted as authorities, and, in unison with them, absurd practices, and superstitions the most gross, are given with all the earnestness of truth. (*G. W. Johnson's Hist. of Eng. Gard.*; *Quart. Journ. of Agr.* vol. xii. p. 204.)

HERON. (Fr. *heron*; Lat. *ardea*.) In ornithology, a genus of wading birds, characterised by a straight, sharp, long, subcompressed bill, with a furrow extending on each side from the nostrils to the apex of the bill. The *Ardeæ* have been latterly subdivided into *Ardeæ*, or herons proper, *Nycticoraces*, or night herons, and *Botauri*, or bitterns. The bitterns have been already treated of under their respective head. Mr. Yarrell, in his *British Birds*, describes six species of heron, besides the little egret, which has been noticed in its alphabetical order.

1. The common heron (*A. cinerea*) is one of the most numerous, as well as the best known, of the group of birds now under consideration; and formerly in the palmy days of falconry, the places where they bred were almost held sacred: the bird was considered royal game, and penal statutes were enacted for its preservation. Now, however, the heron is disregarded, and left to depend on its own sagacity for its safety. The heron generally builds its nest upon large oaks or tall firs, sometimes on precipitous rocks near the coast, and occasionally on the ground among reeds and rushes. The nest is of large size, having much the appearance of that of the rook, but rather broader; it is formed of sticks, and lined with wool. The female lays four or five eggs of a uniform sea-green colour, two inches three lines in length, by one inch nine lines in breadth, and incubation lasts about twenty-eight days. The food of the heron consists of fish, reptiles, and small mammalia. The heron is said to be very long-lived, and was formerly in considerable estimation as an article of food. The male heron is a very elegant bird; its forehead, crown, and upper part of the neck are white; the head is adorned with a pendent crest or plume of dark slate-blue feathers; beneath the cover of the wings it has a fine black plumage; the upper surface of the body and wings are delicate French grey; under surface of the body greyish white, streaked with black; beak, legs, and toes greenish yellow. The whole length of the bird, from the point of the beak to the end of the tail, is about three feet.

2. The purple heron (*A. purpurea*) has

much darker plumage, being of a bluish black; the thighs, legs, and toes are reddish buff and brown. It is smaller than the common heron, being about twenty-nine inches in length. This species is found principally in the temperate and warmer parts of Europe.

3. The great white heron (*A. alba*) is a beautiful species, and merely an accidental visitor to this country. The whole plumage is pure white, and the extreme length of the bird exceeds three feet.

4. The buff-backed heron (adult). The little white heron (young) (*A. russata*). In the adult bird the plumage of the head, cheeks, neck, and breast is orange-coloured; the rest of the body white; the beak and legs are yellow. In the young bird the whole plumage is snowy white. Although classed among the British birds, this species is very seldom seen in our islands. The length of the bird is about twenty inches.

5. The squacco heron. (*A. comata.*) This beautiful species has been taken in many of our English counties. The beak is greenish brown, the feathers on the head are greenish brown; the sides, front of the neck, and back are a rich buff colour; the other parts of the body pure white, legs yellowish brown. Whole length of bird about nineteen inches.

6. The night heron (*Nycticorus Europæus*) has also been killed in many of the English counties, and in Scotland. The adult bird has the top of the head and back of the neck black, the plume white; other parts of the body nearly white, shaded with ash grey, legs and toes green. The whole length of the bird, from the point of the beak to the end of the tail, is about twenty-three inches. (*Yarrell's Brit. Birds*, vol. ii. p. 445—485.)

HERRING. (*Clupea harengus.*) This well-known fish is found in great abundance from the highest northern latitudes down to the northern coast of France. Large shoals of them frequent the coasts of the British Islands, and give employment to a considerable number of boats and men, forming a principal article of commerce. A very elaborate treatise on the natural history and the different modes of fishing and curing the herring, by Mr. John Mitchell, was published in the *Edin. Quart. Journ. of Agr.* vol. x. p. 1.

The scales and other refuse of the herring fishery of the Suffolk coast are used with great success, as a manure by the farmers in the neighbourhood of Lowestoff. There is no doubt that this fish is a powerful manure. The cake produced in Sweden by the herring oil makers, is considered by the farmers of that cold country to be

the most powerful of fertilisers.
have in another place given the re
experiment with some spoiled dried
on a Kentish hop plantation. (
Salt, p. 101.; *Trans. High. Soc*
p. 404.) See Fish, as a Manure.

HIDE-BOUND. In farriery, a
a certain disease of cows and horses,
the skin adheres to their sides.
proper care, spare diet, and bad f
as rank long grass in swampy s
and musty hay or oats are the most
causes of this affection. Hide-
rarely a primary disease: it is a
of unhealthiness, and often of d
the digestive organs. It is som
accompaniment of chronic cough
farcy, and founder. A few ma
a mild dose of physic, often hav
beneficial effect. If the horse c
spared for physic, the following
which is in common use, may be gi
night for some time in a mash,
form of a ball:—levigated ant
drachms; nitre, 3 drachms; su
drachms. For the cow eight ounc
phur, with half an ounce of ginger,
mashes should be given. (*Lib. of U*
The Horse, p. 371.; *Cattle*, p. 571

HIDE OF LAND. (Sax. Hy
Was considered to be such a q
land, as one plough, and its te
plough in a year. It was hence
ploughland. It was about 100
150 acres. Bede calls it a *fami*
says it is as much as will maintain
Crompton, in *Jurisdiction*, f. 222., s
hide of land contained 100 acres,
8 hides made a knight's fee. But
to Sir Edward Coke, a knight's fe
or ploughland, a yardland, or a
of land, did not contain any certain
of acres (*On Lit.* f. 69.), but was de
by the value of 20*l.* per annum
ploughland may contain a messua
meadow, and pasture; and every pl
of ancient time was of the yearly va
nobles; and this was the living of
man or yeoman. The distributio
land into hides of land is very an
they are mentioned in the laws of

HIDES. (Sax. hyðe; Germ
Dutch, *huiden.*) Generally speak
term is applied to the skins of mo
but in commerce it is limited to th
and thick skin of the horse, ox, a
large animals. Hides are raw o
that is, in the state in which they
off the carcase, or dressed with s
and saltpetre to prevent them fro
fying; or they are cured or tann
hides of South America are in th
repute, and vast quantities of the

ally imported into Great Britain. Large antities are also received from various rts of the continent; and from Morocco, Cape of Good Hope, &c. About 200,000 of untanned hides are annually imported, d about 120,000 cwt. of other hides, exsive of Russia hides, which form a large oportion of the imports. The rate of ty charged on hides is — untanned, dry, cwt. 4*s.* 8*d.*; wet, 2*s.* 4*d.* ditto; pieces hide, or hides tawed, curried, or dressed, per lb.; cut or trimmed, 1*s.* 2*d.* per lb. ose imported from British colonies are y liable to half this rate of duty. The ount of duty received on foreign and coial hides in the seven years ending with 32, is in round numbers as follows: —

Years.	Untanned Hides.	Tanned Hides.
	£	£
1826	24,491	1,747
1827	26,319	2,219
1828	34,841	2,512
1829	37,379	2,388
1830	42,538	1,337
1831	32,814	1,037
1832	24,242	1,170

(*M'Culloch's Com. Dict.*)

HIGHLAND AND AGRICULTURAL CIETY OF SCOTLAND, THE. Was tituted 1784. The society's hall is in yn Place; its museum on George IV.'s idge, Edinburgh. The general meetings this society are held, according to the ditions of its charter, on the second Tuesday January, and at such other place, in ne or July, as the society shall appoint. The society has, besides, a great annual w in September, or in the beginning of tober. — The competition for the prizes open to stock from any part of the United ngdom.

New members are admitted at either of general meetings, by ballot. — These y in advance, 1*l.* 3*s.* 6*d.* per annum, or life subscription of twelve guineas. (*Far-'s Almanac.*)

HIGHWAYS received their name from Roman method of elevating the road on causeways, or by raised earth. In highways are roads common to all the een's subjects, which the parish are liable repair. All ways either for foot pasgers, or carriages and horses, are prorly highways (*Co. Litt.* 56.). If a road licated to the public for twenty-five , it becomes a highway, which the are bound to repair, although they not acquiesced in the dedication of the ad (*R.* v. *Leake*, 5 B. & A. 469.). And a road has been freely used by the public for four or five years, a jury is warranted in presuming that the owners of the soil consented to its being thus used (*Jarvis* v. *Dean*, 3 Bing. 448.). Bridges in highways become public by whomsoever built, but not raised causeways furnished with culverts over meadows, if more than 300 feet from the bridge (*R.* v. *Oxfordshire*, 1 B. & A. 289.). And a bridge only used by the public in periods of floods, is merely a public bridge during that period (*R.* v. *Northampton*, 2 M. & S. 262.). By the common law, the obligation to repair the roads lies upon the parish; the bridges are to be repaired by the county, and not only the bridge, but since the 22 Henry VIII. c. 5. s. 9., the road or approaches for 300 feet "from any of the ends of it." Surveyors of the highways are now annually elected by the parishioners on or within fourteen days of the 25th of March (5 & 6 W. IV. c. 50. s. 6.); and the surveyor may be, by sect. 6. of this act, re-elected, who must serve, under a penalty of 20*l.*: he is entitled however to a salary; by s. 20. he is liable to a penalty of 5*l.* for neglect of duty. The surveyor, by s. 25., is authorised to use adjoining grounds as a temporary highway whilst the old road is repairing and widening; and, by s. 27., he is empowered to make a rate on the inhabitants, which must however be allowed by the justices. By s. 47., any person taking road scrapings or other materials from the sides of roads is liable to a penalty of 10*l.* By s. 51., the surveyor is empowered to dig for road materials within his own, or any other parish, and to gather stones free from charge, on any land within his parish, but he must pay for any damage done to the land during their removal; and, by s. 54., after obtaining licence from the justices in special sessions, he may enter upon and dig for road materials, making however satisfaction to the owners; and he must fill up the holes he makes, or have them filled up and sloped down. By s. 64., no tree shall be allowed to be planted within fifteen feet of the centre of the highway; and, by s. 65., with the authority of a justice of the peace (after duly summoning the owner to show cause), the surveyor may order hedges and trees, which shade or otherwise injure highways, to be cut and plashed. By s. 80., cartways must be twenty feet, horseways eight, and footways three feet wide.

A surveyor of highways is not personally liable to the labourers; they must look to the commissioners or their treasurer (*Pechin* v. *Pawley*, 1 W. Black. 670.). A way warden may charge law expenses incurred in the discharge of his duty (*Rex* v. *Fowler*, 3 N. & M. 826.)

Repairing roads.—The advantages of keeping roads in repair, if only regarded by the farmer as lessening the draught of his horses, may be estimated from the following table of the average force required to draw a light four-wheeled cart, weighing with its load 1000 lbs.

Description of Road.	Force of Tracture required to move the Carriage.
Turnpike road — hard dry	30½ lbs.
Turnpike road — dirty	39
Hard, compact loam	53
Ordinary bye-road	106
Turnpike road, newly gravelled	143
Loose sandy road	204

The annual expense of repairing the roads throughout England, according to a report of a committee of the House of Commons in 1814, amounted to 1,500,000*l.*, which Mr. Penfold, in his Treatise on Road-making, divides into

Materials, tradesmen, and officers	£500,000
Manual labour	250,000
Cartage	750,000

The chief points to be attended to in road *making* are,—1. the foundation; 2. the drainage; 3. the choice of the materials; 4. the preparation of them; and 5. the size of them. In *repairing*, 1. the scraping; 2. the removal of shading trees, &c.; 3. the watering. A careful attention to which points will well repay the parish for the care bestowed upon them. There is a paper by Mr. Whyte upon a machine for scraping and cleansing highways (*Trans. High. Soc.* vol. iv. p. 349.), and on roads, and the excessive weights carried on them in narrow-wheeled waggons by Mr. Whetly (*Com. to Board of Agr.* vol. vi. p. 182.); and there is a work on road-making by Sir C. M'Adam, which every road-surveyor should possess. Sir Henry Parnell has also published a valuable treatise on road-making. Of the materials best adapted to road-making, Mr. Penfold remarks, "The trappean and basaltic rocks are those best suited for the construction of roads. No material has ever been used superior to the tough basalts, which are brought as ballast in ships from China and Bombay, and which have been partially used in the macadamised streets of London. The whinstones of Northumberland, and the dark basalt of the Clee Hill in Shropshire, are almost perfect as roadstones. Amongst the granites, the Aberdeen, the Guernsey, and Dartmoor, are preferable to that of Cornwall. Indeed, the darkest in colour are invariably the best, as containing a greater proportion of hornblende, which is tougher than is found in those of a lighter colour,
where the brittle substances of
quartz, and mica, are the chief ingr
Limestones in many respects afford
cellent material. The more un
the material, the smaller is the size
it ought to be broken. Limestones
general a peculiar quality of making
roads, even if not broken to a small s
gravel, especially that belonging to
red sandstone formation, is in gener
be depended upon, as containing
different sorts, and consequently of
degrees of strength. The gravel of t
and other soils of the south of
consists almost entirely of flint, wh
brittle to form a good road stone.
Treat. on Roads, p. 13.) In layin
stones, they should be previousl
with a hammer, so that no stone e
size two inches. "It is one of th
mistakes in road-making to lay
coats of materials. If there be
enough already in the road, and
deed should always be carefully k
will never be right to put on mo
stone's thickness at a time." (*Ib*
It is more than probable that in m
tions where timber plantations are
and road materials expensive, wood
may be economically employed.

HILL, HYLL or HYLE, T
He resided in London, and, besid
published numerous works on
physiognomy, mysteries, astronom
metic, and an almanack, he wrote

"The profitable Arte of Gardening; to w
much necessarie matter, and a number of
the Physicke helps belonging to each Hea
easily prepared." To this is annexed two p
ises, the one entituled "The marvallous
Propertie, and Benefit of Bees, with the ra
the Honnie and Waxe." And the other "
Conjectures mete for Husbandmen." To
wise added "A Treatise of the Arte of
planting of Trees." Gathered by Thomas H
London. London, 1563, 16mo. The same,
12mo., 1574 and 1579, 4to. Other editions w
in 1586, without the author's name, in 15
1594, 16mo. All in black letter. He died
sixteenth century. (*G. W. Johnson's Hist.*

HILL, SIR JOHN, was the
clergyman, and born about 1716.
apprenticed to an apothecary
minster, and there being led to the
botany, obtained, from his prof
that science, the patronage of the
Richmond and Lord Petre, who
him in their gardens. Having ob
patronage of the Earl of Bute, he
under his auspices "a System of
in twenty-six volumes folio; f
pompous work he was created a
the Order of Vasa, by the King of
He wrote several novels and fa
died November 22d, 1775.

He had a dispute with Garrick, having
pamphlet in 1759, entitled, "To David G

al valuable plants.
are his chief works relating to agriculture
—1. A Method of raising Trees from the
the assumed name of Thomas Barnes.
ro. 2. Eden; or a Complete Body of Gar-
loured Plates. London. Folio. 3. Com-
sbandry, with Plates. Folio. 4. The Gar-
ender, with Plates. London. 5. An Idea of
denin England. 1758. 6. Account of a
on being watered, produces mushrooms.
1758. 8vo. 7. Method of producing
from Single, by a regular Course of cul-
with 7 Plates. London. 1758. 8. The
luction of Proliferous Flowers, with the
for raising Double from Single, and Proli-
ible. 7 Plates. London. 1759. 8vo. 9.
Gardening, by T. Perfect, a Pupil of Dr.
1759. 8vo. 10. Botanical Tracts. Lon-
llection of previously published Pamph-
nstruction of Timber explained by Means
pe. London. 1770. 8vo. 12. The Vege-
Experiments on the Structure and Life
The Gardener's Pocket Book, or Coun-
Recreation; being the Kitchen, Fruit,
rden, displayed in Alphabetical Order,
754. (*G. W. Johnson's Hist. of Gard.*)

IELTER. See SHELTER.

TAN, AGRICULTURE OF.

ATHOLOGY. The science
y medicine which comprehends
of the horse. Among the
is subject, within the last cen-
e enumerated Gibson, Clater,
son, White, Rydge, Coleman,
ll, Percivall, White, Rydge,
uatt, and many others; and,
ew of their works may now be
e greater portion, particularly
work of Mr. Youatt, contain a
practical and useful information.

HOMAS, appears to have been
Aberdeenshire. He served his
ip under the gardener of John,
Duke of Rutland, at Belvoir
incolnshire, who was, like his
eat delighter in gardening, es-
culture of fruit trees. During

mometer is *at ten feet from* the ground, of varying degrees of temperature, sometimes as high as 41°; 2dly, that they take place at the time of a high daily mean temperature only during a calm; 3dly, that the air is always, or nearly all of it, unclouded; 4thly, that they most frequently take place when the mercury of the barometer is high and rising, and when the hygrometer for the season indicates comparative dryness. 5thly. In general, low and flat lands in the bottoms of valleys, and grounds that are in land-locked hollows, suffer from these frosts, while all sloping lands and open uplands escape injury. This he accounts for, by supposing, that on sloping grounds there are always currents of air which mix the upper and warmer strata of air with that which rests immediately on the ground, and which it would seem, from some experiments of Dr. Wells, is not unfrequently much colder than that only four feet from the surface. He found, on the 19th of August, 1813 (*Trans. High. Soc.* ix. 250.): —

Time.	On the ground.	Four feet from the ground.
6 h. 45 m. -	53°	60½°
7 h. - -	51	60½
7 h. 20 m. -	49½	59
7 h. 40 m. -	49	58
8 h. 45 m. -	42	54

HOBBY, THE. See FALCON.

HOGS. See SWINE.

HOGWEED (*Heracleum sphondylium*). This plant comes into flower about the middle of May; its nutritive powers appear to be considerable when compared to those of lucern and some other plants. Sinclair soil, and rendering it more permeable to the gases and aqueous vapour of the atmosphere. Hoeing, therefore, not only protects the farmer's crops from being weakened by weeds, but it renders the soil itself more fertile, as more capable of supplying the plants with their food. Jethro Tull was the first who warmly and ably inculcated the advantages of hoeing cultivated soils. He correctly enough told the farmers of his time that as fine hoed ground is not so long soaked by rain, so the dews never suffer it to become perfectly dry. This appears by the plants, which flourish in this; whilst those in the hard ground are starved: in the driest weather good hoeing procures moisture to the roots of plants, though the ignorant and incurious fancy it lets in the drought.

HOLDICH, BENJAMIN, an agricultural writer, and farmer of Thorney in Lincolnshire, was born in November, 1770, and died in 1824. He was long the editor of the *Old Farmer's Journal*, published by Evans and Ruffy. After his decease some of the valuable materials he accumulated were published by his friend George Sinclair, in a fragment of a work by him, "on the Weeds of Agriculture." "I offer," says Mr. S. Taylor, when speaking of Holdich, "no apology for this brief episode, conceiving as I do, that it is well calculated to exhibit to every farmer, and indeed to every person, the power of the mind to overcome great natural obstacles to improvement; and what greater obstacle can there be than the want of early education? Yet Mr. Holdich did completely master the difficulties, formidable as they were, under which he laboured; for at the age when most boys finish their education, he began his; and the ease and correctness of his compositions sufficiently evince the success of his unaided individual exertions." (Preface to *Weeds of Agr.*; *Brit. Farm. Mag.* vol. v. p. 374.)

HOLCUS. The soft-grass. A genus of grasses, of which Smith in his *Eng. Flor.* (vol. i. p. 107.) describes three species, but which Sinclair, in his *Hortus Gramineus*, has extended to five species and varieties, including the northern holy-grass (*Hierochloe borealis*), which Smith very properly refers to another class.

Holcus avenaceus. Tall oat-like soft-grass. In this species the calyx is smooth, the barren floret lowest, with a sharply bent prominent awn; fertile one bent, slightly elevated, scarcely awned; leaves rather harsh; root knobbed, or with tuberous joints, and downy fibres. In dry or fluctuating soils the roots become largely bulbous, and then constitute a troublesome
weed. In the works of Linnæus,
and Host, this grass is found un
name of *Avena elatior*; it has sin
thought to agree better with h
structure; but it appears to be
neither of these justly, serving
form the connecting link betw
avenæ, *holci*, and *airæ*. This gra
common in pastures, hedges, thick
by road sides. The stem rises to t
high, is smooth, simple, and join
joints sometimes downy; the le
deep green, rough-edged, and rat
to the touch, with long striated
and abrupt stipules. The flowerin
is erect, lateral The seeds are n
lindrical, and coated with the
corolla. This grass sends forth
culms during the whole of the sea
entire plant is subject to rust
period of flowering; hence the cr
be cut as soon as the grass is
This grass is eaten by all sorts
and is always present in the comp
the best natural pastures; but it
constitute a large proportion of the
It perishes rapidly after being
and though later in flowering (end
than many other species, produce
and plentiful supply of herbag
spring. These properties would
to rank high as a grass adapte
alternate husbandry, but with
its nutritive properties, it con
large a proportion of bitter extra
saline matters to warrant its
without a considerable admixtu
ferent grasses; and the same obj
tends to its culture for permanent

Holcus avenaceus, var. *muticus*.
tall, oat-like soft-grass. In thi
which is smaller in every respect
preceding, the leaves are very
root slightly tuberous, the pani
contracted, the flowers withou
glumes pencilled at the apex wit
It flowers a week later than the
riety; in all other respects it is
It seldom perfects any good seed
pears to be much inferior in point o
Hares give a decided preference to
less variety.

Holcus lanatus. Woolly or mea
grass. The root in this species is fib
stem simple, one and a half to two
smooth above, hairy below, w
sheaths, and short blunt stipules.
cle is thrice compound, erect, and
The calyx of the flower is woo
floret perfect, awnless; upper with
awn; leaves downy on both sides
a very troublesome grass, which
to get rid of; it grows abundant in

s on all soils, from the richest to
Cattle prefer almost any other
; hence it is seen in pastures,
own perfect leaves, while the
surround it are cropped to the
umphrey Davy has shown that
matter consists entirely of mu-
gar; while the same property
es most relished by cattle has
acid or saline taste. This grass
bly be rendered more palatable
being sprinkled over with salt.
king, and never suffering it to
will at least prevent this grass
ng; but ploughing up the pas-
ing not less than a five years'
ps and then returning the land
asses, will be found the best
tting rid of it. It flowers and
ed in July.

lis. Creeping soft-grass. Couch-
pecific character of this species
ing, calyx partly naked, lower
, awnless, upper with a sharply
ent awn; leaves slightly downy.
ons between this grass and the
adow soft-grass, *H. lanatus*, are
root, and the whole plant being
and less downy. The leaves
ower and more soft than those
natus, and grow more distinct
her: on the contrary, those of
us are in dense tufts. The pa-
loose and smoother, with con-
ns, which, in drying, bend at a
and extend beyond the calyx.
of the *H. lanatus* is generally of a
le colour tinged with green, or,
g under the shade of trees, of a
n colour. The panicle of the
always of the latter colour. This
rank as one of the superior
did not usually tenant a light
y soil; but it produces little
he spring, and the aftermath is
ing. Pigs are very fond of the
contain a very considerable
nutritive matter, having the
w-made meal. The herbage is
ore disliked by cattle than that
natus: it is extremely soft, dry,
. The roots, when once in pos-
e soil, can hardly again be ex-
out great labour and expense.
couch grass of light sandy soils,
requently attain in a few months
five feet in length. The best
ishing this impoverishing and
weed from light arable lands
ested with it, is to collect the
he fork after the plough; and
some measure lessened to apply
ings of clay, perhaps fifty load
per acre, till the texture of the soil is changed to a sandy loam; this grass will then be easily overcome, and the fertility of the soil permanently increased. See Couch.

Holcus odoratus (*repens*). Sweet-scented soft-grass or northern holy-grass. See Holy-Grass.

I have placed together in a tabular form the comparative yield of produce by these grasses. (*Sinclair's Hort. Gram. Wob.*)

	Produce per Acre in Pounds.		
	Green.	Dry.	Nut. Mat.
Holcus avenaceus, soil clayey loam in flower - -	17,015	6,380	664
Holcus avenaceus, seed ripe -	16,335	5,717	255
— latter-math	13,612	-	265
H. avenaceus, var. *muticus*, soil rich clayey loam, in flower - - -	12,251	4,287	669
— latter-math -	3,453	-	53
H. lanatus, clayey loam, in flower - - -	19,057	6,193	1191
H. mollis, sandy loam, in flower - - -	34,031	13,612	2392
— seed ripe -	21,099	8,439	1153
H. odoratus (*repens*), in flower - - -	9,528	2,441	632
— — seed ripe - - -	27,225	9,528	2233

HOLLY (*Ilex aquifolium*). A handsome evergreen tree, of slow growth, with a smooth grey bark, which, abounding in mucilage, makes bird-lime by maceration in water. The wood is hard, close-grained, and covered with the above smooth grey bark. The leaves are alternate, stalked, rigid, shining, waxy, with spinous divaricated lobes; the upper ones on old trees entire, with only a terminal prickle. The flowers are copious, white, tinged externally with purple, the earlier ones least perfect. The berries are scarlet, casually yellow. The holly grows in hedges and bushy places upon dry hills. Numerous variegated varieties are kept in gardens, and one whose leaves are prickly on the disk. Darwin suggested the idea, that the points on the lower leaves of the holly was a provision of nature to prevent them from being eaten by cattle; hence, when the tree grows beyond the reach of cattle, the leaves lose the spines, that species of armature being no longer necessary. The tree bears clipping well; but it is not so fashionable for cut hedges as formerly. The branches, laden with berries, are stuck about rustic kitchens and churches at Christmas, and remain till Candlemas Day. In Norfolk and some other counties the misseltoe accompanies them, and sometimes branches of the spindle tree or prickwood (*Euonymus Europæus*) (*Eng. Flor.* vol. i. p. 227.; *Phillips's Syl. Flor.* vol. i. p. 280.)

HOLLYHOCK (*Althæa*, from *altheo*, to cure; some of the species having medicinal qualities.) A genus of tall, free, flowering plants. The biennial and annual kinds should be sown in the open border in spring and transplanted when sufficiently strong. The herbaceous kinds may be increased by dividing the roots, or from seeds. (*Paxton's Bot. Dict.*)

The hollyhock with angular sinuated leaves (*A. rosea*), the parent of the many beautiful varieties of hollyhock, yields a blue colouring matter equal to indigo.

Hollyhock, with hand-shaped leaves. (*A. ficifolia.*) Miller says these two are distinct species, always preserving their peculiar formed leaf. They are biennials, natives of a warm latitude, but sufficiently hardy to bear our climate. Their handsome flowers are of various colours, white, deep red, pale red, dark red, yellow, purple, almost black, and flesh colour. The hollyhock likes a good substantial mould, in a sunny situation, where it will grow from ten to twelve feet high. The seed should be saved from the most double flowers, and preserved in their capsules till the spring. In April, sow the seed either in drills or broadcast, in a bed of light earth. When the plants have thrown out six or eight leaves, they may be transplanted a foot apart, into a nursery bed, where they should be left till October, when they must be planted where they are intended to remain. Hollyhocks should be well propped to prevent their being affected by high winds.

HOLM. (Sax. and Danish.) An island or fenny place surrounded by water.

HOLM OAK, or HOLLY OAK. See OAK.

HOLT. (Sax. *a wood;* Germ. *holz.*) The termination of many names of places in England, derived from their ancient situation in a wood.

HOLY-GRASS, NORTHERN. (*Hierochloe borealis.*) The sweet-scented soft-grass, *Holcus odoratus* (*repens*) of some botanists. In this grass the panicle is somewhat unilateral, with smooth flower stalks; the perfect floret awnless, the barren ones slightly awned; the leaves rather broad, flat, naked, root creeping extensively; stems a foot and a half high. The nutritive qualities of this grass are greater than in most of the early spring grasses. The stem rises twelve or eighteen inches, is erect, leafy, and smooth; the leaves are broad, flat, naked, rough on the edges; the stipules short, broad, and acute. The panicle is erect, with slender wavy branches, lateral, and the flowers erect; awn not prominent. The powerful creeping roots of this grass, its tender nature, and the great deficiency of foliage in the spring, are, however, demerits which discourage the idea of recommending it further to the notice of the
agriculturist. It comes into flow
the end of April, and perfects ha
seed; but few grasses propaga
quickly by the roots. This grass
be used at high festivals, for stre
churches in Prussia, as *Acorus*
has time out of mind been employ
cathedral and streets of Norwic
mayor's day. (*Eng. Flor.* vol. i.
Hort. Gram. Wob. p. 167.)

HOMESTEAD, or FARM STE
A collection of farm buildings a
arranged in a convenient form.

HONEWORT, (*Sison*, from
sisum, a running stream, in which
the plants formerly in this ge
found.) These annual or bien
are found generally growing on
soil. The native species are :—
honewort, or bastard stone-pa
amomum). It may be seen grow
hedges in rather moist, marly,
ground. The root is tapering,
lateral fibres; stem tough, erect
yard high, with numerous altern
wiry branches; leaves dark gree
pinnate: the odd leaflet lobed.
numerous, terminal, solitary, co
four unequal rays; the parti
also few, and unequal rays. Br
to four, lanceolate, small, slend
flowers cream-coloured. The
are pungent and aromatic; but i
state, they have, like the whol
peculiar nauseous scent when br
sembling that of bugs.

2. Corn honewort (*S. segetu*
species grows in rather moist f
calcareous soil. The root is taper
and very tough; the stems sprea
direction, and are about twelve o
inches high, branched, round, stria
and somewhat leafy. The leaves
radical, long and narrow, on long
of a pale greyish green. The umb
flowers are flesh-coloured or wh
whole herb is slightly aromatic,
more pungent. (*Eng. Flor.* vol. i

HONEY. (German, *honig.*)
known vegetable substance col
bees. "Its flavour (says Dr. A. T
son) varies according to the natu
flowers from which it is collecte
the honeys of Minorca, Narbo
England are known by their fla
is separated from the comb by
and by expression; the first meth
the purest sort, the second separ
pure honey, and a still inferior ki
tained by heating the comb b
pressed. When obtained from y
which have not swarmed, it is de
virgin honey. It is sometimes a

certain penalties are directed
10 shall adulterate honey: and al-
annual importation of honey into
y is now very considerable, yet
nd was once a considerable *ex-*
oney is proved by the preamble
which declares that "the land
reat plenty of honey and wax, as
th suffice the use of the queen's
d her subjects, but also a great
be transported to other realms."
resses that persons have lately
ised to put the honey in casks of
size, but have used, also, deceit-
s of the same." It then enforces
adulterators a penalty of five
r gallon, and directs the forfei-
honey. See BEES.

BUZZARD. See BUZZARD.

DEW. See EXTRAVASATED

SUCKLE. (*Lonicera*, named
a Lonicera, a German botanist,
1586.) This is a genus of very
shrubs, closely allied to the
folium. The species grow in any
il, and are readily increased by
ken off in autumn and planted in
situation. (*Paxton's Bot. Dict.*)
English Flora, by Dr. Smith,
enous species are described.
ale perfoliate honeysuckle. (*L.*
.) This shrub grows in woods
ts, but not common; the stem is
nd, smooth, somewhat branched,
om left to right, and climbing,
eets with support, to a consider-
. The leaves are obovate, entire,
d glaucous beneath. The flowers,
ore axillary whorls, and six in each
highly fragrant, two inches long,

time. Our great Shakspeare, speaking of it, says —

> So doth the woodbine, the sweet honeysuckle,
> Gently entwist the maple.

Goats are extremely fond of the leaves of the woodbine; hence the French have named this plant *chevre-feuille*, goats' leaf.

3. Upright fly honeysuckle. (*L. xylosteum.*) This species flourishes in thickets and rocky places, and grows to five feet high. The leaves are deciduous, ovate, acute, dull green; the flowers small, cream-coloured or reddish, scentless; the berries scarlet, oval. It is a shrub of little beauty, and no known utility, though common in plantations. (*Eng. Flor.* vol. i. p. 324.) "The nurserymen of this country (says Phillips, 1823,) now offer us eighteen distinct species of the *Lonicera*, besides many varieties of the common woodbine." (*Sylva Flor.* p. 297.)

There are five hardy sorts of honeysuckle mentioned by Miller, namely, the Virginian trumpet honeysuckle (*L. sempervirens*), the German honeysuckle, the Italian honeysuckle, the English honeysuckle or woodbine (*L. periclymenum*), and the evergreen honeysuckle. He names also three other sorts which are too tender to raise without artificial heat.

There are two varieties of the trumpet honeysuckle; one is a native of Virginia, and the other is from Carolina. The Virginia trumpet honeysuckle is hardier, its leaves are of a darker green, and its flowers are a deeper red than the Carolina. These plants are weak and trailing; they should therefore be placed against walls and trellis work.

The German or Dutch honeysuckle is a hardy shrub, which can be formed into a is the most valuable, for it flowers from June till the frost nips its blooms. It has strong branches bearing evergreen leaves and fragrant flowers, which are bright red outside, and yellow within.

All the sorts are propagated by layers or by cuttings. The plants produced from cuttings are the best rooted, and should be done in September. Each cutting should have four joints, and only one joint should be left above ground. The honeysuckle loves almost any soil, provided it be not too dry.

HONEYSUCKLE, FRENCH. (*Hedysarum.*) Almost all the species of this genus are very handsome flowering plants, producing racemes of very beautiful pea flowers, particularly adapted for borders or rock work. (*Paxton's Bot. Dict.*) Miller mentions nineteen sorts. The greater number are perennials. The most general species in English gardens is the *H. coronarium*, which blooms bright red flowers, and a variety of it, which blooms white flowers, both flowering in June and July. They are propagated by sowing seed in the spring, in light garden mould, and transplanting the young plants into their destined places, in autumn. The herbaceous kinds are increased by dividing the roots.

HONEYSUCKLE TREFOIL. See TREFOIL.

HOOF. The horny part which covers the feet of many valuable quadrupeds. It is either cloven, as in cattle, or entire, as in the horse. In the horse it is that portion of the foot which is composed of the crust or wall, the bars, the sole, and the horny frog. There is no frog in the foot of cattle, nor are there the provisions for the expansion and elasticity of the foot which we admire in the horse. There is a laminated connection between the hoof of the ox, and the sensible parts beneath, as in the horse; but the horny plates of the hoof, and the fleshy ones of the substance which covers the coffin bone, are not so wide and deep, and therefore the attachment between the hoof and foot is not so strong. The hoofs of cattle are used for making starch and Prussian blue, as they will not make glue or soap like the heels. (*Cattle*, p. 568.; *The Horse*, p. 281.)

HOOPOOE, THE. (*Upupa epops.*) So remarkable is the appearance of the hoopoe (as is justly observed by Mr. Yarrell), that once having seen a specimen of the bird, it is not likely to be forgotten. It most commonly visits this country in autumn, after the breeding season, and can scarcely be considered a very rare bird, since hardly a season passes but one or more examples are obtained, and it has been killed in almost every county on our southern and eastern coasts. The hoopoe builds const
hollow trees, collecting a few gra
and feathers, upon which from fou
or seven eggs are deposited: these
uniform, pale, lavender grey, one i
half a line long, by eight lines in
Their food consists principally of
terous and other insects. In the ad
the length of the beak from the poi
angle of the gape is two inches and a
from the forehead over the top of
to the occiput, are two parallel
elongated feathers, arranged with t
faces outwards, towards the side, f
crest; the longest feathers, which
about the middle, have the base
buff colour; and towards the en
feather, is a patch of white tip
velvet black. Across the back
alternate half circular bands of w
black, and the tail feathers are al
with white and black. The general
is white and black, mixed with som
The chin, throat, belly, and breast
buff; legs and toes brown. T
length of the bird is twelve inc
half. (*Yarrell's Brit. Birds*, vol. i

HOOSE. See CATTLE, DISEAS

HOP. (*Humulus lupulus.*) Thi
known climber supposed to be i
to this country, plants of it being
hedgerows and waste places.
cients were not unacquainted wit
It is mentioned by the Arabian
Mesue, who lived about 845; a
used for beer in Flanders in 15
female flowers, indeed, have been
in many parts of Europe for the
imparting a flavour to beer. It
however, cultivated in England
purpose until about the year 152
the Reformation was then in pro
introduction of the hop is perpe
the following doggerel:—

> Hops, heresy, pickerel, and beer,
> Were brought into England in one

In 1528 the parliament was req
prohibit its use, as an unwholes
that would spoil the taste of be
mentioned for the first time in 15
statute book, in the 5 Edward VI.
pealed 5 Eliz. c. 2.); an act direc
land formerly in tillage should ag
cultivated, but excepting among
ground "land set with saffron
and down to the year 1693 hops
ported from Flanders in considera
tities. In 1578 Reynold Scott pu
curious little work on the cultivati
hop, which is now rare; it was
"A Perfite Platforme of a Hoppe
in which the directions for the c
of the hop are given with considera

river to Canterbury; following
of that river over the tenacious
ıms resting on the chalk form-
ıgh the gorge of the chalk es-
o Ashford, across the green sand
rockstone hills to Tenterden,
Cranbrook, Hawkhurst, and to
on the clayey and iron sand
wing the Ragstone Hills to Maid-
ling, Wrotham, Sevenoaks, and
, leaving the winding vale of
e to the north (being the site of
ay); thence passing into Surrey
l to Riegate, Dorking, Guilford,
ıam to Alton and Hampshire,
etersfield and Portsmouth. This
ld leave the country impressed
ea, that every part abounded in
ruit enclosures. This traveller
the country rich beyond any
be found on the Continent,
ne land which would let for 20*l.*
er annum, the valleys abounding
e timber, the inhabitants well
and enjoying the blessings of
plenty, in the midst of garden
those exceeding in beauty and
the gay vineyards of the south.
traveller we will suppose to land
assing over Barham chalk downs,
ng the course of the north downs
very few miles north of the line
efore traced, passing into Surrey
halk downs near Warlingham,
direction of the downs, and on
shot sand district near Woking,
o Hampshire two miles north of
at Aldershot, to Basingstoke,
bury plain, and thence through
Forest, to Lymington on the

or ten feet. The hop plant is usually raised from cuttings in the spring. "In the early part of the spring," says Mr. Lance, "the old root begins to bud or shoot from the old stump of the last year's bine, which will have two or more buds, the crown of the root is then cleared, and these old stumps are cut off, or most part of them, the hole covered up, and the crown of the root throws up additional shoots to be tied up the poles. The plant is therefore said to have an annual stem, but a perennial root. The cuttings, or old stumps, are bedded for a season, to make roots the best way they can from the edge of the cutting: the plant being exceedingly tenacious of life, every portion of the crown cutting that has a bud will grow and throw out roots from the extremity of the woody cutting; they will make a circle of roots when healthy, and throw up bine from the eyes or buds at the surface of the ground, and other roots will issue from under the eyes. The shoots of the former year that may have become covered with earth will make plants as layers, throwing out many fibrous roots before they are cut off from the stump or crown; this is often the most successful method of obtaining plants, although it may in some measure weaken the old root, but the layer gets the plants a year forwarder, as the roots are already formed when the plant is taken from the old stock; but if all the supernumerary shoots are cut off after the principal ones are well up the pole, then there can be no suckling plants formed. There are several varieties of the hop," adds Mr. Lance, "named according to the colour of the bine, the hanging of the fruit, or local circumstances. The grape hop takes its is the variety now principally cultivated at Farnham, and may be said to be one of the causes which make that place so famed for hops, they being purchased with avidity by the brewers of the west of England."

The qualities of the hop regarded by the dealers are the *colour*, *scent*, *seed*, and *glutinous touch*. The colour, which should be a light green, is attained either by a very careful and early picking, or by exposing the hops when they are drying to the action of fumes of sulphur. By exposure to the air, however, the natural brown colour of the hops thus treated returns; and hence the Farnham hops are often preferred by the brewers of pale ale, because the colour is not apt to alter.

About 60 to 100 bushels of the picked hops are required for a cwt. of dried hops in the bag; but this varies with circumstances. When there is an abundance of plump, well-formed seed, from 40 to 70 bushels will form a cwt. A bag of hops will weigh about 2½ cwts., and a Kent pocket about 1½ cwt. The produce of an acre of hops will sometimes amount to 24 cwt., but the average is about 10 cwt. The hop plant is subject to many diseases, and to a variety of atmospherical influences, which renders it ever the sport of the weather, and occasions the proverbial uncertainty of the crop. The wire-worm attacks its roots; the bob or flea, the fly, and lice, the honeydew, the ladybird, the earwig, and the mould or mildew, the leaves.

In the culture of the hop, a deep soil is preferable. The plants are usually placed on hills at the distance of five or six feet, and this is usually done early in the spring, about the end of March. The first year's poles may be about six feet in length, but twelve feet poles are afterwards needed: two or three of these are commonly placed on a hill; they are generally set in the ground in the end of April. About 500 fresh poles are annually required per acre, to keep up the stock of poles and supply the place of those broken, or otherwise destroyed.

The ground in hop gardens can hardly be too much stirred over. The drying of the hops is effected soon after they are picked: for the dispatch of drying a thickness of from one to two feet of hops are placed on the kiln floor, and a fire of culm or Welch coal, coke, charcoal, or other material that gives out no smoke, is made in an open fire-place, with only a perforated hood over it; or if the kiln fire-place is enclosed and the smoke flue is made to pass round the building, any firing may be used; but the neatest and cleanest method is by passing hot-water through pipes, close beneath the drying floor. About 100 to 200 bushels are c
monly dried at once in the ordinary si
hop-kilns: considerable quantities of s
phur are usually added to the fire, sometim
as much as a cwt. to a ton of hops. Ab
98 to 112 degrees of heat is that commo
employed in the drying, and the cost of t
process is about 14*s* per cwt.

In bagging the hops, great care is r
quisite to tread them as close as possi
for the more completely the air is exclu
the better the hops will keep.

The dried hop has been analysed a
found to contain *lupuline*, a bitter princi
opism, a fatty astringent matter, gum, c
rophylle, and *lignin*. In the grains of t
lupuline, a volatile oil is deposited. T
salts of iron, gelatin, chloride of bari
and oxalate of ammonia cause precipita
in the decoction of the hop. As a medic
agent hops display tonic and narcotic p
perties. A pillow of hops is supposed to
a good soporific; and was obtained for Ge
III. when a lunatic. The extract has b
found to allay pain; but after all it is a be
adjunct to beer than as a medicine.

The expense of one cwt. of hops if p
chased on the poles (says Mr. Lance),
be thus stated:—

	£	s
The duty - - -	0	[illegible]
Picking - - -	0	[illegible]
Bags - - - -	0	[illegible]
Drying - - - -	0	[illegible]
Bagging - -	0	[illegible]
Cartage - - - -	0	[illegible]
Sale - - - -	0	[illegible]
	1	[illegible]

The following are the expenses and p
duce of four acres of hop ground in
Kent in 1836:—

	£	s
Rent and taxes on four acres, at 40*s*. - - - -	8	[illegible]
Culture labour, at 50*s*. - -	10	[illegible]
Repair of poles - - -	8	[illegible]
Dunging, at 40*s*. - -	8	[illegible]
Picking 4,332 bushels, at 7 for 1*s*.	[illegible]	[illegible]
Drying, labour only - -	3	[illegible]
89 pockets, making, marking, sifting, and treading, at 1*s*. 2*d*. -	2	[illegible]
Pole pullers, measurer, and expenses - - -	4	[illegible]
Pocket cloth - - - -	4	[illegible]
Charcoal - - -	6	[illegible]
Sulphur and lime - -	0	[illegible]
Rent of kiln - - -	4	[illegible]
Interest on first years' expenditure	4	[illegible]
Duty on 64 cwts., at 18*s*. 8*d*. -	59	[illegible]
Tithe - - - -	4	[illegible]
	147	[illegible]

The produce, 64 cwt., at 6*l*. 10*s*. 416

following table of the average produce s from 1807 to 1836, is taken from k of Mr. Lance on the hop :—

rs.		Cwts. per Acre. Average.		Cwts. per Acre. Average of seven Years.
7	-	4	88·100	5 58·100
8	-	12	20	
9	-	3	10	
0	-	3	53	
1	-	7	62	
2	-	1	47	
3	-	6	20	
4	-	4	44	5 48
5	-	5	47	
6	-	1	95	
7	-	2	68	
8	-	7	65	
9	-	8	64	
	-	5	14	
	-	6	31	5 62
2	-	8	71	
	-	1	17	
	-	6	38	
	-	0	97	
	-	9	94	
	-	5	30	
	-	6	62	5 31
	-	1	55	
	-	3	51	
	-	6	91	
	-	5	49	
	-	5	94	
	-	6	89	
	-	8	14	
	-	6	74	

The hop duties were first enforced in 1834.

	£	s.	d.
When the duty was 1*d.* per lb. -	0	9	4
Three per cent. added - -	0	1	4$\frac{3}{4}$ $\frac{4}{20}$
	0	10	8$\frac{3}{4}$ $\frac{4}{20}$
1802 new duty 1$\frac{1}{4}$*d.* $\frac{8}{20}$ per lb. -	0	12	7 $\frac{16}{20}$
	1	3	4
1805 duty reduced $\frac{1}{2}$ lb. - -	0	4	8
Present duty per cwt. -	1	18	8

(*Lance's Hop Farmer.*)

Number of Acres of Hops, in Cultivation.

Year.	No. of Acres estimated in England.	No. of Acres in the Clays.	Average price of the country.		Average price of the Clays.		Presumed actual value including the duty.
			£	s.	£	s.	£
1820	50,148	694	3	17	4	10	753,110
1821	45,662	691	4	4	4	6	1,000,000
1822	43,554	672	3	12	5	5	1,221,985
1823	41,458	671	10	0	12	0	446,038
1824	43,449	670	7	0	9	0	1,847,960
1825	46,718	709	23	0	23	0	805,874
1826	50,471	715	4	4	6	0	2,010,590
1827	49,485	715	4	12	6	0	1,360,835
1828	48,365	711	5	5	7	0	1,813,680
1829	46,135	702	9	0	11	11	656,125
1830	46,726	704	10	10	11	10	1,509,560
1831	47,129	712	5	15	8	0	1,767,324
1832	47,101	714	9	0	10	0	2,114,545
1833	49,187	720	6	0	8	0	1,841,610
1834	51,273	726	5	10	6	10	1,974,010
1835	53,816	734	5	0	6	6	2,406,640
1836	55,422	757	8	10	8	10	3,155,832
1837	56,323	759	4	10	4	15	1,647,396
1838	56,104	749	5	0	6	0	1,753,120
1839	52,365		3	3	3	12	1,241,252

Table of the Amount of the Duties upon Hops, from 1820—41.

ent.	Sussex.	Worcester.	Farnham and Hants.	Essex.	Clays.	King.	Total old Duty.	Total new Duty.	Grand Total.
£	£	£	£	£	£	£	£	£	£
,619	42,600	27,027	5,111	1,859	1,285	826	138,333	102,264	240,574
5,436	39,716	22,404	3,522	1,554	1,327	646	154,609	114,276	268,886
,116	48,864	23,225	10,211	3,108	3,162	1,035	203,724	159,579	354,203
,677	10,562	4	667	71	7	66	26,057	19,251	45,317
7,149	39,193	12,104	7,123	1,498	1,331	430	148,832	110,006	258,838
7,631	2,040	11,911	1,289	78	1,341	24	24,317	17,976	42,290
1,539	64,416	30,649	14,650	3,868	3,570	635	269,331	199,070	468,410
2,763	41,077	18,856	5,512	2,217	191	228	140,848	104,105	244,953
5,003	43,364	22,118	7,074	1,740	2,428	297	172,027	127,150	299,178
1,168	5,732	1,292	1,138	210	276	49	38,398	28,381	66,780
1,607	26,932	2,102	4,555	1,126	1,540	182	88,047	64,078	153,125
2,897	42,076	26,364	8,534	1,939	2,710	841	174,864	129,247	304,112
1,617	49,683	9,405	6,121	783	1,234	171	139,118	103,753	241,770
4,952	46,456	17,862	5,256	1,035	1,126	215	156,905	115,973	272,878
0,944	59,191	14,668	9,236	1,708	1,584	380	189,713	140,223	329,936
0,102	73,288	15,751	3,941	1,696	220	205	235,207	173,848	409,055
5,515	60,786	19,853	9,715	1,561	2,209	690	200,332	148,071	348,404
2,335	46,508	35,731	8,340	1,465	3,336	861	178,578	131,992	310,570
2,556	56,205	4,085	7,048	616	571	373	171,556	126,802	298,359
1,452	65,027	16,640	7,730	1,624	2,006	1,058	205,537	151,919	357,456
2,556	56,305	4,080	8,734						266,898
5,040	69,549	4,969							

The number of acres devoted to the cultivation of the hop has long been steadily on the increase since 1693; when they were first successfully cultivated in Kent; in 1807, it was found that the hop grounds throughout England amounted to 38,218 acres: these had increased to 46,293 acres in 1817, to 49,485 in 1827, and to 56,323 acres in 1837; they had decreased however in 1839 to 52,365.

The hop is also well known as a garden plant. It blows its flowers from June till August, and is propagated by seed and by dividing the roots. It likes a deep loamy soil, and is valuable as an ornamental climber over temporary arbours, trellis, &c. in summer, as its leaves are very large, and make a fine shade. The "white bind" and the "grey bind" are the best sorts for this purpose; they succeed each other.

The young shoots of the hop are eaten as a depurative; the flowers, besides their bitter narcotic qualities, are diuretic and sedative.

HORDEIN. A modification of starch, which, according to Proust, constitutes about 55 per cent. of barley-meal.

HORDEUM. The barley-grasses. Besides the species of cultivated barley enumerated in the article under that head, there are three indigenous species which grow wild in this country.

Hordeum murinum. Wall barley, mouse barley, or way-bennet grass.

This is an annual grass, with a fibrous root, supporting a number of culms twelve to eighteen inches high, procumbent at the base, afterwards erect, with three or four joints. Spikes brittle, two or three inches long, flowers placed in two rows. This is one of the most inferior grasses with respect to nutritive powers; and the long awns, with which it is armed must make it dangerous to the mouths of horses, when it enters into the composition of their hay. Fortunately it is uncommon in pastures, being chiefly confined to roadsides and other beaten or barren places. I never could observe this grass eaten by cattle of any description, not even by the half-starved animals which feed by roadsides, where this is often the most prevalent grass. Dr. Withering, however, says, it is eaten by sheep and horses, and that it feeds the brown moth (*Phalæna granella*), and the barley-fly (*Musca frit.*) The nutritive matter afforded by this grass consists chiefly of mucilage and extractive matter insoluble after the evaporation of a decoction of it. It flowers about the first week of July, and the seed is ripe towards the end of the same month.

Hordeum pratense. Meadow barley-grass. This species has some affinity to the
wall barley-grass in appearance,
from it in being strictly perennia
having the culms more slender, m
and erect, and the sheaths roun
spike (about two inches long) is al
in comparison with that of the *H.*
and of a purple or greenish h
that of the wall barley-grass is
yellow. The husks of the calyx
shaped, rough, but not ciliate, and
much shorter.

This is a very hardy grass, whi
rably early in the spring produce
and its nutritive powers are co
Though said to be partial to d
soils, I have always found this g
prevalent on good rich meadow
it thrives under irrigation, and
but few pastures in which it is
found. The Rev. G. Swayne
that in moist meadows it produce
derable quantity of hay, but is not
commended as one of the best g
the farmer. It is liable to the
jection as the last, viz. the long s
with which the spikelets are ar
dering it dangerous to the mouth
by sticking in small fragments to
and producing inflammation. It
July, and the seed is ripe in Aug

Hordeum maritimum. Sea b
squirrel-tail grass. This species
in its habit, and grows in pastures
ground near the sea. It most
H. murinum in general habit, but
whole rather smaller, and more
The awns are all rougher wit
bristly teeth. The plant is not o
occurrence, although it abounds
of Thanet. (*Eng. Flor.* vol.
Hort. Gram. Wob.)

HOREHOUND, STINKING
(*Ballota nigra.*) This is a comm
nial weed, growing about hedges
places, blowing whorls of dull pur
in July and August. The who
finely hairy or downy, of a grey
with a peculiar pungent and di
scent; stem two or three feet hi
clothed with recurved hairs; leav
an inch or more in length, ovate,
(*Eng. Flor.* vol. iii. p. 101.)

HOREHOUND, WATER. (
names of the common gipsy-wort
Europæus); which see.

HOREHOUND, WHITE. (
vulgare, from *marrob*, a Hebrew
nifying a bitter juice; in allusion
treme bitterness of the plant.) T
grows in rubbish by roadsides, in
grounds, and on commons, flow
July to September. The stem
branching from the bottom, blu

:lothed with fine woolly pubes-
ie shape and size of the leaves
flowers are white, in dense con-
s. The whole herb has a white
spect, and a very bitter, not un-
aromatic, flavour. Its extract
r remedy for coughs and asth-
plaints; hence also the celebrity
ınd tea among the common peo-
collect honey from the flowers;
b is not eaten by any of the do-
nals.

ımon soil will suit these plants,
re readily increased by divisions
, or by seeds. (*Eng. Flor.* vol. iii.
ıxton's Bot. Dict.)

AN, WILLIAM. A native of
was educated at Winchester
id proceeding thence to New
xford, became there a perpetual
1477. In 1485 he was elected
er and fellow of Eton, and finally
vice-provost. After several
etirement, he died in 1535, and
in the College Chapel. He was
xtensive and various erudition.
numerous works are "Her-
ıonyma," and Indices to Cato,
umella, and Palladius, "De Re

A hard substance, growing on
f various animals, which partakes
ıical nature of the cartilaginous
ie; it consists chiefly of albumen,
gelatine and a trace of phosphate

ı of the ox is composed of an
of the frontal bone, covered
oating, originally of a gelatinous
base is a process or continuation
tal bone, and it is, like that bone,
divided into numerous compart-
ells, all of them communicating
other, and lined by a continuation
brane of the nose. The bone of
exceedingly vascular, and hence
en, the hæmorrhage is so great,
could scarcely be more bleeding
mputation of a limb. The rings
ıs of cattle have been considered
a criterion by which to deter-
ıge of the ox. At three years
distinct one is usually observed;
rs old, two are seen; and after-
is added each succeeding year.
s deduced the rule, that if two
l to the number of rings the age
ıal would be given. These rings,
re perfectly distinct in the cow
he ox they do not appear until
ears old, and they are often con-
he bull they are either not seen
or they cannot be traced at all.
As a criterion of age, this process of nature is far too irregular for any certain dependence to be placed upon it, and the rings are easily effaced by a rasp. The length of the horn—whether classed as long horns, short horns, or middle horns,—now forms the distinguishing character of the different breeds of cattle. The oxen of the northern part of central Africa, although smaller than the majority of the English cattle, have horns that are nearly four feet in length, and will contain more than ten quarts. The Burmese oxen, which are much larger, have singular horns of a half spiral form, very soft, the pair together scarcely weighing four pounds; yet Capt. Clapperton tells us, they are three feet seven inches in length, two feet in circumference at the base, and one foot six inches midway towards the tip. Some of the true Arnee buffaloes of Bengal and the Abyssinian cattle have also enormous horns. The horns of cattle are applied to a variety of purposes; for making combs, knife-handles, the tops of whips, substitutes for glass in lanterns, glue, and the refuse chippings are used as manure.

The Iceland sheep sometimes carry five or six horns. (*Youatt on Cattle*, p. 278-283.)

HORNBEAM. (*Carpinus betulus*, from the Celtic *car*, wood, and *pinda*, head, the wood being fit for the yokes of cattle.) A rigid tree of humble growth, patient of cropping, and well suited for hedges or covered walks in gardens of the old style, some of which may still be seen attached to several old English mansions. Fashion has entirely swept away the hornbeam, which composed the labyrinth, the maze, the alleys, the verdant galleries, arcades, porticoes, and arches of our forefathers, and which formed the leafy walls that divided their stately gardens into stars, goose-foot avenues, and devices as numerous as geometrical figures are various. When standing by itself and allowed to take its natural form, the hornbeam makes a much more handsome tree than most people are aware of, growing from twelve to thirty feet high. It is found in woods and hedges, on a meagre, damp, tenacious soil, and makes a principal part of the ancient forests on the north and east sides of London, as Finchley, Epping, &c. The wood is, as Gerarde says, of a horny toughness and hardness; the bark smooth and whitish or light grey. Leaves resembling those of an elm, but smooth, doubly serrated, pointed about two inches long, plaited when young, having numerous, parallel transverse hairy ribs.

Young trees are raised from seeds or layers without difficulty. It is known by different local names, such as the hard beam-tree, the horse, or horn beech tree &c. The leaves of the hornbeam afford a grateful food to cattle, but no grasses will grow under their shade. The wood burns like a candle, is much employed by turners, and is very useful for various implements of husbandry, being wrought into cogs for the wheels of mills, presses, &c. which are far superior to those made of yew. (*Eng. Flor.* iv. 155.; *Phillips's Syl. Flor.* vol. i. p. 308.)

HORNED-PONDWEED. (*Zannichellia palustris*, named in honour of John Jerome Zannichelli, a Venetian botanist.) This is a hardy aquatic annual, found common in ponds and ditches, which is generally submersed, except when in flower in July. The root consists of several slender fibres, herbage smooth, stem thread shaped, much branched, leafy, twelve or eighteen inches long, floating. The leaves are very narrow and acute. (*Eng. Flor.* vol. iv. p. 70.)

HORNED-POPPY. (*Glaucium*, from *glaukos*, alluding to the hoary grey colour of the plants.) A genus of very pretty annuals, or biennials, some of which are particularly handsome in the flower borders of the garden, where they flower and ripen seed in abundance, which has only to be sown in the open border. The following are the indigenous species.

1. Yellow horned-poppy. (*G. luteum.*) This is a biennial, growing wild on the sandy sea coast, producing golden yellow flowers in July and August.

The root is spindle shaped, plant very glaucous; stems spreading, two or three feet long, round, branched, leafy and smooth. Radical leaves numerous, stalked, a span long, pinnatifid, lyrate, lobed, cut, hairy; lasting through the winter; the stem leaves are sessile, less rough, short, broad, lobed and cut. Pod nearly a foot long, curved, roughish with minute tubercles, never hairy, rarely quite smooth. The surface of the seeds in every species is curiously cellular.

2. Scarlet horned-poppy, (*G. phœniceum.*) This is a very rare, or, as Smith observes, perhaps doubtful native. It is annual in habit, the root is tapering, the herb rather less glaucous, and more upright than the preceding. The stem is clothed with spreading hairs; the leaves are all oblong, hairy, deeply and unequally pinnatifid and cut; the upper ones clasping the stem. The flower stalks and calyx are also hairy. The petals are smaller and narrower than those of the last described species, and of a rich scarlet, with an oblong black spot at the base. The pod is clothed with numerous rigid, silky bristles.

Violet horned-poppy. (*G. violaceum.*) This is an annual met with sometimes, but not frequently, in cornfields. The root is
slender, stem erect, a foot high, roun
and quite smooth; leaves dark gree
or thrice pinnatifid; flowers of a
violet blue, very splendid, but ex
fugacious, somewhat larger than t
pods two or three inches long, cyl
more or less clothed with bristly
(*Eng. Flor.* vol. iii. p. 5.; *Paxto*
Dict.)

HORNET. (*Vespa crabro.*)
known fierce insect, which is about
in length, and builds its nest in holl
The sting of the hornet is severe,
casions a considerable tumour, acco
with intense pain; for the mitig
which, there is no better remedy th
oil, or honey water, immediately a
the place. Hornets are very dange
mies to bees, which they attack and
entirely except the wings and feet:
also very destructive to fruit. Se

HORNWORT. (*Ceratophylli*
keras, a horn, and *phyllon*, a leaf: t
are cut so as to appear like a stag
These are uninteresting water plants
in any pond, and easily raised fro
The common hornwort (*C. de*
is abundant in ditches and fish-po
herb floating entirely under wa
green, copiously branched, two or
long, densely clothed with whorled
forked leaves, eight in each whorl
illary, solitary, sessile, pale green
The fruit armed with two spreadi
spines. There is another indigeno
the unarmed hornwort (*C. sub*
which is a more rare plant, and th
destitute of spines. (*Eng. Flor*
p. 141.)

HORSE, THE. The genus *E*
cording to modern naturalists, c
six different animals,—viz. the *E*
ballus, or horse; *E. Hemionus*, t
githai; *E. asinus*, the ass; *E. qu*
quagga; *E. zebra*, or mountai
and *E. burchelli*, the zebra of th
It is only of the first that I shall hav
in this article.

Horse, the. This noble animal,
little doubt, is a native of the war
tries of the East, where he is foun
a state of considerable perfectio
there that we find the barb and t
noble races of horses that have lon
contributed to improve the presen
race-horse, until he has arrived a
sent state of unequalled perfecti
use of the horse, both as a beast of
and for the purposes of war, early
the attention of mankind. Thus t
anites are recorded as having go
fight against Israel with many h
chariots. (*Joshua*, ii. 4.) And 1

d from the flood waters in the
st breed of horses must have pro-
m the neighbourhood of Mount
t whether the original stock were
d in Asia or in Africa is an en-
h we have no means of deciding.
effectual are all the attempts
been made to decide as to which
he horse constitutes the original
ile some contend for the barb,
er the wild horses of Tartary.
1, however, that so late as the
tury, there were but few horses
even now the breed is much
d in number, according to Burck-
is commonly supposed. He re-
a letter to Professor Sewel, "It
n idea that Arabia is very rich
ne breed in that country is limited
nt of its fertile pasturing dis-
it is in these parts only that the
pers; while the Bedouins, who
ession of poor ground, seldom
horses. We therefore see that
richest in horses are those who
mparatively the fertile plain of
ia, on the borders of the Eu-
d in the Syrian deserts. It is
the horses can feed for several
ths upon the green grass and
ne valleys and plains, produced
s, which seem to be an absolute
r its reaching to its full vigour
h." The care with which the
their horses is proverbial. "The
adds Burckhardt, "when a horse
er let it drop down to the ground,
and keep it for several hours
arms, washing it, stretching, and
ng its limbs, and hugging it like
(*Quart. Journ. of Agr.* vol. vii.

Lapland, at latitude 65°, he has given place to the reindeer; and in Kamtschatka, at latitude 52°, he has given place to the dog. The nature and abundance of his food, too, greatly affect his character and form. A country of heaths and innutritious herbs will not produce a horse so large and strong as one of plentiful herbage. The horse of the mountains will be smaller than that of the plains; the horse of the sandy desert than of the watered valley."

Leaving, however, these interesting, but for this work too extensive, researches, I propose to direct my attention to the English breed of horses, and more especially to those which come particularly within the farmer's province.

From a very early period there appears to have existed in England a powerful, active, useful, and numerous breed of horses. Cæsar, perhaps with the natural inclination of a conqueror to elevate the prowess of his defeated enemies, gives a very lively account of the horses used by the early Britons in their war chariots; which, armed with iron scythes affixed to their axletrees, were driven furiously and destructively amid the ranks of their enemies. And if it be true, that when Cassibellaunus had disbanded the chief portion of his army, that he yet retained 4000 war chariots to harass the foraging parties of the Roman army; the supply of good horses able to work these heavy war chariots with sufficient speed over the open country, and bad roads of that period, must have been pretty considerable.

Of such imperfect materials is constituted all the accounts in our possession, of the native breed of English horses. That they were valuable, is proved, amongst other horse being used for such a purpose. The first notice of a horse being employed in agriculture, is in the tapestry of Bayeux (woven in 1066), where one is depicted drawing a harrow.

With William of Normandy came many Spanish horses. His army was furnished with a powerful cavalry, to whom he might well attribute his hard-earned victory of Hastings.

In 1121, we have the first notice of an Arabian horse being in our island; for in that year, I find that Alexander I. of Scotland presented one to the church of St. Andrews. King John procured from Flanders 100 stallions, and is to be gratefully remembered for other efforts to improve the English breed of horses. Edward II. and Edward III. also imported horses from Lombardy, France, and Spain. Henry VIII. did all he could to encourage the breed. Race-courses were now established at Chester and at Stamford. But it was not till the time of James I. that the modern system of racing, under certain rules and regulations, commenced, and a peculiar breed of race-horses began to be formed; for previous to that time fast horses of all breeds ran in the same race.

This noble breed of race-horses, which now excels in beauty, speed, and endurance that of all other nations, has been gradually formed by the introduction of the best blood of Spain, of Barbary, of Turkey, and of Arabia. It would be a grateful task to follow the English race-horse through his entire history, to trace his progress by gradual yet steady degrees towards perfection, his generous properties, his contests, and his triumphs over the best horses of Arabia, of Persia, and of the New World; outfooting the fleetest, and in endurance excelling all that the proud nobles of Russia could produce of the best and most celebrated Cossack horses of the banks of the Don. But in a work devoted to agriculture, my attention must be more directed to those valuable breeds of horses generally employed by the farmer.

The Cart Horse. — Of this description there are several varieties, the principal of which are the Cleveland, the Clydesdale, the Northamptonshire, the Suffolk punch, and the heavy black or dray horse.

The Clydesdale is a valuable breed of cart-horses, bred chiefly in the valley of the Clyde (hence their name). They are strong and hardy, have a small head, are longer-necked than the Suffolk, with deeper legs, and lighter carcasses. (See Mr. Wallace's paper "on the Clydesdale Breed of Horses," *Quart. Journ. of Agr.* vol. ii. p. 398.; and *Low's Illustrations of British Cattle.*)

The Suffolk Punch is a very
breed of horses, especially for farm
posed of soils of a moderate de
tenacity. They originated by
the Suffolk cart mare with the
stallion.

"The true Suffolk," says the auth
Lib. of Useful Know. ("*The Horse,*
"like the Cleveland, is now nearly
It stood from fifteen to sixteen ha
of a sorrel colour, was large-head
shouldered, and thick on the top,
round-chested, long-backed, hig
croup, large and strong in the
full in the flanks, round in the
short in the pasterns. It was
horse to throw his whole weight
collar, with sufficient activity
effectually, and hardihood to sta
day's work. The present breed
many of the peculiarities and goo
of its ancestors. It is more or less
a sorrel brown: it is a taller hor
and finer in the shoulders, and
with the Yorkshire half or thre
bred. The excellence, and a ra
the old Suffolk (the new bree
quite lost it) consisted in nim
action and the honesty and co
with which he would exert hin
dead pull even until he dropped."

The heavy black horse is chiefl
Lincolnshire, and the midland
These are commonly sold by the
at two years old to the farmers
and other metropolitan counties,
them till they are four years old,
sell them to the London merc
brewers' drays, and other heavy
"This kind of horse," says the
cellent authority I have just quote
have a broad chest, and thick an
shoulders (the more upright
stands on him the better), a low
deep and round barrel, loins b
high, ample quarters, thick fore
thighs, short legs, round hoofs,
the heels, and soles not too flat.
fault of the large dray horse is his
This is so much in the breed, that
disciplined ploughman who would
pleased to get through an additio
the day, cannot permanently qui
The largest of this heavy breed of bl
are used as *dray horses.* The ne
are employed as waggon horse
smaller variety, and with more b
stitutes a considerable part of ou
and is likewise devoted to un
work." (*Lib. Useful Know.* p. 46

"*The dray horse,*" says M
"probably results from a fine
horse, possessed of a certain

in the neighbourhood of London,
large towns, which it is needless
and difficult to describe: — aged
cab horses, the refuse of the
ackney coaches, &c. may all be
ing the small farmers' teams in
ourhood of London.
tle attention is generally paid, in
e breeding of superior cart horses
rmer. The soil and the food
district produces, has commonly
ence upon the size of the animal
hoice of the mare or the stallion.
ugh by the exertions of the High-
other Agricultural Societies, the
ow considerably improved, yet,
more remains to be effected in

most important circumstance,"
ell-known author, "which in-
he profits of the farmer, is the
is team and the wages of his
These vary in different situ-
n some parts of the country, the
pampered and kept so fat that
scarcely do a day's work as they
others they are over-worked
fed. Either extreme must be a
farmer. In the first case, the
not do their work and consume
ssary quantity of provender; in
they are soon worn out; and the
ses that become useless or die, is
an the saving in their food or the
k done by them. A horse pro-
will work eight or ten hours every
e week, resting only on Sundays.
icious division of the work of the

A horse in a single horse cart seems capable of drawing his load to the greatest advantage; and, of late, several improved single horse carts have been suggested. (See Carts; and *Journ. of Roy. Agr. Soc.* vol. ii. p. 73.) The single horse carts, both of London and Liverpool, convey enormous weights over the paved streets; and at Paris a single horse draws two tons. The carriers between Edinburgh and Glasgow, in carts weighing 7 cwt. convey a ton of goods, twenty-two miles a day, with one horse. The carriers of Normandy, with four horses, in two-wheeled carts, weighing 11 cwt., convey from fourteen to twenty-two miles per day, four tons of goods. See Traction.

The Hunter. It has been said that the hunter should be rarely under fifteen or sixteen hands high, below this he cannot well stand over his work, and above this he is apt to be long-legged and awkward at his work. With the increased speed of the hounds, and by the enclosures increasing the powers of the country to retain the scent, the speed of the modern hunters is much greater than that of the olden time, when with slow hounds, and strong active horses, the country gentlemen had their "meets" at break of day, and continued the chase for hours. Hence it is now pretty generally agreed that the modern hunter should be at least three quarters bred. Many prefer the thorough-bred horse, especially if he can be procured with sufficient bone. The properties which a good hunter should possess, are thus described in the Library of Useful Knowledge cipal power is wanted for behind, and the very lowness of the forehead may throw more weight in front, and cause the whole machine to be more easily and speedily moved. A lofty forehead, however, is indispensable in the hunter, the shoulder as extensive as in the racer, as oblique, and somewhat thicker; the saddle will then be in its proper place, and will continue so, however long may be the run. The barrel should be rounder, to give greater room for the heart and lungs to play, and send more and purer blood to the larger frame of this horse; and especially more room to play when the run may continue unchecked for a time that begins to be distressing. A broad chest is an excellence in the hunter. In the violent and long continued action of the chase, the respiration is exceedingly quickened, and abundantly more blood is hurried through the lungs in a given time, than when the animal is at rest. There must be sufficient room for this, or the animal will be blown, and possibly destroyed. The majority of horses that perish in the field are narrow-chested. The arm should be as muscular as that of the courser, or even more so, for both strength and endurance are wanted. The leg should be deeper than that of the race-horse (broader as you stand at the side of the horse), and especially beneath the knee. In proportion to the distance of the tendon from the cannon or shankbone, and more particularly just below the knee, is the mechanical advantage with which it acts. A racer may be tied beneath the knee without perfectly destroying his power, but a hunter with this defect will rarely have stoutness. The leg should be shorter than that of the race-horse, for higher action is required of him, that the legs may

requires, otherwise the concus
his shorter gallop, and more
of his frequently tremendous
inevitably lame him. The
hunter is a most material po
battered over many a flinty roa
field, and if not particularl
soon be disabled and ruine
sition of the feet requires so
in the hunter: they should, if p
upright. If they turn a li
there is no serious objection,
turn inward, his action can ha
particularly when he is fatig
weighted. The body should
compact compared with that
horse, that he may not in his ga
extended a stride. This would
disadvantage in a long day, and
rider, from the stress on the p
more serious efforts required
over clayey poachey ground i
months. The compact short s
will almost skim on the surfa
feet of the longer reached ani
deep, and he will wear himself
to disengage himself. The loi
broad, the quarters long, the
cular, the hocks well bent, an
horse." (*Ibid.* p. 53.)

Galloways. A horse betw
and fourteen hands high is calle
The name originated from a b
of little horses once bred in Sco
banks of the Solway Firth. T
loway was distinguished for it
stoutness, and was remarkably
Horses of this kind are v
able and useful, are capable
ing a great deal of light activ
are rarely so high-priced as

Foresters are commonly very
arse, ragged, large-hipped, ugly
t active, enduring, hardy, and
tained upon very coarse food.
emarks will pretty generally ap-
of Exmoor and Dartmoor in

cotch breeds, the Highland is the
the most useful; those of the
les, called in the north *shelties*,
een seven and a half and nine
ands in height, are often small-
utiful, good-tempered, and do-
have commonly short necks,
k shoulders, short backs, possess
gth, and will fatten upon the
d.

Horse.—In the rich grazing
Roscommon and Meath, many
ghbred horses are reared, that
ly distinguished for their large,
ed, rawboned appearance, but
has been very materially im-
the introduction of superior
other means, so that now many
horses claim an equality with
those of England. The Irish
ommonly beautiful, fiery, yet
red, easily excited, of great en-
d perhaps the best leaper in the

method of feeding horses, espe-
belonging to the farm, is a
ghly interesting to the farmer.
e substances employed for this
h as oats, oatmeal, barley, bran,
e, potatoes, turnips, carrots,
y, sainfoin, clover, rye-grass,
ns, and sometimes oil-cake:
e or furze is excellent. The
est given when bruised, the
uld be steamed and mixed with
alt; hay and straw are econo-
into chaff. In many of the
t London, hay is never put into
Thus in the stables of Hanbury
n, each horse is allowed per day
ut hay and straw (one-eighth of
14 lbs. of bruised oats, and 1 lb.
beans; half-a-pound of salt per
o given; in summer the beans
awn, and the oats increased.
the daily rations allowed to
cavalry horses are, oats 10 lbs.,
straw 10 lbs. ("On the Nor-
" *Quart. Journ. Agr.* vol. xii.

, of Wivelscombe, some years
the following statement of
t articles of food which his
ived to keep them in excellent
He, too, had no racks in his
id. vol. ii. p. 726.)

	First Class.	Second Class.	Third Class.	Fourth Class.
	lbs.	lbs.	lbs.	lbs.
1. Farinaceous substances, consisting of bruised or ground beans, pease, wheat, barley, or oats	5	5	10	5
2. Bran, fine or coarse -	-	-	-	7
3. Boiled or steamed potatoes, mashed in a tub with a wooden bruiser	5	5		
4. Fresh grains (boiled barley) - -	6			
5. Hay cut down into chaff	7	8	10	8
6. Straw cut down into chaff - -	7	10	10	8
7. Malt dust, or ground oil-cake - -	-	2	-	2
	30	30	30	30
With 2 oz. of salt for each class.				

The advantage of *cooking* the food for horses has been advocated by Mr. Dick, *Ibid.* vol. iii. p. 1024.; and in many cases is a practice highly to be commended. An apparatus for steaming food for horses with an engine is given, *Ibid.* vol. vi. p. 33.; and Mr. Fisher details the mode of feeding them with potatoes, *Com. Board of Agr.* vol. iv. p. 335. A machine for bruising grain for horses is described in *Quart. Journ. Agr.* vol. v. p. 100.; but I have given a cut of a simpler and better one under the head CRUSHER.

The number of horses of all kinds in England is estimated by Mr. M'Culloch, to be from 1,400,000 to 1,500,000, which, at an average value of from 12*l.* to 15*l.*, makes their total value from 18,000,000*l.* to 22,500,000*l.* In 1832, the riding horse duty was paid for 182,878 horses. (*Com. Dict.*)

The Wild Horse.—The horse is still found wild in Africa, in Tartary, and in southern America, in which last extensive continent they are said to be sometimes found in droves of 10,000. It is here that they seem to act both in self-defence, and for the attack of their enemies, with a subordination and union of purpose that is not a little curious. It seems that they have some bold and strong horse for their chief, who is their courageous leader in the onset, the first to direct their retreat. They close, at some intelligible signal, upon their enemies, and trample them to death. These, amongst the natives of America, are neither very numerous nor dangerous. The leopard, tiger, and lion of the New World are very inferior animals to their namesakes of the olden continents. Man is their greatest enemy; they are hunted and captured by the Guachos with their lassos, or even killed for their skins and flesh, in considerable numbers. These wild American horses are not particularly fast, but they can endure great fatigue, and, when once tamed, are exceedingly docile. Other wild horses business it is to buy and sell horses. Each person carrying on the business of a horse dealer is required to keep a book, in which he shall enter an account of the number of horses kept by him for sale and for use, specifying the duties to which the same are respectively liable. This book is to be open at all reasonable times to the inspection of the officers; and a true copy of the same is to be delivered quarterly to the assessor of the parish in which he resides. Penalty for non-compliance, 50*l.* (43 Geo. 3. c. 161.) Horse dealers are assessed if they carry on their business in the metropolis 25*l.*, and if elsewhere, 12*l.* 10*s.* per annum. From the papers published by the Board of Trade, it appears that the number of persons of this class assessed in 1831, was 74 in the metropolis, and 963 in other parts of the kingdom.

HORSE, DISEASES OF. See each disorder.

HORSE DUNG. See FARM-YARD MANURE.

HORSE FLY or FOREST FLY (*Hippobosca equina*, Linn.) This fly lives chiefly on horses, but sometimes also attacks horned cattle and other mammalia. The male is scarcely so large as the house fly; the female is larger. The insect generally attaches itself to the abdomen of the animal which is least covered with hair, particularly between the hind legs. This fly has a singular movement: it runs very quickly, but sideways like a crab: it is covered with a hard crust; and adheres so firmly by its claws as to render it difficult to take it off. As it torments the animals very much, means of driving it away must be thought of. Picking off by hand is too trou-

more than a century since, an
an horse-hoe of his own inv
resembles a common, rudely-
plough, with the mould board
the shares having a cutting e
on its landside. A variety of i
were gradually made in t
tion of this implement: I pro
those which are now considered

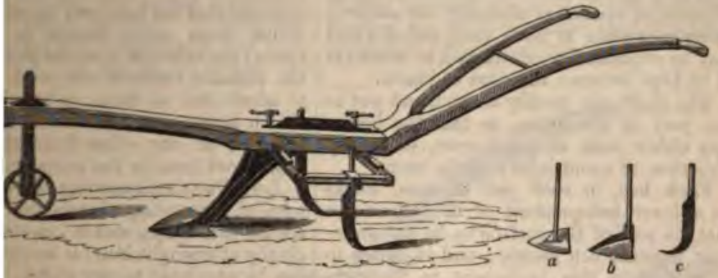
The advantages which these
the hand hoe are very fairly
late Mr. Francis Blakie: he
many cases the hand hoe may
vantage, and should then be
generally speaking, the hand
cient as the horse-hoe. Ex
most material point in all pro
bandry, carried on in a vari
certain climate, and it freque
that hoeing, in any way, can
cuted to advantage, in a ver
spring: hence the horse-hoe h
cided advantage over the har
man will only hoe about half
with the latter, while, with
man and a boy, with one h
eight or ten acres a day, and t
effectual manner." (*On Fa
nure*, p. 39.)

Clarke's Universal Ridge
This is a very ingenious contr
Clarke, of Long Sutton, whic
the Messrs. Ransome, for carr
several operations of ridge cul
which the English Agricult
awarded its silver medal at its

It is adapted for the uses
tom, a moulding plough, a h
cleaning plough, and a hors
only as fitted for the latter pu

rk, the flat hoe should be sub-
the curved or inverted hoe *a*, *b*, *c*.

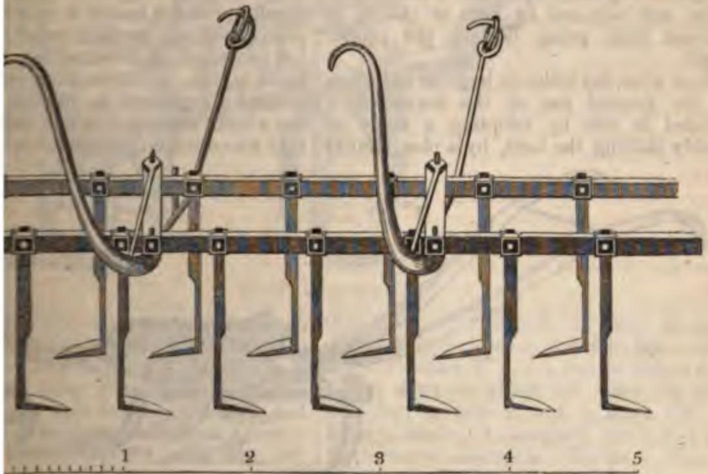
This forms a very perfect and simple horse-hoe.



CLARKE'S RIDGE HORSE-HOE.

erted Horse-hoe.—This excel-
ich was the first that succes-

fully hoed between several rows of turnips at once, and which led the way to the re-

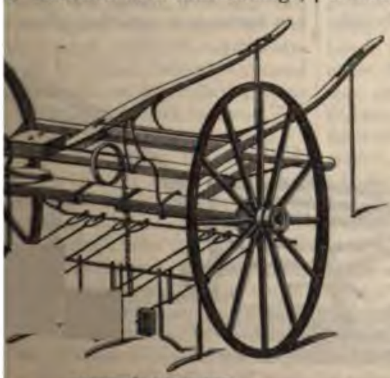


BLAKIE'S INVERTED HORSE-HOE.

ements of Mr. Garrett, was in-
e attached to a drill carriage,

or any light axletree, by the draft irons fixed to the handles. Blakie described it pretty accurately when he said "it is adapted for cleaning between rows of plants, growing at narrow intervals, within which it may be worked with perfect safety when in their infant state; indeed the idea first struck me on observing a large proportion of the plants buried by the operation of the hoes formerly in use." (*On Farm-yard Manure*, p. 40.)

Garrett's Horse-hoe.—This horse-hoe, invented by the manufacturers, Garrett and Son, of Leiston, Suffolk, is suited to all methods of drill cultivation, whether broad, stetch, or ridge ploughing; and is adapted to hoeing corn of all kinds

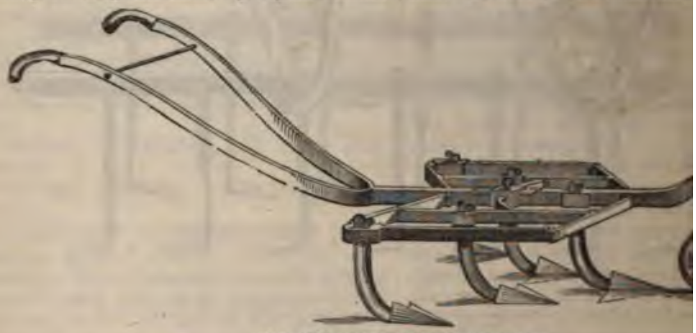


GARRETT'S HORSE-HOE.

that no part of the surface to be cut, however uneven, can escape; and in order to accommodate this implement to the consolidated earth of the wheat crop, and also the more loosened top of spring corn, roots, &c., the hoes are pressed in by different weights being hung upon the ends of each lever, and adjusted by keys or chains, to prevent their going beyond the proper depth.

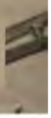
And what has hitherto been an objection to the general use of the horse-hoe is avoided in this by adopting a mode of readily shifting the hoes, by a plan similar

hoeing drill crops, and is cons
cipally of wrought iron : it has
can be regulated to any width
to twenty-seven inches, witl
facility, so that the tine shall a
its edge to what it has to
effected by the support of eac
parallel with the beam : it is v
principle of the parallel rule
has one wheel in front, with a
horse to yoke to : the depth it
ground is regulated by raisin
the wheel ; there is a pair of h
man who attends the machine t

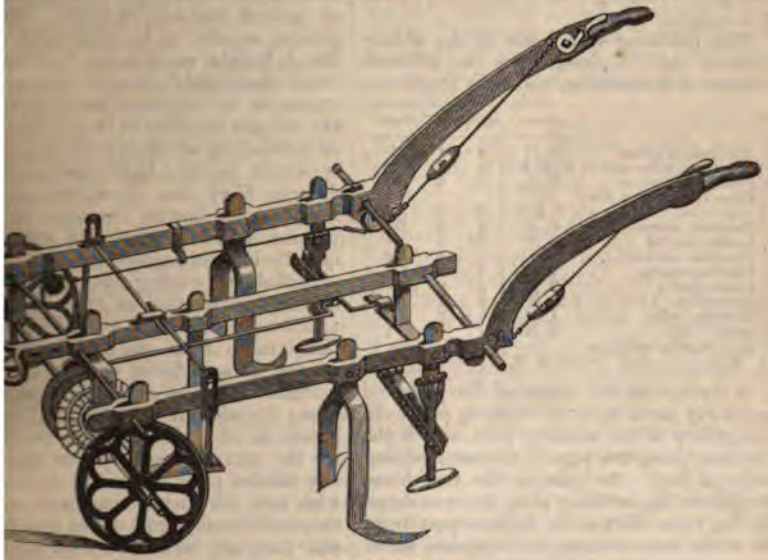


MORTON'S OR LORD DUCIE'S HORSE-HOE.

Grant's Horse-hoe, and Moulding Plough. — The form of this implement will be seen by the annexed wood engraving. By substituting mould-boards in the
wrought iron frame and hoe
hoe becomes a moulding plou



's Double-action Turnip Hoe.—This
nt is constructed so that it may
with only one horse and a man,
ntended to hoe either broadcast,
or ridged turnips. It hoes two
gthways and crossways at one time
cessary. It can be set to suit the drills at any distance, from fifteen to thirty inches, and to leave the distance of each turnip, nine, twelve, or fifteen inches apart. It may be used also as a scarifier by removing the cross-cut hoes, and replacing them with spear-footed tines.



WHITE'S HORSE-HOE.

SE MINT. (*Mentha sylvestris.*) A
f wild mint, growing freely in waste
especially in watery places. It is
ial, blowing dense crowded whorls
pale purple flowers in August and
er. The whole herb is of a hoary
ish green, clothed with fine soft
airs, and exhaling a strong peculiar
The stems are two or three feet
her bluntly quadrangular; the leaves
ssile, one and a half to two and a
es long, spreading, strongly and
errated, acute; their upper surface,
under, shaggy, with dense soft white
It might be used in medicine instead
entha viridis, as it yields the same
oil by distillation with water. The
of it allays sickness.

SE-RACING. By the 13 G. 2.
2. horse-races for sums under 50*l.*
ibited. And this statute applies to
(*Bilmead* v. *Gale*, 4 Burroughs,
but a match for 25*l.* a side is
hin the statute. It has been de-
hat a horse-race is a game within
Anne, c. 14. (*Blaxton* v. *Pye*, 1
309.) — so is betting at a horse-
ve 10*l.* (*Clayton* v. *Jennings*, 2 W.
706.) And as racing for less sums than 50*l.* is prohibited, no bets at such illegal races can be recovered by law (*Johnson* v. *Banns*, 4 T. R. 1.), but an action does lie for a wager under 10*l.* when the race was for the sum of 50*l.* or more (*M'Allester* v. *Haden*, 2 Campbell, 438.), but not for a wager above 10*l.* (*Shillito* v. *Teed*, 7 Bingham, 405.) But an action does not lie for wagers on races run on the high road (*Whaley* v. *Pigot*, 2 B. and P. 51.), nor on such wagers as those against time in a post-chaise (*Ximenes* v. *Jaques*, 6 T. R. 499.). A plaintiff cannot recover a stipulated reward for running an illegal race after having performed it, although he was retained by the defendant to do so. (*Coates* v. *Hatton*, 3 Starkie, 61.) The loser may recover back his deposit upon an illegal wager, after the event has been decided. (*Lauccasade* v. *White*, 7 T. R. 535.)

Lengths of Courses. — Doncaster is a round course of about 1 mile, 7 furlongs, and 70 yards. The other courses are portions of this circle, viz. — Red House in, 5 furlongs, 164 yards; T. Y. C., 7 furlongs, 189 yards; Fitzwilliam Course, 1 mile, 4 furlongs, 10 yards; St. Leger Course, 1 mile, 6 furlongs, 132 yards; Two-mile Course, 2 miles, 15 yards; Four-mile Course (twice round), 3 miles, 7 furlongs, 219 yards; Cup Course, from the Red House and once round, 2 miles, 5 furlongs, 14 yards.

Epsom.— Old Course, 2 miles; the New Derby Course is exactly a mile and a half, in the form of a horse-shoe; New T.Y.C., 6 furlongs; Old T.Y.C. or Woodcot Course, not quite 4 furlongs; Craven Course, 1 mile, 2 furlongs.

The following is a table of the abbreviations used in designating the different courses of Newmarket, and their length: —

	Abbrev.	Miles.	Furl.	Yards.
The Beacon course -	B. C.	4	1	138
Last three miles of do.	L. T. M.	3	0	45
From the Ditch in -	D. L.	2	0	97
From the turn of the lands in - -	T. L. I.	0	5	184
Clermont course -	C. C.	1	5	217
Across the Flat -	A. F.	1	1	44
Two-year old course -	T. Y. C.	0	5	136
Yearling course -	Y. C.	0	2	147
Round course - -	R. C.	3	6	93
Ditch mile - -	D. M.	0	7	148
Abingdon mile - -	A. M.	0	7	211
Rowley Mile - -	R. M.	1	0	1
Two middle miles of B. C. - -	T. M. M.	1	7	115

A *distance* is the length of two hundred and forty yards from the winning post. In the gallery of the winning post, and at the distance post, are placed two men holding crimson flags. As soon as the first horse has passed the winning post, the man drops his flag; the other at the distance post drops his at the same moment, and the horse which has not then passed that post is said to be distanced, and cannot start again for the same plate or prize.

A *feather-weight* is the lightest weight that can be put on the back of a horse.

A *give-and-take plate* is where horses carry weight according to their height. Fourteen hands are taken as the standard height, and the horse must carry nine stone (the horseman's stone is fourteen pounds). Seven pounds are taken from the weight for every inch below fourteen hands, and seven pounds added for every inch above fourteen hands. A few pounds additional weight is so serious an evil, that it is said, seven pounds in a mile-race are equivalent to a distance. A *post match* is for horses of a certain age, and the parties possess the privilege of bringing any horse of that age to the post. A *produce match* is that between the produce of certain mares in foal at the time of the match, and to be decided when they arrive at a certain age specified." (*Farmer's Series; Lib. of Useful Knowledge*, 50.)

HORSE-RADISH. (*Cochlearia armoracia.* From *cochlear*, a spoon; the form of the leaves, being rather hollow, resemble an old-fashioned spoon.) The horse-radish delights in a deep, mouldy, rich soil, kept as much as possible in a moderate but regular degree of m
hence the banks of a ditch, or oth
which has a constant supply of w
most eligible situation for the bed
they do not lie so low as to have
cess. If the soil is poor, the ro
attain any considerable size; and
effect is produced if grown in a sh
or beneath the drip of trees. S
ground require to be artificially
Mr. J. Knight recommends leaf
other thoroughly decayed veget
stance, to be dug in to the depth
the sets are intended to be plante
or horse-dung are from necessity
it should be in a highly putres
(*Trans. Hort. Soc. Lond.* vol. i
Horse-radish flowers in June, b
climate seldom perfects its see
quently it is propagated by sets,
provided by cutting the main
offsets into lengths of two inc
tops or crowns of the roots form
those taken from the centre
coming so soon fit for use, or o
growth. Each set should have a
eyes; for without one, they ref
getate at all. Mr. J. Knight re
for the obtaining a supply of t
any inferior piece of ground to
with sets, six inches apart and
these will furnish from one to five
and they may be collected for s
cessive years with little more tr
keeping them clear of weeds.

Horse-radish may be planted
close of January until the same
March; but the best times are i
and February; the first for dry
latter season for moist ones.

The sets must be inserted in row
inches apart each way. The grou
be trenched between two and
deep, the cuttings being placed
bottom of the trench, and the mou
from the next one over them,
to a similar depth by a long, blu
dibble. When the planting is c
the surface should be raked level
clear of weeds, until the plants a
size as to render it unnecessary. It
benefit if the mould lies as light
over the sets; therefore, treadin
beds should be carefully avoide
speedily take root, and send up lon
shoots, which make their appearan
or June. The only cultivation
is to keep them free of weeds, an
leaves decay in autumn, to have th
fully removed; the ground being
and raked over at the same sea
may be repeated in the followin
before they begin to vegetate.

eeding autumn they merely require to ssed as before, and may be taken up as ted. By having three beds devoted to root, one will always be lying fallow improving, of which period likewise advantage should be taken to apply any reite manure. If the plants, when of anced growth, throw out suckers, these ld be carefully removed during the ner as they appear. In September October of the second year, the roots be taken up, and in November a cient quantity should be raised to erve in sand for winter supply. To them up, a trench is dug along the de row, down to the bottom of the up- roots, which by some persons, when bed is continued in one place, are cut vel tó the original stool, and the earth the next row is then turned over them e requisite depth, and so in rotation to nd of the plantation. By this mode a will continue in perfection for five or ears, after which a fresh plantation is ly necessary. But the best practice is e the crop up entirely, and to form a ation annually; for it not only causes oots to be finer, but also affords the tunity of changing the site. If this is followed, care must be taken to every lateral root; for the smallest of will vegetate if left in the ground. W. *Johnson's Kitchen Garden.*) See vy-Grass.

ORSE-SHOE VETCH, TUFTED. *pocrepis comosa.* Both the popular and ic names allude to the appearance of urved recesses of the pods.)

e plants of this genus are all remarkneat and beautiful, and highly deservplace in every garden. The herbaceous grow well in any light sandy soil, and well when planted in a bank, or rock-. The seeds of the annual kinds should wn early in spring, in the open border. tufted horse-shoe vetch is the only e species. The root is woody, running into the ground. Stems branched at bottom, furrowed, procumbent, from to twelve inches long. Flowers deep w, about six or more together, in umrising high above the rest of the plant; es above an inch long, curved downds, bright bay-coloured. (*Eng. Flor.* l. p. 292.)

ORSE STEALING. See Animals, of; and Buying and Selling.

ETAIL. (*Equisetum*, from *equus*, and *seta*, hair, in allusion to the -like branches.) Although the this genus are looked upon as mere hey have a very interesting aspect en growing in their natural situations; they are found in boggy places, and multiplied by divisions. Several of the species, like grasses, secrete a quantity of flinty earth (silica) mostly lodged in their articulations. There are seven indigenous species.

1. Branched wood horsetail (*E. sylvaticum*), growing in shady moist woods, by trickling rills, but not very frequent. This is a very elegant species, twelve or eighteen inches high; stems erect, beset with many whorls of slender compound, angular, smooth, spreading branches.

2. Great water horsetail (*E. fluviatile*). Horses eat this plant with avidity, and in some parts of Sweden it is collected for the purpose of serving them as winter food; flourishing in watery places, about the banks of rivers and lakes. This is by far our largest species, differing from the foregoing in the fructification, which is a large cylindrical catkin, having four or five pale teeth on a separate short stem, differing from the branched or whorled frond, as is likewise the case with the following one, *E. arvense:* all the others hitherto observed in Britain have terminal catkins at the top of the fronds. The terminal stems of the great water horsetail are quite erect; at least a yard high, often much more, furnished from top to bottom with whorls of numerous long slender branches. The catkins are brown, with scales, which separate and show the white scales when they are ripe.

3. Corn horsetail (*E. arvense*). This is a very common species growing in wet meadows and moist corn fields. It is a most troublesome weed in pastures, and is seldom touched by cows, unless pressed by hunger, when it occasions an incurable diarrhœa; it is eaten with impunity by horses, but is noxious to sheep. The fronds are reckoned unwholesome to such animals as feed upon them in autumn, especially swine. This rough grass is employed for cleansing and polishing tin vessels. In this species the root is much branched, creeping extensively, producing in the spring several simple, upright, flowering stems quite destitute of branches; a span high, cylindrical, smooth, juicy, of a pale brown, bearing three or four brown-ribbed sheaths, and at the top a solitary catkin.

4. Marsh horsetail, or paddock pipe (*E. palustre*). This species grows most frequent in spongy watery bogs, and other marshy places, flowering in June and July. The stem is rather slender, deeply furrowed, beset throughout with whorls of slender, angular, minutely rough branches.

It is not so strong as the preceding species, but is equally prejudicial to cows. It is also very troublesome in drains, within of a deep glaucous green, from one to two feet high, cylindrical, uniformly and rather copiously furrowed, the furrows minutely toothed and of a strong hardness. This species is wholesome to horses, and is eaten by them; but it is hurtful to cows and disagreeable to sheep. That eminent chemist, Sir H. Davy, first detected a quantity of pure silex in the furrowed cuticle of this plant, which accounts for its power, as a file, in polishing wood, ivory, or even brass. This purpose it has long served in England under the name of Dutch rushes, being usually imported from Holland, and is chiefly employed by turners and cabinet-makers to polish their work, as well as by dairy-maids for cleaning pails and other wooden utensils. So wheat-straw, whose cuticle contains the same earth in an impalpable state, like others of the natural family of grasses, is used, when burnt, to give the last polish to marble.

7. Variegated rough horsetail (*E. variegatum*) is found in wet, sandy ground in Scotland and Ireland. The whole plant is smaller and much more slender than the last. The fibres of the root of this curious little species are remarkably woolly, like those of grasses that grow in loose sand. The sheaths which crown the joints are lax, with lanceolate teeth. The catkin is ovate, acute, blacker than *E. hyemale*, with a more slender stem. (*Eng. Flor.* iv. 335—341.; *Willich's Dom. Encyc.*)

HORTICULTURAL SOCIETY OF LONDON. This society had its origin in 1804, from a few individuals of wealth and talent who associated for the improvement of the art in which they delighted. Their views soon enlarged, and on the 17th of April,

and GARDENING.

HORTUS SICCUS.
dried plants preserved in
See HERBAL.

HOT-BEDS. In garde
either with fresh horse-du
bark, and covered with
them from the severity
weather. It is very impo
hot-beds not to raise the
high, as the plants become
FRAMES, KITCHEN GARDEN

HOT-HOUSE. A gen
glass structures used in ga
cluding STOVES, GREENHOU
and CONSERVATORIES. Se

HOT WALLS. In gar
the growth of fruit trees,
with flues or other contriv
heated in severe weather,
the ripening of the wood o
the fruit. The advantages
well illustrated by their in
ing peaches, nectarines, a
in Scotland, and many pa
of Europe, where such fru
produced in the open air wi

HOUND. An appellati
of the chace. See DOG an

HOUNDS'-TONGUE.
A genus of herbaceous plan
two species grow wild in
The cultivated foreign sp
border plants, succeeding
soil, and readily multiplied

1. Common hound's-tong
is found abundant in waste
road-sides. The root is fle
The whole herb of a dull gr
very soft, exhaling when to

d externally and internally in de- in cases of scrofula.

een-leaved hound's-tongue. (*C. syl-*) This is a more rare plant, grow- road-sides and hedges in shady situ- and is distinguished from the com- ecies, in its bright shining green and want of downy softness, besides scarcely any scent. The flowers, low in June, are at their first opening subsequently of a dull blue. (*Smith's Flor.* vol. i. p. 259.; *Paxton's Bot.*

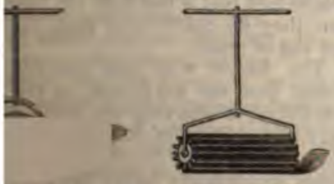
SELEEK. (*Sempervivum*, from *vivo*, to live for ever; the tenacity in the houseleek is well known.) re seven species of houseleek men- by Miller (but these are only a few extensive genus). They all thrive dry rocky situations. These inter- lants are worthy a place in every n. The mountain houseleek is a ardy perennial, bearing a purple n June and July. The houseleek *reum*), which is a native of the is hardy and handsome, bearing a ellow flower in autumn and even in Cuttings taken off and laid to dry or three days, will root very freely. e of the common houseleek (*S. tec-* applied either by itself or mixed am, gives immediate relief in burns external inflammations. (*Paxton's ct.*)

SE-SPARROW. See Sparrow.

EL. An open shed for sheltering or protecting produce or materials ent kinds from the weather, or for ing various country operations, eavy rains, falls of snow, or severe

EN. See Cattle, and Sheep, Dis- r.

IMELLER, BARLEY. An instru- r separating the awns of the barley om the seed. There are various of taking off the awns: a com- e is by treading it by a horse walk- r it; another by rolling it with a oller, an instrument something simi- garden roller, the cylinder being



of thin flat wrought iron bars, placed wo inches apart, and the edges to the this rolled over the barley, takes off the awns or ailes. We have also seen a grated presser or chopper, about a foot square, barred across with thin plates, which is lifted up and down by the workman, and thus chops off the awns; but the best machine we have seen is one upon a wood stand, with a hopper into which the barley is thrown, from whence it falls into a box in which a spindle is placed in an inclined position, having, when at a few inches apart, short knives placed spirally, so as to form a sort of screw, which, when put in motion, has a tendency to draw the barley from the upper end of the box to the lower: during the operation the awns of the barley are effectually knocked off. This mode of dressing barley constitutes one of the principal improvements in Salter's patent winnowing machine, which will be described hereafter; but the hummeller is made in the form described for barley only, by several makers: a good one is made by Mr. Grant of Stamford. See Winnowing Machine. (*J. A. Ransome.*)

HUMUS. A modern term given by some chemists to the very finely divided organic matters, which all cultivated soils contain. "Woody fibre in a state of decay (observes Liebig) is the substance called *humus*. The humic acid of chemists is a product of the decomposition of humus by alkalies: it does not exist in the humus of vegetable physiologists." He says in another place, "Transformations of existing compounds are constantly taking place during the whole life of a plant, in consequence of which, and as the result of these transformations, there are produced gaseous matters which are excreted by the leaves and blossoms, solid excrements deposited in the bark, and fluid soluble substances, which are eliminated by the roots. Such secretions are most abundant immediately before the formation and during the continuance of the blossoms: they diminish after the development of the fruit. Substances containing a large proportion of carbon are excreted by the roots, and absorbed by the soil. The soluble matter thus acquired by the soil is still capable of decay and putrefaction; and by undergoing these processes furnishes renewed sources of nutrition to another generation of plants, and it becomes *humus*. The leaves of trees which fall in the forest in autumn, and the old roots of grass in the meadow, are likewise converted into humus by the same influence: a soil receives more carbon in this form than its decaying humus had lost as carbonic acid. Humus does not nourish plants by being taken up, and assimilated in its unaltered state, but by presenting a slow and lasting source of carbonic acid, which is absorbed by the roots, and is the principal nutriment of young plants at [illegible] being destitute of leaves, they [illegible] extract food from the atmo- [illegible] *Organic Chem.* pp. 46-58.)

HUNDRED. An ancient division of [illegible], which originated either from its [illegible] occupied by 100 families, or because [illegible] such district found the king 100 able-[illegible] men for his wars. They were first constituted by Alfred the Great. He is supposed to have derived the idea from Northern Germany; but there centa, or centena, is a jurisdiction over 100 towns. A hundred court is only a larger court baron: each hundred has its high constable, who is bound to present the petty constables of his hundred who neglect their duty, and he is to collect county rates, and fulfil other duties. See CONSTABLE.

HUNDRED-WEIGHT. A weight of 112 lbs. avoirdupois, generally written cwt.

HUNGER-ROT. The name of a disease in sheep which speaks for itself. It is occasioned by poor living, especially during the winter, and is best cured by better keep.

HUNTERS. See HORSE.

HURDLE. (From the Sax. hẏrðel, to keep, or the Germ. *hurden.*) The hurdles of the ancients (*crates*) were somewhat similar to those of the moderns; they were a kind of wicker work, and used for various purposes. When employed for drying figs or grapes, they were called *ficaria:* they were also used for screening fruit from the weather. (*Colum,* xii. 15.) Hurdles, Virgil informs us (*Georg.* i. 94.), were employed as harrows to level the ground, which had been turned up by the *rastrum,* or heavy rake. In modern husbandry hurdle implies a light frame of wood or iron, somewhat in the form of the common gate, constructed for the purpose of forming a moveable fence for the confining of sheep and other animals. They are generally made of some light split timber, or of hazel-rods, wattled together. These are principally employed where sheep are folded on arable lands, or where they are fed with turnips in the field, to keep them on a certain space of ground, or to confine them to a certain portion of their food at a time, in which way they are extremely useful; as the sheep, by being so closely confined, contribute greatly to the improvement of the land in the first case; and they improve by having a given quantity of food allowed them at once, with less loss than they would do if allowed to range at large over the field.

A dozen and a half hurdles will fold 30 sheep, and twelve dozen 1000. On the South Downs the allowance is three sheep to a hurdle: this of course varies with the description of sheep. A shepherd and his dog, without any other help tha
the hurdles carted to the field,
the requisite number of hurdles,
one hundred acres of turnips.
number of hurdles required (*Qua*
of Agr. vol. iii. p. 647.) is one
whole length of the ridges of an
field, and as many more as
twice across two 8-step lands or
four 4-step lands. This numbe
ficient for a whole quadrangul
whatever number of acres it may
The daily portions are given, mor
according to the number of t
Two of these portions are firs
or "pitched," the sheep being
the first or corner piece. Next
are turned into the second piece
cross-hurdles that enclosed them
first are carried forwards and set
the third piece. These removes
tinued daily till the bottom of th
reached: both the cross rows ar
spare, and are carried and set
new long row, close to the off-
furrow, and the daily folding car
over two or four lands, as at fir
always proper to begin at the
field, if there be any difference in
in order that the flock may have
lair to retire to in wet weather
setting of hurdles an iron crow-ba
pitcher, is employed, by which m
and loss by breakage of the h
effected." New hurdles, in the
England, are about 16*s.* per doze
are made at 4*d.*, by professed hurdl
who find their own tools; they ma
a dozen per day. A larger kind of
called park hurdles, costs 2*s.* each,
hurdles about 4*s.* 6*d.* to 6*s.*; and the
the long run, for permanent divisio
economical than wooden ones. A
of iron hurdle for feeding sheep in
and pleasure grounds is describ
a wood engraving, by Mr. Bai
vol. ii. p. 113.), and the compl
cess of wooden hurdle making is giv
vol. iii. p. 647. There is also ano
of hurdle, made with twisted ha
very common in the south of
whose first cost is less than the oth
but they do not last so long, an
get out of repair.

The farmer who uses the ash
would find the advantage, on the
durability, of charring (or partial
ing) that portion of them which
the ground. Net hurdles are al
times economically used; but they
ther more troublesome than wo
iron hurdles, and require to be k
fully in a dry place, when not

ed at night, for the sake of their
on the enclosed arable pastures of
This is a highly profitable mode.
lculated that the dressing thus
y 300 sheep is sufficient, in a
r one acre of land, and is worth
unds. Hence the enhanced value
having ready access to downs, or
g a right of common. The second
folding is the feeding off of green
sheep enclosed in daily divisions,
les, by which means the land has
benefit, equally distributed, yielded
onsumption of the green crop; of
he value of the folding will mainly
both in quality and quantity, upon
consumed: hence, too, the superior
g effect derived from sheep having
or corn added to their green food.
n of feeding sheep on one field
he day, and folding them on another
the night, is a bad practice long
ndemned by Arthur Young, who
it as "merely robbing Peter to
l," since it is, in fact, only the
from one field to another of the
rganic matters, the sheep being
red by the drift or labour of re-
nd by the fasting (so contrary to
ural habits) during the night.

lding of sheep on green crops is
he great modern agricultural im-
nts. It ensures the equal dis-
of the manure, prevents waste of
eps the sheep quiet, gives them
und daily, and enables the farmer
h close after the sheep, and thereby
the loss by evaporation of the
rtion of the manure. See Folds
DING.

DS or HARDS. A provincial

træa.) This is a pretty alpine native plant, growing on limestone rocks and walls in the south of Britain. The root is fibrous, annual rather than biennial. The stems, one or more, two or three inches high, erect, leafy, branched; leaves, elegantly and deeply pinnated, with a terminal one of the same size. The flowers, which appear in March and April, are white, very minute, corymbose. The petals narrow, with oval pouches, tipped with a sessile stigma. The seeds are two in each cell. (*Smith's Engl. Flor.* vol. iii. p. 168.)

HYACINTH. (*Hyacinthus.*) Miller reckons six distinct species of hyacinth, of which there are many varieties; but one species only is indigenous, namely, the starch hyacinth (*H. racemosus*). It grows wild in grassy fields, or among ruins, blowing ovate dense clusters of little drooping, dark blue flowers in May. The bulb is ovate, brown externally. The leaves are deep green, flaccid, and loosely spreading, about a span long, linear, very narrow. The flowers small, like wet starch, being equally disagreeable and oppressive to most people, causing headach and nausea to many. (*Engl. Flor.* vol. ii. p. 149.) The *H. orientalis* is our garden favourite. The soil in which these bulbs succeed best is a light sandy loamy soil, or a compost made from leaves, dung, turf, &c., decomposed by salt which has been thrown over the materials and dug in. Such a compost heap should be ready in every garden. The bulbs of the hyacinth should be taken up when the flower-stems decay, and they should be replanted in September. When dug up first, they should be laid sideways on the bed, covered with an inch of soil only, to dry gradually. Here they may re-sprinkled upon it, and fine light earth sifted over them half an inch deep. The boxes must then be placed in an eastern aspect, till the weather becomes cold and wet, when they must be protected through the winter from frost. In the early spring the seedlings appear: guard them from frost and heavy rains, and keep the earth clean round them The second year the seedlings may be placed in a bed to strengthen, till they flower. Hyacinths bloom well indoors. Place the bulb in a *blue* glass, and fill it with rain water, to half way up the bulb, and add a few grains of salt. The water should be changed every week.

HYACINTH, THE WILD. See SQUILL.

HYBERNATION. (Lat. *hybernus*, wintry.) The act by, or the state in, which certain animals exist during the season of the year when excess of cold, or lack of food, prevents their going abroad, and performing their customary functions. The bat and the hedgehog, lizards, snakes, frogs, toads, &c., are among the animals and reptiles which hybernate. Some quadrupeds, as the dormouse and squirrel, which subsist on articles of diet better adapted to be laid up in store than insects, carry a winter provision to their hybernating nests; and their torpidity is more nearly allied to a profound, but ordinary sleep.

HYBRIDS. (Gr.) The produce of a female plant or animal which has been impregnated by a male of a different variety or species.

The most common hybrids are those which result from the connection of different varieties of the same species, as the produce of the wild boar and domestic sow; the endless modifications which result from analogous inter-breeding from varieties of the rose, the African geranium, and other ornamental plants, are familiar examples of the principle among vegetables. The most common and useful of hybrids is the mule. Although some rare exceptions to the rule are on record, it seems to be a principle of nature that all hybrids should be sterile.

HYDRANGEA. (*Hydrangea arborescens.*) A hardy perennial, native of North America, which flowers in July and August. It loves a moist soil, and should be kept free from weeds. Its roots may be parted in October. If a severe winter attacks the plant, it will only die down to the ground.

H. hortensis, or the changeable hydrangea, blooms from June to October. It is a native of China. Cut the stems down every autumn, and cover the root through the winter, to guard it from frost. Hydrangeas are propagated by cuttings.

HYDROGEN. A chemical element, which derives its name from two Greek
words that signify "a generator of
because it is one of the constituents
fluid, which is always formed when hy
gas is burned in combination with
spheric air, or with oxygen gas. It is
to us, in its simplest form, only in t
of gas, and is speedily fatal to ani
when it is breathed unmixed wit
spheric air. It is, however, a comp
animal matters, and it forms a very
part in the economy of vegetable sub
it which it is always found. Thu
contains 6·90 per cent. of hydroger
6·93; bee's wax, 12·672; wood of
5·69; wheat starch, 6·77; acetic a
acid of vinegar), 6·35 per cent.
garded as an element, because it has
every attempt to decompose it.
lightest of all ponderable matter, 1
inches weighing only 2·15 grains. N
degree of cold has been able to con
to a liquid. It cannot support com
but is combustible in conjunction wi
spheric air. It constitutes one nin
weight of water, — a substance ess
vegetation, and which plants are
to have the power of decomposing.
such circumstances, Liebig asserts t
parts of hydrogen unite with 100
carbonic acid to form woody fibre, w
oxygen is separated in the gaseo
(*Organic Chem.* p. 63.) Most
structures contain hydrogen in the
water; but the hydrogen essential
constitution cannot exist in the
water. That hydrogen gas exerts
siderable influence upon the leaves
was first noticed by Dr. Priestly.
bier found that plants which lose the
colour in the dark, preserve it und
circumstances, if a small portion of h
gas is present in the atmosphere
they are placed; and Dr. Ingenhous
that its presence, when they are gr
the light, renders their colour of
green (*Ann. de Chim.* vol. iii. p. 57
again, M. Humboldt has noticed
Poa annua, *Trifolium arvense*, an
plants growing in the galleries of co
preserve their green colour, althou
tating in the dark, and that, in su
tions, the atmosphere contains a pr
of hydrogen gas.

When applied to the roots of
moderate proportion, the influence
drogen gas is evidently beneficia
those situations where this gas is ev
in drains, stagnant waters, dung-h
the vegetation growing over such
uncommonly rank and luxuriant.
observed to arise by the agitatio
mud of stagnant pools is the
employed for the purposes of illu

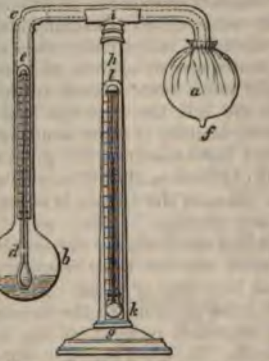
buretted hydrogen gas, a peculiar
mposed of carbon 0·416; hydrogen
In the process of putrefaction,
tity of water exactly corresponding
of the hydrogen, is formed by the
ion of oxygen from the air; while all
gen of the organic matter is returned
atmosphere in the form of carbonic
Now the process of vegetable as-
on consists in the extraction of
en from water, and carbon from
bonic acid; hence the advantage of
osing vegetable matter to living
A small portion of carburetted hy-
gas in the atmosphere, or in the soil
s, certainly therefore promotes their
ion; but like pure hydrogen gas,
constitutes their entire atmosphere
oys them. (*Thomson's Chem.* vol. iv.
See Gases, their Use to Vege-

ROPHOBIA. A disease caused by
of a rabid dog, or other rabid
The disease occurs at irregular
after the bite has been received;
s are on record where it appeared
days; and in a few, two years have
before its appearance. The wound
ly heals kindly, and the person
in good health, until a few days
he disease displays itself. Pain or
hing is first perceived in the cica-
the bitten part; and shoots along
cted limb. This is followed by
convulsive pains in different parts
body. The countenance of the
next indicates great anxiety; he be-
estless, and depressed in spirits; the
s are contracted; the face is tumid;
is broken; and during the day he
gular chills and flushings. The appe-
etimes is lost; and a peculiar pain
the pit of the stomach, with a sen-
stiffness at the back of the neck, and
ng to the jaws. The patient, in at-
to swallow, finds that the effort is
by spasmodic convulsions of the mus-
eglutition; and as this is increased
uids are attempted to be swallowed,
eives a dread of the attempt: hence
sence of liquids associating in the
e pangs connected with the effort
owing them, his imagination operates,
shudders on beholding them, and
y turns from them, when they are
to him. This has given the name
isease, but it is the dread of the
f swallowing, not of the liquids,
auses the convulsions excited by
t of them. As the disease pro-
the skin becomes so susceptible of
ons that the least breath of air, or
e movement of a person in the room,

or a fly lighting upon the body, will bring on tremors, and sometimes convulsions. The salivary glands are peculiarly excited, which causes constant hacking and spitting; and often the saliva runs out of the mouth. The senses are sometimes affected: — they become more acute; touch is painful; odd smells are felt, the causes of which are not present; hearing is often acute to a painful degree; but by degrees this great sensibility ends in obtuseness, almost amounting to paralysis. In man the disease is never attended with any attempt to bite, and the stories of howling and barkings are fabulous. The symptoms are the same whether the rabid animal be a dog or a cat. Every age and sex is equally liable to the disease; and in every recorded instance it has terminated in death. It unfortunately happens that nothing in the way of cure, and little even as palliation, has been successfully effected in this disease; but there appears no doubt that the timely application of preventive measures has been successful, and of these the excision of the bitten part, and the application of caustics to it, or both united, are most to be relied on, and the sooner they are resorted to, the better the chance of success. It appears, however, that they may be effective any time before the appearance of itching, pain, or redness in the cicatrix of the wound. Among caustics, the nitric acid and the nitrate of silver are perhaps the most effective. Excision, however, can be confidently relied upon; and care must be taken to make the excision much beyond the wound, both as to extent and depth.

HYGROMETER. (Gr. ὑγρὸς, moist, and μετρον, measure.) An instrument which indicates the degree of moisture, or vapour present in the atmosphere, or its relative degrees of dampness and dryness. Hygrometers are of several forms, and a rude hygrometer is easily made by means of a long hair, or strip of leather, or cat-gut suspended from a peg, kept in its upright position by a slight weight: these, by their very sensible contractions and expansion according to the humidity of the air, indicate by an attached scale its variations. Hygrometers of this kind, however, are defective, from the irregularity of their action, and the impossibility of comparing them with each other, their alteration by time, and other circumstances. These disadvantages gave rise to the construction by Professor Daniel, of that now commonly used, which is thus clearly described by the inventor.

Its principle is simply this: it consists of two small glass bulbs connected together by a glass tube bent at right angles. A very delicate thermometer is introduced into one bulb (*a*), which is filled with ether,



and heated until the vapour passes with full force into the other bulb (*b*), and passes out of an aperture in it, which is then hermetically sealed. The empty bulb is next covered with a piece of fine muslin, so that when ether is dropped upon it, the evaporation will cool the covered bulb. This external evaporation will condense the internal etherial vapour, and cause the ether in (*a*) to evaporate and cool its external surface. The fall of the interior thermometer will mark the degree of the falling temperature, which must be noted as the dew-point, at the moment that a slight ring of dew, just coincident with the surface of the liquid, forms upon the glass. A small thermometer (*e*) is inserted into the pillar of the stand for the purpose of comparing the temperature of the air with that of the dew-point (*Daniell's Introd. to Chem. Phil.* p. 136–7.)

By this particular contrivance the temperature of the apparatus can be gradually reduced at pleasure. This reduction of temperature, unless the surrounding atmosphere is perfectly dry, will at length occasion a deposition of moisture in the form of dew upon the exterior surface of the glass; for it is known that, whenever aqueous vapour comes in contact with a substance whose temperature is less than its own, condensation immediately ensues; and this condensation is the more copious the greater the difference between their temperatures. Familiar instances of this are seen in summer, when a bottle of wine is brought from a cool cellar, or when a decanter is fresh filled with water from a well. As the reduction of temperature takes place slowly, the precise instant can be observed when the deposition of the moisture commences. The indication of the thermometer enclosed in the bulb at this instant is what is called the "dew-point."

We see then that the dew-point
temperature immediately below that
vapour contained in the surrounding
sphere: the difference, however, b
the dew-point and that of the vapo
slight that for all ordinary purpos
may be considered the same.

The temperature of the invisible
of the atmosphere being thus asc
(for it differs materially from the
rature of the air in which it is con
it is easy to calculate the force it e
thus existing in the state of stea
the weight of given bulk of it, and i
quence tables have been formed, wl
be found in Daniell's *Meteorological*
p. 139.

HYSSOP, COMMON (*Hyssop*
nalis, probably from the Hebrew).
are three varieties, distinguished
colour of the flowers, the white,
blue; the last of which is most co
cultivated. It is a perennial, n
Siberia, but cultivated in our
flowering from June to Septembe
root is knobbed, woody, fibrous;
about two feet high, quadrangula
branching. The leaves sessile, i
elliptical, entire, punctured. The
are borne in half verticillate spik
mixed with leaves. The calyx is pe
striated; the corolla is violet-colou
a whitish tube; the seeds are fou
bottom of the calyx.

A dry soil is the one most approp
hyssop. If it is grown on a rich or
it becomes luxuriant; but from a d
of woody matter, is generally destr
the frost, as well as rendered less
and powerful in its medicinal quali
is propagated by seed and slips
branches and young shoots, as we
offsets. The seed may be sown f
close of February until the end
Rooted offsets may be planted in
April, August, and September; cu
the branches in April and May, and
young shoots in June or July.

The seeds may be inserted broa
preferably in drills, six inches
either case not being buried deeper
an inch. It is the usual practice,
seedlings have attained the growt
weeks, to prick them out twelv
apart; but it is by much the best
to raise them where they are to re

The slips and offsets are best p
first in a shady or north border;
generally firmly rooted in two mo

In September or October they
fit for removal to their final station
every removal, whether of plantin
ing, &c., they must be watered p

ch naturalists. It is characterised
g large horns, with a flattened an-
rface, and marked with prominent
e ridges or knots. It inhabits the
of the highest mountain chains in
nents of Europe, Africa, and Asia,
not exist in the New World. Its
e solitary, and its haunts the most
ble rocks; on which account its
s a work of difficulty and danger.

THE GLOSSY. (*Ibis falcinellus*).
earance of the glossy ibis in this
s very rare, and merely accidental,
it is now included among the birds
it the British Islands. This bird
a *liver*, and it is said the town
of Liverpool derive their titles
s from it. In Europe the ibis lives
y on the banks of rivers, and par-
the form and character of the
The head, neck, breast, sides and
the adult bird are deep reddish
he wing coverts and testials dark
brown, with brilliant green and
eflections; the legs and toes are
en. The whole length of the bird
twenty-two inches. (*Yarrell's
ds*, vol. ii. p. 505.)

Sax. ıꞅ; Dutch, *eyse.*) Water in a
ongelation. Ice is about one eighth
er than water: hence it swims in
ent; and, owing to this property,
rgs and ice islands are floated down
rn latitudes from the arctic circle.
ht of an ice island out of the sea is
ne-half of the real depth of the mass
which it is composed. The degree of
isite to form ice in salt water is
ater than in fresh water; for saline
tions lower the point of freezing,

fication of fishes.

IGNIS FATUUS. (Lat. vain or foolish fire; a translation of the French *feu follet.*) A kind of luminous meteor, which flits about in the air a little above the surface of the earth, and appears chiefly in marshy places, or near stagnant waters, or in church-yards, during the nights of summer. There are, we are told, many instances of travellers having been decoyed by these lights into marshy places, where they perished; and hence the names *Jack-with-a-lantern*, *Will-with-a-wisp*; the common people ascribing the appearance to the agency of evil spirits, who take this mode of alluring men to their destruction. The cause of the phenomenon does not seem to be perfectly understood; it is generally supposed to be produced by the decomposition of animal or vegetable matters, or by the evolution of gases which spontaneously inflame in the atmosphere. (*Brande's Dict. of Science.*)

Milton, in his *Paradise Lost*, b. ix. l. 634., thus alludes to it: —

> A wandering fire,
> Compact of unctuous vapour, which the night
> Condenses, and the cold environs round,
> Kindled through agitation to a flame,
> Which oft, they say, some evil spirit attends,
> Hovering and blazing with delusive light,
> Misleads the amazed night wanderer from his way
> To bogs and mires, and oft through pond or pool,
> There swallowed up and lost, from succour far.

IGNITION. (Lat. *ignis*, fire.) The act of setting fire to, or of taking fire; as opposed to combustion, or burning, which is a consequence of ignition. The term "spontaneous ignition," is applied to cases in which substances take fire without previous application of heat. This is illustrated in the burning of hay-stacks, when the hay has upon the roof of a house; as the scales upon the cup of some acorns; also applied in speaking of the æstivation of petals, or leaves, to denote that they overlap each other at the margin without any involution. (*Brande's Dict. of Science.*)

IMMERSED. Buried; applied usually to persons or substances, totally sunk in water. In botany the term is applied to the leaves of aquatics when they grow under the water, and to the ovary when it is buried in the disk. The *Ranunculus aquatilis* has some of its leaves immersed; some spread on the surface of the water; some elevated above it. (*Paxton's Bot. Dict.*)

IMPLEMENTS, AGRICULTURAL. Almost all the operations of agriculture may be performed by the plough, the harrow, the scythe, and the flail; and these, or similar tools for performing the same work, are the sole implements in the primitive agriculture of all countries. With the progress of improvement, however, many other implements have been introduced, the more remarkable of which are the drill-plough, the horse-hoe, the winnowing machine, the thrashing machine, and the reaping machine. The object of all these implements and machines is to abridge human labour, and to perform the different operations to which they are applied with a greater degree of rapidity, and in a more perfect manner than before. As I have treated at length of the different implements, &c. in their alphabetical order, it is unnecessary to go farther into the subject here. Of the progress made in the constructrion of agricultural instruments, the judges of implements, at the Liverpool meeting of the English Agricultural Society, in their report very justly remark, when speaking of "the good effects which have already resulted from the public exhibition of implements at the Society's meetings, in stimulating the talent of the mechanic and the zeal of the husbandman. At Oxford the show-yard may be said to have presented an epitome of the state of agricultural mechanism existing in 1839, the era of the formation of the Royal Agricultural Society of England. No spectator of that show can have failed to be struck with surprise and admiration at the Liverpool exhibition. At Oxford there were some examples of good machinery and workmanship, but many more of rude, cumbrous, and ill-executed implements. At Liverpool many machines were exhibited, not only of surpassing skill in contrivance and execution, but also having for their object the effecting of processes in tillage-husbandry of the most refined nature and acknowledged importance, but hitherto considered of very difficult practical attainment. Some o
may already be considered as formi
of the necessary apparatus of eve
managed farm, and to be essentia
economy and profit. This vast s
the mechanics of agriculture, mad
so short a period, has doubtless aris
the congregating together of agric
and mechanicians from all parts
empire: and a still higher perfe
machinery may be confidently ant
from the opportunity offered, under
pices of the Society, of periodically c
ing and estimating the merits of va
plements used for similar purposes in
localities and soils. It is apparent
manufacture of even the commone
ments has already, to a great exten
out of the hands of the village plou
and hedge-carpenter, and been tra
to makers possessed of greater inte
skill, and capital. The improved
finish, the greater lightness and el
construction, and the generally
adaptation of the means to the end,
class of implements, were sufficie
festations of the beneficial result
from the encouragement given by
ciety to these objects. Neither
amples wanting in the higher c
machines to show that the fourth i
object for which the Society wa
porated is, to some extent, fulfille
'to encourage men of science
attention to the improvement of agr
implements.'"

The remarks of the Messrs. Ra
Ipswich, upon the preservation
cultural implements in general are
every farmer should be guided by
"suggest to farmers generally, th
instruction given to the workme
use of the machines, and care in p
them, would add to their efficie
durability. Attention to washing
ments and machines before laying
a little oil on such as have revolving
parts, and a coat of paint occasi
each, will cost but little, and
difference between having a machi
for use, or covered with rust and
repair, just as the season for its
mences. These suggestions are so
that they would think no apology
for making them, as their experienc
that a large proportion of the re
quired, arises from want of atte
these apparently trifling matters.
to this end the advice of Mr.
of Beverley, may be acted upon w
siderable advantage: he says, "S
most likely labourer on the farm,
implements under his care, make

and the pruning knife. The rake added, but it can be done without, if seed be sown on a rough surface, e covered by beating that surface with a spade; and if on a smooth it may be covered by scattering, spade, a very thin sprinkling of er it. Even the pruning-knife dispensed with; because culinary s could be pulled up by the roots, at the surface of the ground with e; and fruit trees will produce thout pruning, as by disbudding ing with the finger and thumb, as it may be grown as ever will be by the use of the knife. It must sed, however, that the knife and the very nearly essential instruments ulture. With the progress of ure a great number of implements, nts, utensils, and machines have ught into use. Of these may be d the hoe for stirring the soil and up weeds; and this implement on scale, in warm countries, is used as ute for the spade. The watering-odern gardening is an important nd the syringe a machine that can be dispensed with. In the forcing nt we have the thermometer, the ter, and various contrivances for g and regulating heat, admitting or g air, and producing artificial va-ain. (*Brande's Dict. of Science, &c.*)

RTS, AND EXPORTS. The in-f the agriculturists and the culti-the soil in general are usually much y the legislature of every country, ely afford protection, by imposing all articles imported from foreign which are likely to come into com- drawback of excise had been received on exportation, unless by special permission of the commissioners of customs. See Corn Laws, Woollen Manufactures, &c.; and for a statement of the various organic matters that are annually imported into this country, and eventually tend to fertilise the land, see Manures applicable by the Drill. (*M'Culloch's Com. Dict.*)

IMPOSTHUME. In farriery a sort of swelling, or collection of matter or pus in any part of the body of an animal. See Abscess.

IN-AND-IN-BREEDING. The practice of breeding from close relations. See Breeding, Cattle, Sheep, &c.

INARCHING. See Grafting.

INCH. A measure of length, the twelfth part of a foot.

INCISORS, or INCISORES. (Lat. *incido*, I cut.) The teeth implanted in the inter-maxillary bones of the upper jaw, and in the corresponding place in the lower jaw, and which are generally shaped for the purpose of cutting or coarsely dividing the food. The ruminating animals, including the bull and cow, sheep, goats, the deer tribe, and the camel have no incisors in the upper jaw; but some of them have canine teeth, which project from the mouth. See Age of Animals.

INCLOSURE. (Lat. *includo*, I shut up.) See Enclosure.

INCUBATION. (Lat. *incumbo*, I brood over.) Hatching or the lying down of an animal upon her own or another's eggs, communicating to them heat, and maintaining them at her own temperature; a condition essential to their development. In many animals the development of the fœtus takes place after the exclusion of the

Chinese: the former indeed have carried this process to such a high degree of perfection, as in many instances to have entirely superseded the use of the hen in hatching.

It is effected either by means of an oven, stove, or steam, and it has been calculated that the ovens of Egypt every year communicate life to about 93,000,000 chickens. This process has received considerable attention from the French philosophers: but perhaps the best exemplification of its results that has been witnessed in Europe, was given by the proprietor of the *Eccaleobion*, which was lately exhibited in Pall Mall, London.

The mean temperature of incubation is 100° Fahr.; it may vary from 95° to 105°, and, towards the close of the process, may be suspended for one or two hours, or for a longer period, according to the degree of extraneous heat which the eggs may derive from their situation, without fatal consequences to the embryo. The power of communicating the requisite degree of warmth to their eggs arises out of the unusual development of, and determination of blood to, a peculiar plexus of vessels, distributed over the skin of the abdomen, and which in most birds is connected with a derivation of blood from the internal organs of generation, after the subsidence of the functional activity of the ovarium and oviduct to the external integuments. The vascular, hot, and sensitive condition of the skin of the abdomen is the exciting cause of that uncontrollable propensity to incubate, which the Greeks denominated "storge," and which, with its associated phenomena of patience, abstinence, and self-denial, forms so remarkable a feature in the economy of birds. The eggs of the bird present so-

bears relation to this dif
lopment. If the thrush had
that her young would be e
egg naked and helpless, sh
prepared beforehand a wa
comfortable abode, than he
her to construct for their
and if with such a nest we
mass of straw in which the
incubates her eggs, it mi
that she knew beforehand
would come into the wo
and strong enough at on
and pick up their own fo
therefore, the nest relates o
in the other to incubation
rearing of the young: and
degree of development att
cubation, and the associa
the nest and habits of the p
been divided into two g
Aves altrices, and *Aves pra*
Dict. of Science.)

INDIA, THE AGRI
The British farmer will,
derive many useful hints
careful study of the ag
eastern portions of Asia.
for instance, too many ca
buted to retard the marc
improvement. The innat
natives to innovations of
ture of their region, thei
the political oppressions u
have long laboured, are an
causes of the degraded sta
culture. I am indebted
Mr. George Johnson of th
at Calcutta for most o
sketches of Indian mode

g prices to the cultivator. Now,
e contingencies occur in Hin-
on the contrary, the operations
re are rudely executed; the
re poor, the profits are small,
correspondent. The dwellings
s throughout India are in no
rior to the other mean huts,
hey are associated in the village.
ttached to the residence of the
vators; for the pittance of grain
sed is immediately beaten out,
rt sold at once to the merchant,
ll residue for seed and suste-
ed in baskets, or jars, and these
placed in the room where the
s. The outbuildings rarely ex-
an enclosure in which to se-
tle at night. By far the greatest
rms do not exceed a size re-
gle yoke of oxen, for the occu-
nly ploughman."

us imposts to which these little
exposed, sound strange to an
culturist: they are enumerated
hanan. (*Ind. Rech.* vol. ii. p.
ryot's heap of grain is usually
seers: of this is first set apart,

	Seers.
, or rather for the priests -	5
to the brahmins and other - - -	5
loger - - -	1
litary brahmin of the vil- - - - -	1
er - - -	2
r - - - -	2
enter and blacksmith -	2
urer - - -	4
erwoman - - -	2
le - - - -	7
of the village - -	53
antant - - -	200
hman - - -	10
uctor of the water - -	20
	314

a residue of 2686 seers: of
ment takes 10 per cent., and
the residue, so that when all
have been satisfied, the grower
possession of 2000 seers of rice."
Mysore, vol. i. p. 265.)

is practised in India and in
he hot countries of Asia, to an
which the English farmer has
tion; for, as Mr. George Johnson
In every district of Hindostan,
er tropical climates, irrigation
effectual mode of promoting
In places favoured by nature
are occasionally flooded merely
truction of a dam across the
ne mountain stream, or it is confined nearer to its source, so as to form a reservoir, from which the water may be obtained at the most desirable seasons. In less favourable situations, the water frequently has to be raised to a considerable height, in order to attain an elevation level with, or slightly above the cultivated land. This is very generally effected by a scoop of matting suspended between two ropes, the ends of which are held by two men who bale it from the reservoir into a hole, some feet above it, and from thence it is similarly baled by others from hole to hole, until the desired height is attained. Sometimes the scoop is suspended between poles, erected in the form of a gallows; at others, as in the Jáut wells, from which the water is raised by cattle or by hand, in some districts. The extensive canals, formed in the neighbourhood of Delhi and in the Punjab, are no longer employed. The machinery, so general in China, is no where used in India for raising water. In 1798, Dr. Tennant relates, that the practice of the natives then was, and is still followed, after ploughing the fields in the usual manner, but before sowing, to divide them into regular small squares like a chess board: each square is surrounded with a shelving border about four inches high, capable of preventing the escape of water. Between these square inclosures, small dykes are formed for conveying a rivulet over the whole field; when the water has stood a sufficient time in one square, it is let off into the surrounding dyke, and conveyed to another, and so in succession through the whole field. The fertility induced amply recompenses the labour, and the neatness imparted to the country by this husbandry is very striking." (*Ind. Rech.* ii. 167.) In some places the water has to be raised from deep wells, several of which are in the most elevated parts of each field. The work of drawing the water is performed by two bullocks, not travelling round in a mill, but pacing in a direct line from the well's mouth. The various little trenches already mentioned, all radiate from these wells. About Patna the irrigation water is raised from the wells by means of a bamboo lever with its fulcrum on a frame about ten feet high, a weight at the opposite end being employed to assist the workmen in counterpoising the leather bag of water; this plan is only resorted to when the wells are shallow and the water near the surface of the earth, and then not bags but buckets are used, sometimes of leather but more frequently of iron. Four bullocks and three labourers are engaged nine days in irrigating one acre of land thoroughly. The importance of this branch of agriculture is evidenced by the great

number of wells, which even these most indolent people sink in districts deficient in streams. Near Madras, at Saymbrumbacum, a reservoir more than seven miles long, and three broad, for the purposes of irrigation, has been formed, by merely raising a bank across a natural ravine. In the Tamul language a reservoir of this kind is called an Eray. This supplies 32 villages containing 5000 persons employed in agriculture (should the rains fail) for 18 months. Sluices lined with bricks pass under the banks to supply the fields: the inner opening of the sluice is covered by a flat stone, in which is cut a circular hole, through which the water is allowed to pass as required, by means of a plug fixed to a bamboo, and secured from escape by means of stone pillars and cross bars. When bullocks are employed to raise water from wells, a leathern bucket is used, which holds 45 gallons; this two bullocks will raise every minute and a half from a well 44 feet deep, and they work eight hours per day.

To the insoluble matter of the water employed in irrigation, must be attributed a considerable portion of its value. These vary at different seasons. That of the Ganges, which is extensively employed in irrigation, was examined by Mr. Everett: he found in it of insoluble matters

		Grains.
July 3.	In a wine quart -	- 1
7.	- - -	- 8
23.	- - -	- 10
Aug. 1—8.	- - -	- 58·10
22.	- - -	- 26
Sept. 6.	- - -	- 17
24.	- - -	- 8
Oct. 8.	- - -	- 6

This insoluble or mechanically suspended matter was analysed by Mr. Piddington: he found in 200 parts from the banks of the Ganges at Mohulpore —

	Parts.
Vegetable matter - - -	5½
Saline matters, chiefly muriate of potass	½
Carbonate of lime - - -	16½
Phosphate of lime - - -	1
Oxide of iron - - -	12
Silex - - - -	139
Alumina - - -	14¾
Water - - - -	2
Loss - - - -	8¾
	200

As these rich, purely divided matters, are depositing on the lower grounds within reach of the flood waters, it follows as a natural consequence that "the higher soils are generally and rapidly impoverishing, and this to a degree of which few, who have not made the subject one of attention, are aware."

The rapid effects produced by a copious
artificial watering of grass land
burning sun of India, may be ju
following report made in 1841,
ward Burnes to Lord Aucklan
artificial grasses of Cabool.

"There are three kinds of g
vated in Cabool — 'rishku,' or l
tul,' a kind of trefoil, and '
clover. The first and the last
yield crops for some years, but
(shuftul) is an annual. The lu
is sown in spring, generally abo
equinox: for each jureeb, or a
English acre (20,089 jureebs
an English acre), two seers
about 28 lbs. English are requ
In forty days it comes to perfe
cut down, and will yield fou
crops ere winter sets in, but
ting six or eight crops may be
last may sometimes be inferi
mature cold. One jureeb or
glish acre yields on an averag
loads of grass at each cutting
carries about 500 lbs.; this is
5000 lbs. the jureeb, or 10,
English acre, and for four fine
lbs. English. The third crop
the best, and from it the seed
of this the half acre sown
seers of Cabool will yield fo
about 560 lbs. This plant req
black soil, much manure, an
five times each crop, in fact
droops. It is sometimes sow
barley, but in that case the
hausting the soil injures the
seed is never exported, but th
plentiful, though all the cattle
as much to exceed the consu
therefore dried, and that pro
distance from a market is ge
in this manner and sold durin
camel load of it, or about 500
whether green or dry, sells fo
rupee — a coinage of which 11
to 100 Company's rupees.
rally lasts for six years, but it
ten years if manure be abunda
over it. The seed is at prese
rupee, a stone of 14 lbs.; but a
tivated for exportation, this is
than it might otherwise be
price has been almost doubl
rival of the British troops.
'shuftul,' in cultivation, in
sowing, reaping, and soil, rese
and the calculations of produ
will suffice for the other, only i
plant. The seed too is dear
than that of lucern.

"The clover, or 'si barg
leaves), assimilates likewise

py it in profusion : they have be-
retched method of sowing various
ether, in a manner that cannot be
y reprehended. It is only in some
India, that any thing like rotation
s observed. In the high lands of
he following rotation is usually
— 1. Year fallow and wheat. 2.
ucknai) followed by big or bear, a
barley. 3. Murwa, sama, and
being species of millet, followed by

is nothing remarkable in the do-
imals of Bengal: the oxen are
and their sheep are described as
nk, and thin;" the colour of three
f each flock is black, or dark grey.
ty of the fleece is worse, if possible,
olour; it is harsh, thin, and hairy,
y remarkable degree: no part of
or domestic furniture, so far as
ant had observed, is manufactured
xcept a coarse kind of blanketting
ne of the boatmen (dandies) and
the upper districts use during the
n, as a wrapper at night.
ne system of irrigation which pre-
rabia, in Persia, and in Hindostan.
on to a very considerable extent
pire of China, where the soil is
l perhaps more carefully, and with
minuteness of detail, or garden
f husbandry, than in any other
I do not allude in this work to
ivation of crops, such as the tea
those from which the English cul-
as little likely to derive useful
hey are remarkable for the care
h they deepen, even by the spade,
ivated lands, and their husbanding
es of all kinds is admirable; every
collecting in the public roads and streets all the horse and other dung, which is also made into cakes, with marl, and these are afterwards dried in the sun.

The system of tillage formed by the Chinese, however antiquated, is not of a general description, calculated to instruct the English cultivator; and the Chinese husbandmen are entirely uninformed as to any scientific principles, by the observance of which the cultivation of the earth is improved. The same remark, in fact, extends to most oriental farmers: they merely follow a regular routine of operations, because it is that which their forefathers adopted:— followed without consideration, it is transmitted unimproved. See Irrigation, and Night-soil. (*Memoir on the Agriculture of India*, by G. W. Johnson.)

INDIAN CORN. See Maize.

INDIAN CRESS. See Cress, Indian.

INDIGENOUS PLANTS. Such plants as are natives of, or are common to, a country.

INDIGO. (*Indigofera*, from *indigo*, a blue dye stuff, a corruption of *Indicum*, India, and *fero*, to bear; most of the species produce the well-known dye, called indigo.) This is an extensive genus of rather elegant plants, the shrubby kinds of which are well worthy of cultivation. The stove and green-house shrubby kinds thrive best in a mixture of sandy loam and peat, and may be increased without difficulty by cuttings of the young wood, planted in sand, under a glass, in heat. The annual and biennial kinds must be raised from seeds sown in a hotbed, in spring; and when the plants have grown a sufficient height, they may be planted singly into pots, and treated as other tender annuals and bi-besides yielding indigo, is also medicinally employed; and the powdered leaf of *I. anil* is used in some diseases of the liver. (*Paxton's Bot. Dict.*)

INDURATED. (Lat. *induro.*) A term implying that a substance naturally soft is hardened. It is a term frequently used in botanical works to signify the above-mentioned change.

INERT VEGETABLE MATTER. The inert vegetable matters of the soil are those which decompose very slowly, and consequently afford very little nourishment to the growing plant: of this kind are woody fibre, tanner's bark, peat, &c. all of which, if not previously rendered more easily soluble, by being mixed with farm-yard dung, or other easily fermentable substances, afford food to vegetation by very slow degrees.

INFIRMARY. (Lat. *infirmus*, weak.) A hospital for the reception of the sick. The Veterinary College in London have an infirmary for sick and diseased horses, to which the horses of their subscribers have access and medical treatment, free from charge.

INFLAMMATION. In farriery, is a disease or affection consisting in an increased heat and action in any part of an animal, arising from various causes, external or internal, local or universal. In animals, the chief causes are wounds, bruises, and sudden or excessive cold, and the application of heat afterwards.

The horse is subject to inflammation of the lungs, stomach, bowels, kidney, and of the eye and foot. Of inflammation of the bowels I have already spoken (see Bowels). Of inflammation of the stomach in the horse, except from poisonous herbs, or drugs, we know little. It very rarely occurs, and then can, with difficulty, be distinguished from inflammation of the bowels; and in both diseases the assistance of a skilful veterinary surgeon is required. (*The Horse*, p. 200.)

Among the causes of inflammation of the kidney are, improper food, such as mow-burnt hay, musty oats, &c. Bleeding, in this case, must be promptly resorted to; and carried to its full extent. An active purge should next be administered; and a counter-inflammation excited as near as possible to the seat of disease.

Inflammation of the lungs is one of the causes of roaring: it is generally brought on by the respiration of heated and empoisoned air, in neglected and filthy stables; by sudden changes from heat to cold, or cold to heat, from grass to the stable, or stable to grass, and so on. Bleeding, blistering, and relaxing medicines should be resorted to under the advice of a profes-

sional man; for the cure of thi
can scarcely be safely undertake
proper advice.

Cooling applications, such as
extract, one drachm or half an ou
tincture of opium to a pint of w
mash diet and gentle physic, w
get rid of common inflammation
or the inflammation will subside
should three or four days pas
inflammation not be abated, we
to suspect that it is specific an
flammation, or true ophthalmia
there is no cure. See Eye.

Inflammation of the foot is
by over-exertion. If a horse th
ridden or driven hard be suffere
in the cold, or if his feet be
not speedily dried, he is very lik
" fever in the feet." Bleeding
and poultices of linseed meal t
whole of the foot and pastern, w
and cooling medicines, should
to. And to promote evapor
advisable to remove the shoe, pa
as thin as possible, and have th
particularly the quarters, well ra
Horse, p. 291.) See Grease.

A very excellent article by M
M. Milburn, of Thorpfield, Yorksh
Inflammatory Complaints of Far
which received a premium from
land Society, may be consulted
tage. See their *Transactions*, vol

For inflammation in sheep see

In inflammatory fever in ca
bleeding, followed by immedia
($1\frac{1}{2}$ lbs. of Epsom salts dissolv
or gruel) must be had recourse
on Cattle, p. 359.)

INFLORESCENCE. (Lat.
to flourish.) The general arra
the flowers upon a stem or bran
sists of the following principal
the spike, the raceme, the pani
pitulum, the cyme, and the umb

The spike is a long rachis of ses
The term raceme is commonly
flowers, when they are arrang
filiform simple axis, each partic
being stalked. The panicle is
position of inflorescence, in whi
mary axis developes secondary
themselves produce tertiary, as
in other words, it is a racem
branches of flowers in place of
Capitulum implies the arrangem
heads. The cyme is a mode of in
resembling a flattened panicle, a
elder.

Of the particular arrangement
bel, the carrot is a familiar ex
peduncles and pedicles spring f

of a peculiar state of the atmos-
hough we have no means of de-
is undoubtedly the true cause of
. Miasms, or vapours of a noxious
y exist, though in very minute
lso as exciting causes of influenza,
uggested by Dr. Prout. It may
e of volcanic origin; and such a
as seleniuretted hydrogen, which,
tremely minute quantity, is highly
s, might perhaps account for some
enomena of influenza; but we
owledge that nothing certain is
specting the cause of this disease.
mper, Epidemic, and Murrain.
A provincial term, employed to
ommon pasture or meadow which
wet.
LATION. An operation in the
nt of fruit trees, which is some-
d budding. It is a kind of graft-
sed in the summer months on va-
s and plants, and often succeeds
n the common method of grafting.
ding and Grafting.) It is also a
l to signify the process of trans-
rasses. See Grasses.
BARLEY. A local term ap-
arley which is sown as the second
the ground has been fallowed.
T-ORCHIS. (*Ophrys.*) The
this genus are highly curious, and
place in every collection. The
e large and handsome, inodorous,
coloured, especially the lip, re-
different kinds of insects. The
ligenous to Britain, are:—
fly orchis (*O. muscifera*) grows
pastures, or in meadows among
rocks, sparingly, or much dis-
owering in June. This is one

to the Rev. G. E. Smith, usually narrower. The calyx leaves are shorter in proportion to the lip than those of the *apifera*, always paler, and rather white than pink, except when the flowers approach to decay; the keel is green, as in that species. Petal rather shorter, smaller, and broader, more coloured, downy on the inner surface. Lip essentially and obviously different, much broader and more dilated, nearly twice as long as the calyx; its margin thin, expanded and directed forward, not reflexed. The disk is of a duller brown, the lines or spots less yellow or vivid. The *O. arachnites* is observed to grow more in tufts or clumps, than the *apifera*, which is commonly scattered or solitary, though less so than *O. muscifera*.

4. Early spider orchis (*O. aranifera*). This species is found most generally in dry chalky limestone, or gravelly pastures and pits, flowering in April; it is of more humble growth than the bee orchis, with fewer flowers, which are of a greenish brown hue; the herbage is rather more glaucous.

5. Drone orchis (*O. fucifera.*) This is of the size and habit of the last species, with which the general aspect of the flowers accords, though they are of a somewhat lighter brown, and seldom more than three in each spike. (*Smith's Eng. Flor.* vol. vi. p. 28. and 273.)

INSECTS. (Lat. *insecta.*) A very extensive, and, to the cultivators of the earth, important class of animals. On the subject of the science of entomology, in this work, I propose only to touch upon those, which are the most injurious or important to the farmer; and many of these, such as the *bee*, *ant*, *fly* in turnips, *wireworm*, &c. will be character, as a whole, than that just mentioned."

From the works of Mr. Swainson, of Kirby and Spence, the papers of Mr. Duncan in the *Quart. Journ. of Agr.*, and the valuable little work of V. Kollar, *On Insects injurious to Gardeners, Foresters, and Farmers*, so carefully translated from the German, by the Misses Jane and Mary Loudon, the chief facts of this paper are obtained. And to use the words of M. Kollar, in reference to the plan I propose to follow in it, "To enable the readers, for whom this work is intended, to find more easily the insect particularly interesting to each, it has been considered proper not to treat of families and species in any systematic arrangement, but according to the branch of culture to which they are particularly injurious." And, in pursuance of this object, I shall only briefly allude to some of the chief of the insect depredators, for "to enumerate," says Davy, "all the destroying animals and tyrants of the vegetable kingdom, would be to give a catalogue of the greater number of the classes in zoology; almost every species of plant is the peculiar resting-place or dominion of some insect tribe; and from the locust, caterpillar, and snail, to the minute aphis, a wonderful variety of inferior insects are nourished, and live by their ravages upon the vegetable world."

Of the considerable extent to which the various insect tribes commit their depredations, no farmer will for a moment doubt, and yet he forms his judgment only upon the ravages of the larger insects. Of the smaller tribes—the minute trespassers—the animalculæ, those only discernible

cotyledon leaves, and a
in the bulb and rootlets,
eased and covered with
cences (see Anbury),
foliage is often consume
But even when there is
mentation of their numb
to believe that the injury
getation by insects is a
than is generally suppos
tions are often carried
either beneath the surfac
the substance of the plan
ations where they escape
kinds again feed only du
conceal themselves durin
and crevices. In consequ
and insidious mode of a
doubt that we are often
unhealthiness and decay
ness of soil, unfavourable
causes, when in reality t
entirely by insects." (
vol. viii. p. 97.) "The
Mr. Duncan, "which is
the discovery of proper
vestigate carefully the h
history of insects in co
structure and general
plants which they attack
this object the attention
to ascertain the time whe
in which, the eggs are
as their composition, an
closing membrane, with a
in what way the vital
most easily destroyed.
larvæ call for particular
generally in this state th
committed: the period of

knowledge of the economy of the sect is of course of the utmost im- if we could become acquainted retreats in which they pass the r find means to destroy the few rally survive, when they first ap- the spring, and before they have their eggs, the injuries which are by their means might be alto- evented." (*Ibid.* p. 99.)

, however, the farmer, when he is nly engaging in the destruction of ying insects of the field, omit to whether many of these are not, in ne or other, productive of benefit r they do not serve to keep within e limits other insects, or perhaps some other wise purpose in the the creation. This has been be the fact in the case of the earth-worm, whose casts so often gardener and the farmer. (See VORM.) For these not only assist ontinual admixture of different earths, but, by boring the soil, note in it the circulation of the ric gases, and even the drain- it of its superfluous moisture. Vhite, of Selborne, remarks in his *History*, "The most insignificant id reptiles are of much more con- , and have much more influence in omy of nature, than the incurious of. From their minuteness, which them less an object of attention, ir numbers and fecundity, earth- hough in appearance a small and e link in the chain of nature, yet, ould make a lamentable chasm."

have been divided by entomo- to two great divisions — the *winged*, *ingless.*

d insects are divided into the fol- rders: —

eoptera. Of this are the weevils, ug, ground beetles, &c.

hoptera. Of this order are the tle, the cockroach, field cricket, y locust, the green grasshopper,

niptera. Of which are the field, house bugs, &c.

uroptera. In which are compre- the dragon fly, lace fly, day fly or n, &c.

menoptera. In this order are bees, nts, humble bees, saw-flies, gall-

idoptera. Of which order are the es, moths, &c.

piptera. Of which are certain in- ng on bees, wasps, &c.

tera. Of this order are gnats, house flies, midges, ox and horse breeze-flies, &c.

The insects without wings are divided into the following orders: —

9. *Myriapoda.* Of this are the centipede, julus, &c.
10. *Thysanura.* The sugar louse, &c.
11. *Parasita.* The lice tribe, &c.
12. *Suctoria.* The flea.

Crabs and spiders, included by Linnæus amongst insects, are now formed into two classes—*Crustacea* and *Arachnida.* (*Kollar*, p. 12.)

I. *The Transformation of Insects.* — Insects commonly change their form several times in the most apparently magic manner. A few, the Aphis, for instance, are viviparous, but they are generally produced from eggs, that is, the eggs are produced in the body of the mother. "The female," says Kollar, "lays her eggs (which are often stuck on and covered with a kind of glue to protect them from the weather) shortly after pairing, instinctively in the place best adapted for their development, and which offers the proper food to the forthcoming brood. The whitethorn butterfly, and the golden-tail moth, lay their eggs on the leaves of fruit trees, or other leafy trees, and the latter covers them over with a gold-coloured covering of silk. The common lackey-moth (*Gastropacha* (*Bombyx*) *neustria*) fastens them in the form of a ring, round the stem of the fruit trees, and the gypsey-moth (*Bombyx dispar*) fastens them in a broad patch on the stem of a tree or paling, and covers them with a thick coating of hair. The winter-moth (*Geometra brumata*) lays them singly on the buds of the leaves and flowers; the printer-beetle (*Bostrichus typographus*) introduces them between the bark and the albumen, &c.

Most insects issue from their eggs as worms or larvæ; those of butterflies are provided with feet, and are called caterpillars; those of beetles and other insects, larvæ; and when they have no feet, they are called grubs or maggots. In this state, as their bodies increase, the insects often cast their skin (see EXUVIÆ, *ante*, p. 429.), and sometimes change their colour. Many winged insects, such as the grasshoppers, dragon flies, &c., very much resemble in their larva state the perfect insect; they only want the wings, which are not developed till after the last change of the skin. The larva state is the period of feeding; and insects are then usually the destructive enemies of other productions of nature, and objects of persecution to farmers, gardeners, and foresters.

The nympha or pupa state succeeds that of the larva. Insects do not now require nourishment (with the exception of grasshoppers and a few others), and repose in a death-like slumber. To be safe from their enemies and the weather, the larvæ of many insects, particularly butterflies, prepare for themselves a covering of a silky or a cottony texture. Many form themselves a house of earth, moss, leaves, grass, haulm, or foliage. Many even go into the earth, or decayed wood, or conceal themselves under the bark of trees, and other places of security.

After a certain fixed period the perfect insect appears from the pupa. It is usually furnished, in this state, with other organs for the performance of its appointed functions, as for the propagation of its species, &c. The male insect seeks the female, and the female the place best suited for laying her eggs: hence most insects are furnished with wings. Food is now a secondary consideration; consequently, in many, the feeding organs are less perfectly developed than in the larva state, or very much modified, and suited for finer food, as, for example, in butterflies, which, instead of the leaves of plants, only consume the honey out of their flowers.

II. *The food of insects* is indeed procured from an extensive pasture. "From the majestic oak," observes M. V. Kollar, "to the invisible fungus or the insignificant wall-moss, the whole race of plants is a stupendous meal to which the insects sit down as guests. Even those plants which are highly poisonous and nauseating to other animals are not refused by them. But this is not yet all. The larger plant-consuming animals usually limit their attacks to leaves, seed, and stalks: not so insects, to the various families of which every part of a plant yields suitable provender. Some which live under the earth, attack roots; others choose the stem and branches; a third division live on the leaves; a fourth prefers the flowers; while a fifth selects the fruit or seed. Even here a still further selection takes place. Of those which feed on the roots, stems, and branches, some species only eat the rind like the bee-hawk moth; others the inner bark and the alburnum, like the *Tortrix Wœberiana*, and the bark beetle; a third division penetrates into the heart of the solid wood, like the goat-moth and the family of the long-horned beetles. Of those which prefer the foliage some take nothing but the juice out of the sap vessels, as the aphides: others only devour the substance of the leaves without touching the epidermis, as the mining caterpillars; others only the upper or under surface of the leaves (leaf rollers), while a fourth division (as the larvæ of the *Lepidoptera*) devour the entire leaf.

Of those feeding on flowers some eat the petals (the mullein moth, &c.), others the farina (bees, rose-chaffer, &c.); a still greater number consume the honey from the nectaries (wasps, flies, &c.); other insects injure the plant by puncturing it and laying their egg in the wound, and with it an acrid matter, which causes a peculiar excrescence in which their young are hatched and live, until they are able to eat their way out, to perform the functions of the parents, such as the gall-fly, &c. The death-watch or ticking beetle (*Anobium*) feeds on dry wood, long used as portions of our dwelling-houses.

Those insects which tenant and feed upon animal matters have an equally varied taste; of these are the different kinds of bird and sheep lice, ticks, mites, &c., gnats, midges, breeze flies, bugs, fleas, &c. Some of the carnivorous beetles devour their prey entire; others only suck out their juices; others live upon the food they obtain in water, and devour swarms of the infusoria. Many live on carrion and the excrements of the larger animals, such as the blue-bottle fly, horse-beetle, dung-beetle, and carcass-beetle; others live in the stomach of animals; many moths live entirely upon hair, leather, wool, and feathers.

The food of insects varies strangely with their transformations: the caterpillar requires very different food from the butterfly; the maggot from the beetle and fly. The larva of *Sirex gigas* feeds on wood, the perfect insect on flies. That of the May bug or cockchaffer lives on roots and tubers, the beetle on leaves. The quantity of food consumed by different insects varies very much: many consume more than their own weight in a day. The maggot of the flesh-fly, according to Redi, becomes two hundred times heavier in the course of twenty-four hours. Caterpillars digest every day, about one third to one fourth of their weight: hence the ravages they commit in a few days. Others, however, such as the day-flies (*Ephemeridæ*) and the breeze flies, and even amongst the *Lepidoptera* which spin cocoons, many appear to abstain from nourishment. Some eat only during the day, others in the evening, and others, such as the caterpillars of the night moths, during the night. Most of them procure their own food; but a few which live in communities, such as the wasps, bees, ants, &c., are fed by the perfect insect. Many provide a store of food, but the greater number die unprovided with a store: to feed their larvæ." (*Trans. by the M Loudon.*)

III. *Destruction of Insects, &c. by Art. Means.*—Various have been the recipes suggested for the destruction insects which destroy the cultivator's s: thus *ants*, it is said, may be easily oyed by toasting the fleshy side of the of a piece of bacon till it is crisp, and g it at the root or stem of any fruit that is infested by these insects — put thing over the bacon to keep it dry, nts will go under it — after a time, up *quickly*, and *dip* it into a pail of . While treating of insects, I may ntally allude to worms and slugs. he destruction of *slugs*, warm in an or before the fire, a quantity of cab- leaves, until they are soft, then rub with unsalted butter, or any kind of dripping, and lay them in the places d by slugs. In a few hours the leaves found covered with snails and slugs; an has been successfully tried by Mr. n at Bayswater. Earwigs and wood- e destroyed in the same way. For perations, perhaps, the best means of ying slugs and worms is common agent too little known for this pur- et its powers are undoubted.

person has employed common salt for urpose of destroying worms, to a extent than Jacob Busk, Esq., of urn Park, in Hertfordshire. His le experiments have extended over undreds of acres of wheat. To use n words — "In every situation, and ry time, the effect appeared equally ial." The quantity per acre — "about five bushels sown out of a common uttle." The period — "In the g." The effect — "In the morning hrow may be distinguished by the ty of slime and number of dead slugs n the ground. In some fields it has ly been the means of preventing the tion of the whole crop." Six bushels per acre was applied by hand, in 1828, to a field of oats attacked by gs and worms, on the farm of Mr. Slatter, of Draycote, near Oxford. rop was completely saved by this ap- on, although an adjoining field, *not* was entirely destroyed by this sort of n.

, too, is a complete prevention of the s of the *weevil* in corn. It has been sfully employed in the proportion of of salt to a barrel of wheat. I learn an American merchant, that wheat l in old salt barrels, is never attacked se destructive insects. Six or eight ls of salt sprinkled over 100 sheaves in ng, produces exactly the same effect. olders of bonded corn would do well ember these facts. (*Observations on* p. 9.)

kill the *black and green fly*, dip the points of the young shoots infested with them into a thin cream, composed of strong stiff yellow clay mixed with water, the clay will look dirty upon the trees for a few days, but the first shower of rain washes it off, and the shoots will look more healthy than before the application; "there is no fear," says Mr. Loudon, "of the return of the insects that season." The *scale in pines* may be destroyed by the same mixture. *The bug* (*Aphis lanigera*) *upon fruit trees* (see AMERICAN BLIGHT), may be killed by the use of the same clay and water, made as thin as whitewash, and mixing with every 6 gallons of it 2 lbs. of cream of tartar, 1 lb. of soft soap, and half a peck of quick-lime. "When you think," says Mr. Loudon, "that the weather is likely to continue dry for some time, take a bucketful of this mixture, and with a large brush wash over the bark of the trees, wherever you think it has been infected with the bug. A man will dress a number of trees over in a few days with a whitewash brush and this liquid; it is only necessary to be careful to do it in dry weather so that the rain may not wash over the mixture for some time. *Flies and wasps*. A mixture of pepper, sugar, and water, will speedily attract and destroy them. (*Gard. Mag.* No. 37.; *Quart. Journ. Agr.* vol. iii. p. 1071.)

Moss and Insects. — Mr. Thomas recommends that the trees infected should be sprinkled with a fine powder in March, and again in October, on a foggy day when the trees are damp but not dripping, and I have no doubt of its efficacy. It is composed as follows: slake five bushels of lime, hot from the kiln, with common salt and water (say one lb. of salt to each gallon of water). When the lime has fallen to a fine powder, add by small quantities at a time a bushel of soot, stirring it until completely incorporated. Mr. Thomas has found that one man can dust over with the powder fifty trees in a day, and that the moss in the turf under fruit trees thus treated, is also completely destroyed by the application. (*Trans. Soc. Arts.*) *Worms* in grass plats may be readily destroyed by copiously watering the turf with lime water (half a pound of the hottest quick-lime well stirred in each gallon of water), or by sprinkling common salt (20 bushels per acre) over it, or by strewing it on gravel walks in rather larger proportions. Lime is recommended for the destruction of the worm, which sometimes injures young larch plantations, by Mr. Menzies (*Com. Board of Agr.* vol. vi. p. 162.); coal tar and tar water, to preserve hop poles, and other wood, from the ravages of insects. (*Ibid.* p. 166.) The caterpillars on cabbages may be readily destroyed by sprinkling them with fine powdered lime; and when some years since, a black caterpillar attacked very generally and extensively the turnips, in some instances they were very successfully destroyed by turning into the fields considerable numbers of common ducks. Heavy rolling, especially during the night, is in many cases destructive of slugs. Salt, and also rape powder, is pernicious to the wireworm. On many soils, the wheat crop sown after a summer fallow is never attacked by this vermin. Mr. Hillyard thinks he has escaped their ravages of late years, by ploughing his clover lays for wheat after the *first* year. (*Prac. Farm.* p. 115.) And it is certain that, by occasional material variations in the rotation of crops (see Rotation of Crops), the number of predatory insects may be very considerably reduced in cultivated soils by depriving the larvæ of their particular and essential food.

Mr. Knight recommends the use of carbonate of ammonia for the destruction of the insects upon the pine and other plants. (*Selection from Papers*, p. 245.) Mr. Baldwin, in effect, does the same, when he commends the use of the steam from hot fermenting horse dung. (*Prac. Direct.* p. 30.) Mr. Robertson found soot (which contains ammonia), when diffused in water, to be an excellent application. (*Gard. Mag.* vol. ii. p. 18.) When speaking of the use of fermenting horse dung, in the destruction of insects, Mr. Knight remarked, "I conclude the destructive agent in this case is ammoniacal gas, which Sir Humphrey Davy informed me he had found to be instantly fatal to every species of insect; and, if so, this might be obtained at a small expence by pouring a solution of crude muriate of ammonia upon quicklime; the stable, or cow-house, would afford an equally efficient, though less delicate fluid. The ammoniacal gas might, I conceive, be impelled by means of a pair of bellows amongst the leaves of the infected plants, in sufficient quantity to destroy animal without injuring vegetable life; and it is a very interesting question to the gardener, whether his hardy enemy, the red spider, will bear it with impunity." Ammonia seems peculiarly distasteful to insects. Carbonate of ammonia is often successfully placed in meat-safes to prevent the attacks of flies.

IV. *The natural Enemies of Insects.*—Amongst the enemies by which insects are kept in check, may be numbered long-continued rains, late frosts, inundations, storms; and, among the animals, bats, mice, moles, badgers, hedgehogs, squirrels, foxes, &c. Birds devour them by myriads; the greenfinch tears open (says Reaumur) the strong nest of the yellow-tailed moth, and eats the infant caterpillars. The green and red woodpecker, the tree-creeper, and the nut-hatch, commit great ravages amongst the beetles and caterpillars. The starling is equally indefatigable. The chaffinch is ever in search of the eggs of the caterpillar and the moth. Then, again, the titmouse, the ox-eye, the goldfinch, the redbreast, the redstart, and the wagtails, commit great ravages amongst insects. To these may be added the cuckoo, the crow, the frog, the toad, &c. Many insects, such as the ground beetles, devour the pupæ of others. Then, again, there is the numerous order of the Ichneumonidæ, which lay their eggs in the bodies of other insects, and destroy them. "The eggs are hatched within the body of the living insect, and the young parasites, in the most literal sense, fatten on the entrails of their prey. At last the wounded caterpillar sinks, the enemies escape through the skin, and become pupæ; or the caterpillar, notwithstanding its internal parasites, enters the pupa state; but, instead of a butterfly, one or more *Ichneumonidæ* appear. To these wonderful animals we often owe the preservation of our orchards, woods, and grain." (*Loudon's Kollar*, p. 25.) Many other modes besides those I have enumerated, have been suggested, by which the number of the cultivator's predatory insects may be reduced, most of which I shall notice under their respective heads. I am quite of the opinion, however, of the authors of the work I have extensively quoted, "that the most essential and necessary means to be opposed to the serious injuries caused by insects, consists in the universal dissemination of the knowledge of the natural history of hurtful insects amongst farmers, gardeners, foresters, and all those, in fact, who are in any manner connected with agriculture." (*Ibid.* p. 28.)

V. *Of the Insects which live and propagate on domestic animals.*—The chief are lice, which commonly originate from want of cleanliness, poor unwholesome food, or from the weakening effects of other diseases. Old horses are more subject to them than young ones; they are common in sheep, and in swine;, for which the best remedies will be found under their respective heads. (For the bots in horses, see Bot; for those in sheep, see Sheep Bot; for the ox-warble, see Warble.) The forest fly, or horse fly, chiefly on horses. It flies in short flights quickly, and moves about with considerable agility. The female lays but one egg time, from which the fly is hatched. abound in the New Forest. See Horse

The sheep tick, so well known to herds, has no wings; the fore part of small, but the abdomen is lour reddish, with white lines f the abdomen. The farmer following an excellent receipt lipping wash, by which they stroyed:—½ a lb. of powdered , 4½ lbs. of soft soap. Boil arter of an hour, or until the olved, in five gallons of water. he water sufficient to dip fifty quantity of arsenic usually re- s too large. (*Farmer's Al-*

TICKS.

which injure Bees.—There sects which injure bees, such e bee-louse (*Braula cœca*), ut the size of a flea, has no rudiments of four feelers. chiefly populous hives: some- ree are found on a bee. These rb and annoy even the queen ," says M. Kollar, "infested se, endeavours, but to no pur- rid of such an unwished-for st she creeps under a number and rubs off the louse from n it immediately betakes itself another bee. That the pre- arasite causes pain to the bee, m the restlessness with which at the hole and back again. also disturbed in her employ- ying, when she is infested by the hive suffers in another way ment. It may even happen ny of these parasites infest a tern once counted eleven of ust eventually perish. In fected bees usually fall to the rish with cold and hunger." *oudon*, p. 74.) Spiders also but only in their nets. Then aterpillar of the honeycomb- avages are very considerable, ey find their way into a hive. only the wax. Three hundred und in a hive, and there are ns of these caterpillars in a so are very fond of honey, and into hives. Wasps very fre- e same. Bees even rob each

Insects which injure Grain.— umerous; the chief of them ous ground beetle (*Carabeus bus*), the larvæ of which feed leaves and roots of grain. rooks and other useful birds opiously. The German or affer (*Melolontha agricola*): the ears of wheat and rye, in the grain is juicy. The lined (*Elater lineatus*), whose larva is the wireworm, so well known to the English farmer. (See WIREWORM.) Kollar describes this beetle as "blackish with grey hairs, the feelers and legs brownish yellow, and the wing-covers striped with grey." The winter, or dart moth (*Agrotis* (*Noctua*) *segetum*), injures winter grain sometimes very considerably. It generally appears in August, and lays its eggs on loosely broken ground. In two or three weeks the young caterpillars appear: they prey upon the tender leaves and roots of young corn. The white line dart moth (*Noctua* (*Agrotis*) *tritici*). This moth attacks buckwheat and grain sown in autumn. The caterpillar of the *Botys* (*pyralis*) *silacealis* attacks millet. The corn moth (*Tinea granella*) produces a larva, known as the white *corn worm*. It tenants corn granaries, flies only at night, and appears as a moth in May, June, and July. It is only in these months, and in August that the larvæ devour the grain. They destroy both wheat, rye, barley, and oats. From September to May, it must be sought for in the cracks of the walls and floors, where it lies wrapped up in its cocoon, until it reappears in April or May, as a fluttering moth. (See CORN MOTH.) The Hessian fly (*Cecidomyia destructor*) is a small midge, which preys upon the wheat plant; as does the wheat midge (*Tipula tritici*). The barley midge (*Tipula cerealis*) attacks the barley and spelt plants.

VIII. *Insects which injure Meadows.*—This is also a very numerous class. "Most of the insects that choose the various sorts of corn for their food (says M. Kollar) "do not reject the other sorts of grasses, in the meadows. The herbage of the meadows has also often peculiar enemies, which are very difficult to find out, and destroy. In most cases the meadows suffer from the roots of the grass plants being injured, which is chiefly occasioned by the larvæ of various species of cockchaffers, living in the earth. When bare spots are seen on meadows we may be pretty sure that the larvæ of the cockchaffer are there carrying on their work of destruction. (*Trans. by Loudon*, p. 126.) The sub-turf plough disturbs the operations of these vermin; the crows devour them. The unspotted lady-bird or lady-cow (*Coccinella impunctata*); the migratory locust (*Locusta migratoria*); these are only rarely met with in our islands. The rye-grass moth (*Liparis* (*Bombyx*) *morio*); the antler or grass moth (*Noctua* (*Episema*) *graminis*); these, especially in Germany, are all considerably injurious to the grasses.

IX. *Insects injurious to cultivated Vegetables*—Are also numerous, and highly injurious to the gardener's crops. The spring beetle or skip-jack (*Elater sputator*) often *garis*). This insect is often peculiarly injurious to the German cultivators. It does not confine its ravages to the garden crops, but injures very materially those of the meadow and corn fields. It measures, when full grown, about two inches in length. The painted field-bug (*Cimex ornatus*); the plant-lice (*Aphis*) chiefly haunt the cabbage, peas, and beans. They are devoured in great numbers by several of the lady-birds and fly tribes. The large cabbage white butterfly (*Papilio* (*pontia*) *brassicæ*); the small white butterfly (*P. p. Rapæ*); the green-veined white butterfly (*P. p. napi*), (whose caterpillar dwells on cabbages, turnips, and mignionette); the gamma moth (*Noctua* (*Plusia*) *gamma*); the white line brown-eyed moth (*Noctua* (*Mamestra*) *oleracea*); the cabbage-garden pebble moth (*Botys* (*Pyralis*) *forficalis*); the carrot moth (*Tinea* (*Hæmilis*) *daucella*); the onion fly (*Anthomyia Ceparum*); the cabbage fly (*A. Brassicæ*); the lettuce fly (*A. Lactucarum*); the negro fly (*Psila Rosæ*), which also attacks the carrot, are the chief insects injurious to the gardener.

X. *Insects which injure Greenhouse Plants.* — Of these I need only mention the *Forficula auricularia* (see Earwig); the orange scale insect (*Coccus hesperidum*); the pine-apple scale insect (*Coccus bromeliæ*); the mealy bug (*Coccus Adonidum*); the oleander scale insect (*Aspidiotus Nerii*) abounding on oleanders, acacias, aloes, palms, &c.; the rose-scale (*A. Rosæ*), found in old rose stems and twigs; the cactus-scale (*A. Echinocacti*), on the cacti; the sweet-bay-scale (*A. Lauri*), on the sweet bay; the rose-moth (*Tinea* (*Ornix*) *rhodophagella*); and the plant-mite or red spider (*Acarius telarius*).

XI. *Insects which attack Fruit Trees.*—The

(*Gastropacha*) *neustria*),
all kinds of trees, both everg
ciduous; it only appears at nig
The gypsey moth (*Bombyx* (*I*
appears in August. The goat
(*Cossus*) *Ligniperda*); the ca
dreaded moth lives upon the w
fruit trees. It is one of the
moth tribe, measuring four inc
and lives deep in the interio
although the walnut and ot
are its favourite abode, it is
the oak and the elm. The
moth (*Bombyx* (*Cossus*) *Æ*
chiefly in the trunks of the el
and apple trees, during the
gust. The figure-of-8 moths
sema) *cæruleocephala*) are m
on the leaves of the black a
almond, apricot, and peach tr
pillars arrive at their full size
winter moth (*Geometra* (*Aci*
appears in November, its c
green looper) in the sprin
brindled beauty moth (*G*
pilosaria) appears in March
lime looper or mottled umbre
(*Geometra*) *defoliaria*) appear
The small ermine moth (*Tinea*
padella) arrives in June o
July, and haunts the app
codling moth (*Tortrix* (*Ca*
monana): the small reddish
in early pears and apples i
of this moth; it may be see
ing in May depositing its eg
which produce these frui
grub of the plum (*T. C. n*
moth which produces this
large as a house fly. It chie
bark of the plum tree

ıpple tree. The stem-boring
?. *Alliariæ*) bores into young
grafts. The apple weevil
omus) *pomorum*) attacks the
ear weevil (*C. A. Pyri*) tenants
, destroying its blossom-buds,
leaf-buds. The oblong weevil
usus) *oblongus*) devours the
trees—as does the red-footed
rus rufipes), and the garden
lontha (*Anisoplia*) *horticola*).
ırk beetle (*Bostrichus dispar*)
at an interval of several years.
k beetle (*Scolytus hæmorrhous*)
rk of apple trees. The common
ıg scolytus (*Scolytus destructor*)
ine its ravages to the elm, but
other fruit trees often suffer
om its attacks; it penetrates
the inner bark. The plum saw-
lo morio) attacks chiefly the
s, as the pear saw-fly (*T.*
is) ravages the pear-tree, de-
eggs in May or June on the
peach or poplar saw-fly (*T.*
ks only the leaves. The
(*Chermes pyri*) besets the
dwarf pear-trees in May and
ıe subsequent months. The
aphides generally confine their
ırf fruit trees. There are three
s—the *A. pyri mali*, *A. pruni*,
æ. The pear midges (*Sciara*
midbergeri) attack chiefly the
ear, as do the black gall midges
nigra).

ts injurious to Forest Trees.—
ivided by M. Kollar into two
Those which attack deciduous
. those which are injurious to
ns.

destructive to the deciduous
cockchaffer or May bug (*me-*
aris). (See COCKCHAFFER.)
ionary moth (*Bombyx gastro-*
ionea) deposits its eggs deeply
The satin moth (*B.* (*Liparis*)
the same on the willow and
The ruff-tip moth (*B.* (*Pygæra*)
one of the few which attack
is found also on the oak,
elder, and willow. It appears
June.

ects which attack the Fir and
—These often injure very se-
eaves, bark, and young shoots
he Pinus tribe. The most de-
e the pine-tree lappet-moth
lastropacsa) *Pini*), chiefly on
es; the black arch moth (*B.*
onacha), chiefly on the white
; and the pine saw-fly (*Ten-*
this last appears in April, and
continues till July. Besides the above there are several others, such as the fox-coloured saw-fly (*Tenthredo* (*Pteronus*) *rufus*); the red-headed saw-fly (*T.* (*Pamphilius*) *erythrocephala*), which in a minor degree injure the fir tribe.

Such then is a very brief glance at that immense and important class of animals, which are included in the science of entomology. It must be considered, to use the words of Mr. Swainson, only as suggestions and stimulants to further inquiry. The review, however, cannot but fill us with astonishment; for although we see only a very limited portion of the insect world (and even the microscope, it is probable, does not enable us to see all), yet that view, limited as it is, is fraught with instruction to the cultivator. It will lead him perhaps to a clearer understanding of the often-repeated truth, that nothing is created in vain. It may suggest to him also the means in some cases of arresting their ravages, when by their excessive numbers they become a nuisance, and it may perhaps be instrumental in saving from destruction many a rook or other useful bird when the sportsman is made aware of the number of predatory insects which they so unceasingly destroy. The astonishing number, habits, and instincts of the insect tribe too are equally instructive, and can only be explained in one way. These phenomena did not escape the notice of the great Paley. Thus he observes, "Moths and butterflies deposit their eggs in the precise substance, that of a cabbage for instance, from which not the butterfly herself, but the caterpillar which is to issue from her eggs, draws its appropriate food. The butterfly cannot taste the cabbage; cabbage is no food for her; yet in the cabbage, not by chance, but studiously and electively, she lays her eggs." (*Nat. Phil.* p. 306.) And when referring to this immense mass of animal life, he says, in another place, "To this great variety in organised life the Deity has given, or perhaps there arises out of it, a corresponding variety of animal *appetites*. For the final cause of this we have not far to seek. Did all animals covet the same element, retreat, or food, it is evident how much fewer could be supplied, and accommodated, than what at present live conveniently together, and find a plentiful subsistence. What one nature rejects, another delights in. Food which is nauseous to one tribe of animals, becomes, by that very property which makes it nauseous, an alluring dainty to another tribe. Carrion is a treat to dogs, ravens, vultures, fish. The exhalations of corrupted substances attract flies by crowds. Maggots revel in putrefaction." (*Ibid.* p. 345.)

change should come over it, so complete, as that not a lineament of its first form was retained; that in this state, after remaining a misshapen lump to all appearance inanimate, it should suddenly burst forth, full of life and joy, and with many-coloured wings ascend into mid air, and derive its only sustenance from the nectar of flowers;—all this we say is one of those miracles of Nature, which, were it told of an insect that had never yet been seen, the world would not believe." (*Nat. Hist.* "Insects," p. 81.; *Swainson* and *Shuckard's Treat.*; *Kollar on Insects*; *Mr. J. Duncan, Quar. Journ. Agr.* vol. viii. p. 96—348.; vol. ix. p. 1. 394. 563.; vol. xi. p. 59—362.; vol. xi. 128. 252. 355.)

INSPISSATED. Thickened, in botany, spoken of sap and other liquids.

INSTEP. In farriery, a name given to that part of a horse's hind leg, which reaches from the ham to the pastern joint.

INSURANCE. One means of security against fire. The farmer being constantly surrounded by much combustible matter, should never omit rendering himself safe by insuring his stock of every kind, in some public office, instituted for this purpose.

The legislature has wisely afforded very considerable facilities to the insurance of farming stock. By the act of 3 & 4 W. 4. c. 23. s. 5., *farming stock* is exempted from duty. "The Farmer's Insurance Institution" of London insures it at 1*s*. 9*d*. per cent., *without* the average clause; thus easily repaired are the ravages of the incendiary, of accidental fires, and lightning. To small farmers and others, also, the legislature, by the 5 & 6 W. 4. c. 64., has increased the facilities for *life* insurance, by reducing the stamp duty for policies under 50*l*. to 2*s*. 6*d*., and under

breach of the covenant to ins
Chancery will not relieve th
v. *Warner*, 2 Merrivale, 4
Bridges, 4 Simons, 96.).

And it will be a breach
to insure, the suffering the
main uninsured for ever so
even if no damage ensues
omits to pay the premium w
days allowed by the office
3 Campbell, 137.).

A tenant has no equity to
lord who has received mon
surance office, to expend it
premises being burnt down
premises, or to restrain th
sueing for the rent, until t
rebuilt (*Leeds* v. *Cheetham*,

INTEGUMENT. The
or skin of an animal; it is
same sense as a synonyme
husk or exterior covering

INUNDATION. (Lat
inondation.) An excessive o
Sir John Hall (*Trans. Hi*
p. 440.) suggests a plan fo
evils arising from great a
dations in *hilly* countries, w
making at the upper end
steep-sided defile which
into a plain of some exten
arch, just sufficient by cal
tain the harmless flood, and
a mound, also essentially
the principle of the arch,
strength fully sufficient to
waters of a destructive flo
then gradually run off in a
after the rain had ceased
melted. Of the expense of
taking (concludes Sir John

rium.) A detailed account taken of
ng upon a farm. Inventories of the
kinds of farming stock should be
annually, at the close of the year.
OKKEEPING and APPRAISEMENT.

OLUCRE, or INVOLUCRUM. In
the bractes (or small leaves placed
e calyx, or the peduncle or pedicil)
surround the flowers or the umbels.
els are the partial involucres of um-
ous plants. (*Paxton's Bot. Dict.*)

(From *iris*, the eye; alluding to
iety and beauty of the colours of the
This extensive genus has long
s it still continues to be, a great fa-
in the flower-garden. "The sword-
sorts (says Sweet) do best in a light
soil, and increase freely by suckers
e roots or by seeds. The tuberous-
cies are more difficult to cultivate,
ive best in a mixture of loam, peat,
d, as does also the tribe to which
ca belongs, as *I. alata*, *I. caucasica*, *I.*
a, &c. The common bulbous species
in any garden soil, the more sandy
er." *I. tuberosa* is aromatic as well
ic and purgative, and *I. versicolor*
erna are used in the United States as
es. (*Paxton's Bot. Dict.*) Two
of iris only are indigenous to this

e yellow water iris, or flower-
(*I. pseud-acorus*), which grows
ditches, pools, and rivers, and
handsome ornament for the banks
s and streams, blowing from three
arge bright yellow flowers in July.
ot is horizontal, depressed, brown,
ringent; the stem three or four feet
leaves erect, ribbed, grass-green.
ks of the larger segments of the
are pencilled with dark purple.

inking iris, or Gladwyn. Roast-beef
(*I. fœtidissima.*) This species grows
es, thickets, and under hedges, but it
r rare. Dr. Withering, however, ob-
it to be very common in all the
est counties. It is a perennial;
to about two feet high; the leaves
green, exhaling, when rubbed, a
ompared to that of roast beef, to
it is no compliment. The flowers
ppear in May are dull pale purple,
d with dark veins. Seeds, orange-
d, polished. (*Eng. Flor.* vol. i. p.

r only mentions 19 species of cul-
irises, but there are now nearly
wn species and varieties. Two or
ly are much admired as ornamental
The *I. xiphium* is a bulb from
blowing blue, white, yellow, and
owers in June. The *Persian* iris blows a fragrant flower in March and April: plant the bulb in October, in a pot filled with equal quantities of fine mould and sand, and house it during frost. The dwarf iris is ornamental in clusters, in a garden: it grows only three inches high, and blows in April. Part its roots in autumn. The *Siberian* iris blows in June, and likes a moist situation: it bears flowers, whose falling petals are blue, and the upright ones dark purple; its stem is tall, and its leaves are narrow. *I. susiana*, or fleur-de-lis. This iris was said by Clusius to be derived from Susa, the capital of Susiana, an assertion which Sir J. E. Smith has refuted; and he added reasons for believing that it is a native of a more northern clime. The Turkish name for an iris is *susam*, derived from the Hebrew Susan or Schuscham, a lily. (*Linnæan Trans.* vol. xi. p. 228, 229.) The plant is tuberous-rooted, loves a good soil, and should be removed every three years. It flowers handsomely in June, bearing varieties of pale blue, deep blue, and striped or blueish white flowers. Its odour is feeble, but it is fetid. These are the most favourite kinds in gardens. The *I. florentina*, which is occasionally seen in our gardens, yields the orris root, which is the dried and peeled rhizomes of the plants. Orris root is prized chiefly on account of its odour, which resembles that of the violet. It is added on this account to tooth powders and hair powder. A hazardous custom prevails of giving the entire root to infants to gnaw during teething; but fatal results have followed this custom.

IRISH SHEEP. See SHEEP.

IRISH HEATH. (*Menziesia polifolia.* Named in honour of Archibald Menzies, F. L. S., surgeon and naturalist to the expedition under Vancouver, who collected many specimens of plants from America, New Holland, &c.) This is a very ornamental genus of plants, which thrive best in sandy peat, or very sandy loam; and cuttings taken off close to the plant will root in sand, under a glass placed in heat, or they may be multiplied from seeds, &c. (*Paxton's Bot. Dict.*)

IRRIGATION. (Lat. *irrigo*, to water.) In agriculture, the watering of the earth, to increase its productiveness. The term, however, is confined to that species of flooding which consists of spreading a sheet of water over a field or meadow, in such a manner that it can be easily withdrawn.

Irrigation, or the artificial watering of the earth, chiefly to produce increased crops of grass, has been in use from a very early period. In Oriental countries, in fact, the heat of the climate is such, that, in many situations, the now productive soil would be tice when he reminded the Israelites of their sowing their corn in Egypt, and watering it with their feet (*Deut.* xi. 10.; 2 *Kings*, xix. 24.), and in the sandy soils of Arabia the same system is still continued. (*Niebuhr*, vol. i. p. 121.) According to Dr. Shaw, the following is the modern mode of raising and using the water of the Nile for the purpose of irrigation in Egypt. "Such vegetable productions as require more moisture than what is occasioned by the annual inundation of the Nile, are refreshed by water that is drawn at certain times out of the river, and lodged in large cisterns made for that purpose. The screw of Archimedes seems to have been the instrument formerly made use of for that purpose, though at present the inhabitants either supply themselves with various kinds of leathern buckets, or else with a *sakiah*, as they call the Persian wheel, which is the most useful and generally employed machine. Engines and contrivances of both these kinds are placed all along the banks of the Nile, from the sea to the cataracts, their situations being higher, and consequently the difficulty of raising the water being greater, as we advance up the river. When their pulse, saffron, melons, sugar-canes, &c. (all of which are commonly planted in rills), require to be refreshed, they take out a plug from the bottom of the cistern, and then the water gushing out, is conducted from one rill to another by the gardener, who is always ready, as occasion requires, to stop and divert the current." In Egypt, at the present day, according to Dr. Clarke, the water is sometimes raised, for the purposes of irrigation, by means of a wicker basket lined with leather, which is held by cords between two men, who, by this laborious

pious supply of water can
tained for the purposes of
the quantity thus require
as to be beyond the pow
engine to supply; thus, to
rate a square yard of a ca
with water to the depth of
rigation, requires about 3
equal to about 145,000 ga
acre. Now, that the st
readily and profitably su
of water, may be conclu
facts; thus, the two engin
the other of sixty hors
keep Deeping Fen, nea
pletely drained, when
only ninety-six days, of
raised more than 14,000,
several feet. The district
contains about 25,000 a
Mag. N. S. vol. iii. p. 30
otherwise be a complete
has been proved that, b
densing steam-engine, on
will raise more than 50,00
one foot. In many sit
where, for the purposes o
river water can be copio
fuel is at a moderate pri
that great results are yet
the aid of mechanical po
steam-engine, the soils of
adapted for irrigation, m
brought into cultivation;
poor sands and gravels on
of many of the English a
many of whose waters, fr
with organic matter, the c
phate of lime, and various
are excellent for the use o

f the earth have certainly em-
s process for a period previous to
Virgil (*Georg.* lib. i. v. 106-9.),—

s fluvium inducit, rivosque sequentes—

ill carried on with a zeal and care
the art they practise. M. P. Cato,
t of the Roman writers upon
e (150 years before Christ), in
chapter, told the Italian farmers
e water meadows if you have
l if you have no water, have dry
The directions of Columella
ve all the freshness of a modern
hem. He was the first who noticed
r nutrition afforded by the hay
r meadows. "Land," says he,
aturally rich, and is in good heart,
eed to have water set over it;
tter hay which nature, of its own
duces in a juicy soil, than what
ws from a soil that is overflowed.
ver, is a necessary practice when
y of the soil requires it; and a
ay be formed either upon a stiff
il, though poor when water may
it; neither a low field with hol-
a field broken with steep rising
re proper; the first, because it
oo long the water collected in
s; the last, because it makes the
too quickly over it. A field,
hat has a moderate descent may
meadow, whether it be rich, or
l as to be watered; but the best
s where the surface is smooth, and
t so gentle, as to prevent either
r the rivers that overflow it, re-
o long; and, on the other hand, to
water that comes over it quietly
f; therefore, if in any part of the
ded for a meadow, a pool of water
nd, it must be let off by drains,
s is equal either from too much
oo little grass." (*Col.* lib. ii. c. 16.)
us that "meadows ought to be
mmediately after the spring equi-
the waters restrained whenever
shoots up into stalk." (*Nat. Hist.*
c. 27.) When, after the fall of the
mpire, agriculture, in common with
sciences, rapidly declined, a very
le exception to this melancholy re-
very and despotism was presented
of irrigation, which was carried on
ded through the long period of the
with equal zeal and success. This
especially the case in Lombardy,
as certainly prosecuted on a very
profitable scale long before 1037.
es of Lombardy patronised and fol-
example of the various religious
ents, which then monopolised all the wealth and learning of the land, in extending the employment of water in all possible directions. The monks of Chiazevalle, in particular, were so celebrated for their knowledge of this branch of agriculture, and of hydraulics in general, that the emperor, Frederick the First, in the thirteenth century, very gladly sought their advice and assistance. This system has ever been zealously and carefully extended and improved, in every possible way. The waters of the chief rivers of the north of Italy, such as the Po, the Adige, the Tagliamento, and of all the minor streams, are employed in irrigation. There is no other country which possesses an extent of rich water meadows equal to that of the Lombards. The entire country from Venice to Turin may be said to be formed into one great water meadow: yet the irrigating system is not confined to grass lands; the water is conveyed into the hollows between the ridges in corn lands, into the low lands where rice is cultivated, and around the roots of vines. From Italy the practice extended into the south of France, into Spain, and then into Britain. In the States of Lombardy, the water of all the rivers belongs to the state; in those of Venice, the government extends its claims to that of the smallest springs, and even to collections of rain water, so highly, for the use of the cultivator, is water of every kind valued in the north of Italy. It is necessary, therefore, in Lombardy, to purchase from the state the water taken from the river; this may be taken, by means of a canal, through any person's grounds, the government merely requiring the payment of the value of the land to the proprietor, and restraining him from carrying his channel through a garden, or within a certain distance of a mansion. The water is sold by the government at a certain rate, which is regulated by the size of the sluice, and the time the run of water is used; this is either by the hour, half-hour, or quarter, or by so many days at certain periods of the year; the right to these runs of water is regularly sold like other property. Arthur Young gives an account of the sale of an hour's run of water through a sluice near Turin, which produced, in 1778, 1500 livres. The rent of the irrigated lands in the north of Italy is, upon an average, more than one-third greater than the same description of land not watered. (*Com. Board. of Agr.* vol. vii. p. 189.)

In Bengal, wells are dug in the highest part of their fields, and from this, by means of bullocks and a rope over a pulley, water is raised in buckets, and conveyed in little channels to every part of the field. No attempts at cultivation are here made without the assistance of water, obtained by some mode or other. (See INDIA, AGRICULTURE OF.) The art of irrigation was not confined to the Old World. The Mexicans practised it long before the days of Columbus; they collected the mountain torrents, and conducted their waters to their lands in proper channels, with much care and address. It was only towards the termination of the seventeenth century that water meadows were constructed in Britain upon any thing like a regular system. Of these, those in Wiltshire, which are amongst the most celebrated in England, especially those in the Wyley Bourn, were made between 1700 and 1705. Those of Hampshire and Berkshire were constructed about the same period, but they were at first formed very inferior to the modern noble water-meadow lands of those counties. Great improvements were made towards the conclusion of the eighteenth century, through the publications of G. Boswell on Meadow Watering in 1780, and of the Rev. T Wright of Auld, in Northamptonshire, whose writings appeared at intervals from 1789 to 1810. It is noticeable that the water employed for these celebrated southern meads is perhaps the most clear and swift flowing of all the English rivers: issuing from the chalk-formation, it is equally copious and transparent. Some of the chief advantages, therefore, of irrigation may evidently be derived from almost any description of water; for it is proved by the good effects produced by the brilliant chalk-waters of the south of England, and the still greater fertilising effect of those surcharged with organic matter, as in the Craigintinny meadows, near Edinburgh, that there is no water too bright or too full of impurities, to be useless for the purposes of irrigation.

I propose in this paper to investigate the chemical properties of river water, and of the effects produced by it in irrigation, adding a few remarks upon the practice of the best and most skilful cultivators of the water meadows of the south of England.

1. With regard to the composition of river water, there have been several chemical examinations; that of the Thames was analysed by Dr. Bostock, who found, in 10,000 parts after most of its mechanically suspended matters had subsided, about 1¾ parts of foreign substances, viz.—

	Parts.
Organic matters - -	0·07
Carbonate of lime - -	1·53
Sulphate of lime - -	0·15
Muriate of soda - -	0·02

In an equal quantity of the waters of the Clyde, Dr. Thomson found 1¼ part of solid substances, namely,—

	Pa
Common salt - - -	0
Muriate of magnesia - -	0
Sulphate of soda - -	0
Carbonate of lime - -	0
Silica - - - -	0

The water of the Itchen in Ham
one of the most celebrated of all the
streams, for the use of the irri
found, in 10,000 parts of its wate
2½ parts of solid matter, viz.:—

Organic matter - -	
Carbonate of lime - -	
Sulphate of lime - -	
Muriate of soda - -	

From an examination of the substan
in these streams (and they afford
correct view of the contents of mos
the farmer will see that they all
gredients which are the food or nat
stituents of the grasses. Thus, sul
carbonate of lime are found in mos
and there is no river-water which
contain, in some proportion or
ganic matter. To ascertain, theref
ther pure water was alone able to
the magic effects of irrigation, it w
sary to employ other water tha
rivers, lakes, or even springs. Pu
as obtained by distillation, there
been tried as a supporter of veget
it was found totally inadequate to
port of plants,—they merely vege
a time, but they could not, by a
be made to perfect their seeds.
conclusion, the experiments of Dr.
and of MM. Saussure and Hassen
tirely agree. Pure water, theref
withstanding the dreams of the G
losophers, and the celebrated dec
periments of Van Helmont with
tree, is not able to support the
the grasses. Van Helmont's tree
planted it in an earthen pot, wei
pounds; the earth previously dr
oven, weighed 200 pounds; after
it weighed 164 lbs., although it
watered during that time with
and distilled water, and the earth
only two ounces of weight. He
Van Helmont and his disciples, wa
sole food of plants. Bergman, in 1
pointed out the source of error. He
from the experiments of Margraff,
rain-water contained a sufficient
of earth to account for the increas
in the willow, every pint of rain-wa
taining one grain of earth. Then, a
earthen vessel (which was sunk in th
would in this experiment tran
moisture impregnated with all kind
luble substances. And yet, it h

at impure water, such as that from r from a dunghill, is alone suffi- sustain vegetation. This was idenced in the experiments of M. s; for he found, that plants placed earth, such as silica or alumina, they would not grow when wa- h pure water only, yet, when with the liquid drainage of a they flourished very luxuriantly, ct has been also proved in another has been shown by chemical ana- the quantity of solid or earthy sorbed by plants, is in exact pro- the impurity of the water with y are nourished. Thus, equal of some plants of beans, fed by ater, yielded

	Parts.
matters or ashes - -	3·9
d by rain water - -	7·5
own in garden mould -	12·0

cts strongly confirm the conclu- me of the most sagacious cultiva- he chief advantages of irrigation table to the foreign substances the water is charged, although, elsewhere observed, almost every s a mode of accounting for the ilising effects of irrigation,—one *ools* the land, another that it keeps *warm* in winter. And this was inion. He thought that a winter otected the grass from the inju- ts of frost He says, "Water is specific gravity at 42° than at freezing point; and hence, in a rigated in winter, the water im- in contact with the grass is rarely a degree of temperature not at icial to the living organs of plants. the month of March, I examined rature in a water meadow near d in Berkshire, by a very delicate ter. The temperature of the air morning, was 43°. In general, rs which breed the best fish are tted for watering meadows, but e benefits of irrigation may be de- any kind of water."

re the opinions of Davy as to the properties of water. It is to be that the opportunities for agricul- rvations of this great chemical r were so few, for his valuable ere always cautiously made. He owever, as I have remarked else- rer to have steadily investigated cal composition of river-water d to its uses in irrigation, and, in ce, knew little of the value of impurities to vegetation. Thus, -water contains gypsum, (sulphate of lime,) which it certainly does—if the water is *hard*, it must, under ordinary circumstances, on this account alone be highly fertilising to meadows, since all grasses contain this salt in very sensible proportions; for, calculating that one part of sulphate of lime is contained in every two thousand parts of river water, and that every square yard of dry meadow soil absorbs only eight gallons of water (and this is a very moderate allowance, for many soils will absorb three or four times that quantity), then it will be found that, by every flooding, more than one hundred weight and a half of gypsum per acre is diffused through the soil in the water, a quantity equal to that generally adopted by those who spread gypsum on their clover crops, lucern, and sainfoin, as a manure, either in the state of powder, or as it exists in ashes. And if we apply the same calculation to the organic substances ever more or less contained in flood waters, and allow only twenty parts of animal and vegetable remains to be present in a thousand parts of river water, then we shall find, taking the same data, that every soaking with such water will add to the meadow nearly two tons per acre of animal and vegetable matters, which, allowing, in the case of water meadows, five floodings per annum, is equal to a yearly application of ten tons of organic matter.

The quantity of foreign substances present in river water, although commonly less, yet very often exceeds what I have thus calculated to exist in it. I have found it impossible, however, to give, from analysis, the amount which, under ordinary circumstances, is present in river waters, with any tolerable accuracy, since the proportion not only varies at different seasons of the year, but a considerable proportion of the merely mechanically suspended matters subside, when the specimen water is suffered to rest. In my conclusions with regard to the theory of irrigation, I have found many excellent practical farmers concur. Thus, Mr. Simmons of St. Croix, near Winchester, considers that the great benefit of winter flooding for meadows is derived, in the first place, from the deposits made by the muddy waters on the grass; and, secondly, from the winter covering with water preventing the ill effects to the grass of sudden transitions in the temperature of the atmosphere. This gentleman is perfectly aware of the value of the addition of the city drainage of Winchester to the fertilising qualities of the Itchen river water, and of its superiority for irrigation after it has flowed past the city, having water meadows both above and below the town; and he finds that, if the water has been once used for irrigation, that then its fertilising properties are so materially reduced, that it is of little value for again passing over the meadows; and so convinced is he of this fact by long experience, that, having in this way long enjoyed the exclusive and valuable use of a branch of the waters of the Itchen for some grass land, a neighbour higher up the stream followed his example, constructing some water-meadows, and using the water before it arrived at those of my informant, who, in consequence, found the water so deteriorated in quality (though not sensibly diminished in quantity), that he had once thought of disputing the right with his more upland neighbour. The experience of other irrigators tends to the same conclusion. In the best managed water meadows of Hampshire the farmer does not procure annually more than three crops of grass; yet in situations where a richer water is employed, as near Edinburgh, four or five are readily obtained. It is evident, therefore, that the chemical properties of water have a much greater influence in irrigation than is commonly believed. The quality of the water, therefore, employed for the purposes of irrigation, is of the first importance to be well understood by the farmer; and although many more modern discussions have taken place upon the subject, yet the definition which the great Lord Bacon gave, in his Natural History, of the advantages of "Meadow Watering," has never been excelled,—"that it acts not only by supplying useful moisture to the grass, but likewise by carrying nourishment dissolved in the water." This nourishment is, generally speaking, composed almost entirely of the animal and vegetable matters mechanically suspended or chemically dissolved in the water;—the fouler the water the more fertilising are its effects. The objection which has been sometimes urged to this explanation, by instancing the prejudicial effects of some very thick muddy waters (as those of the Humber) on meadow lands, is very erroneous; for, in those cases, the mud deposited on the grass did not consist of animal or vegetable matters, but of fine earthy particles, such as clay or chalk, substances of which the alluvial soil, on which the same flood waters had for ages occasionally deposited their earths, was in fact entirely composed, and to which, in consequence, any farther supply was almost useless, the earthy slime merely covering the grass with mud, without adding a single fertilising ingredient not already abounding in the soil. If, however, the soil is naturally deficient in any of the earthy ingredients contained in the water, then even such flood waters are ever found most fertilising.

"The agency of water in the
vegetation," says Mr. Stephens,
till of late been distinctly perce
Hales has shown that, in th
months, a sunflower, weighing th
avoirdupois, and regularly wat
day, passed through it or perspir
two ounces each day, that is, half
Dr. Woodward found that, in
seventy-seven days, a plant
spearmint increased seventeen
weight, and yet had no other fo
rain water; but then he found
creased more in weight when
spring water, and still more w
was Thames water." (*Practic*
p. 2.) And when speaking of t
some irrigators think clear
equal to any, he adds (p. 24.),
recommend to those who are
opinion, to inspect the irrigat
which are watered by the wasl
city of Edinburgh, where, I tru
find the superiority of muddy
of clear spring water most stril
fested."

Edinburgh has many advanta
most of her sister cities; the
of excellent spring water is
greatest blessings to her nume
ants, both in respect to househ
and keeping the streets clean,
rigating the extensive meado
below the town, by the rich st
carries along in a state of
where the art of man, with
sewer water, has made sand
duce riches far superior to any
kind in the kingdom, or in
country.

By this water, about two hu
of grass land, for the most pa
catch-work meadow, are irrigat
130 belong to W. H. Miller, Es
intinny, and the remainder to
Haddington and Moray, and ot
tors. The meadows belonging
blemen, and part of the Craigi
dows, or what is called the ol
containing about 50 acres,
irrigated for nearly a century.
by far the most valuable, on ac
long and continual accumulatio
sediment left by the water;
water is so very rich, that the t
meadows lying nearest the town
it advisable to carry the co
water through deep ponds, into
water deposits part of the supe
nure before it runs over the gr
though the formation of these
irregular, and the management
fect, the effects of the water are

roduce crops of grass not to be
d, being cut from four to six times
and the grass given green to milch

rass is let every year by public sale,
patches of a quarter of an acre and
, and generally brings from 24*l.* to
acre per annum. In 1826, part of
of Moray's meadow fetched 57*l.* per
annum.

forty acres of the Craigintinny
re formed into catch-work water
before the year 1800, which com-
hat is called Fillieside Bank old
, and is generally let at from 20*l.*
r acre per annum. In the spring
thirty acres of waste land, called
gate Whins, and ten acres of poor
il, were levelled and formed into
meadow, at an expense of 1000*l.*
ure of the Freegate Whins was let,
y to this improvement, for 40*l.* per
and the ten acres for 60*l.* They
g from 15*l.* to 20*l.* per acre per an-
may be much improved by judi-
aying out 200*l.* more in better
that part next the sea, and carry-
ger supply of water to it which
easily done without prejudice to
meadows.

erhaps, is one of the most benefi-
ultural improvements ever under-
or the whole of the Freegate Whins
sed of nothing but sand, deposited
e to time by the action of the waves
a. Never was 1000*l.* more happily
agriculture; it not only required a
sewer to bring about this great
but a resolution in the proprietor
out his capital on an experiment
oil of such a nature.

the making of the Freegate Whins
er meadows, Mr. Miller has levelled
ned forty acres more of his arable
o irrigated meadow, worth, before
ation, 9*l.* per acre per annum. It
require a few years before these
will be as productive as the for-
it is evident that the longer water
ed to run over the surface of grass
e greater quantity of fertilising
e will be collected; therefore, as
er is so very superior in quality to
r water, a speedy return for the ca-
d out may be expected. The ex-
keeping these meadows in repair
10*s.* to 15*s.* per acre per annum,
more than double the expense of
water meadows in repair in general.
no means, however, follows, as a
ry result of any contemplated im-
ent in irrigation, that the water
previously undergo a chemical examination. There are many other modes by which the farmer can form a pretty correct conclusion, as to the fertilising properties of the water he proposes to employ.

The surest proofs, says Mr. Exter, of the good quality of water (and the observations of this gentleman will be readily confirmed by the irrigators of the southern counties), as a manure, are the verdure of the margin of its streams, and the growth of strong cresses in the stream itself; and wherever these appearances are found, though the water be perfectly transparent, the occupier of the soil through which it flows may depend, in general, on having a treasure, if he is attentive to it; but that this is not invariably the case, and that there are instances where a good water will not improve the herbage of certain soils, is proved by the following account (and there are several other cases with which I am acquainted) of the meadows of Mr. Orchard, of Stoke Abbey, Devon. These two meadows are situated on the side of a hill, their aspect nearly south,—the superstratum a fine rich loam, from eight to ten inches deep, on a substratum of strong yellow clay. No difference whatever can be seen by the naked eye, in either the upper mould or the substratum, or in the herbage growing on the surface of them; except that, in the lower part of one, a few rushes appear, in consequence of some small springs which rise near them, but the water from them is not sufficient to render any part of the land poachy. At the head of the two meadows is a large pond, formed by the collecting of some small runs of spring water rising near it, and which is also improved by the wash of a small farm-yard adjoining, which, of course, must add to its efficacy as a manure. When this water is thrown over one of the meadows, it produces the richest herbage in abundance, and this field is regularly mowed for hay; on the other meadow, though repeatedly tried, it produces no good whatever. (*Ann. of Agr.* vol. xxx. p. 206.)

This result is attributable to the superior tenacious, retentive quality of the substratum of the lower field, or of some chemical difference in the composition of the soil; and although almost any description of soil is adapted to the formation of water meadows, those of a heavy clay description are generally the most unsuitable, those of a light or peaty kind are better, and those with a sandy or very absorbent gravel substratum still more so. There are some of the most celebrated water meadows on the banks of the Kennet of this description, and many of the best on the banks of the Wiltshire Avon have a mass of broken, porous flints for a subsoil.

Those near Edinburgh, irrigated by the city drainage, rest upon the sands thrown up by the sea.

It is evident, therefore, that it is as important an object in the construction of these meadows to secure a ready and rapid exit for the flood-waters, as to procure, in the first instance, a copious and fertilising supply.

The farmer is generally well aware of the injurious effects to his meadows of suffering the water to remain too long on them. He watches, therefore, with much care, for the first indications of fermentation having commenced, which is evinced by the rising of a mass of scum to the surface of the water — putrefaction is now beginning in the turf, and he knows very well that if the water is not speedily removed, that his grass will be either materially injured, or entirely destroyed; he hastens, therefore, to open his water-courses. There are some soils in the vicinity of Standen in Berkshire, however, of so porous a quality, that they need not any drains to empty the water-courses; and, in fact, in many instances, the farmer does not even require them: after a few hours all the water is absorbed by the soil; and yet these lands, with hardly six inches of mould above the gravel, are amongst the richest of water-meadows; the roots of the grasses penetrate readily into the gravel, and the earliest and sweetest grasses are produced on them.

Almost any description of grass will flourish under proper management in water-meadows. Those whose soils consist of peat resting on sand or on sandy loam, with a substratum of chalk or gravel, generally produce the meadow foxtail (*Alopecurus pratensis*), the brome-grass (*Bromus arvensis*), and the meadow-fescue (*Festuca pratensis*), on the tops and sides of the ridges. The furrows and sides of the drains are usually tenanted by the creeping-bent, the hard-fescue, the rough-stalked meadow-grass, and the woolly soft-grass. In those water-meadows whose soil consists of a sandy loam on a clay subsoil, the chief grasses are commonly the creeping-rooted soft-grass, the crested dog's-tail, the meadow barley, and the sweet-scented vernal-grass. But some grasses change their appearance in a very remarkable degree, when exposed under favourable circumstances to the influence of the flood-waters. This fact is strikingly exemplified in the case of two small meadows situated at Orcheston, six miles from Amesbury in Wiltshire, denominated from their great produce, "the long grass meads." These, says Davis, "contain together only two acres and a half, and the crop t
duce is so immense, that the tith
them was once sold for five
Much discussion took place am
Wiltshire farmers as to the nat
crop of these meads, before it
shown that the greatest part of
age consisted of nothing else
black-couch, or couchy-bent, th
stolonifera, one of the worst of
or weeds which haunt the poo
vated arable soils.

It is a very general, as well
conclusion of the English farme
grass and hay of water-meadow
nutritious as that of the perman
lands. The difference, howeve
great as is commonly supposed.
Mr. George Sinclair determine
perimentally, and he is no mea
with regard to all that relates to

He obtained from the rye-gr
perenne), at the time of flowe
from a water meadow that ha
off with sheep till the end
nutritive matter, 72 grains; a
same weight of this grass, ta
rich old pasture, which had b
for hay about the same time,
From the same grass from th
that had not been depastured in
100 grains. And from the same
the pasture which had not been
grains. All the grasses, in fact,
growth is forced by the ap
either liquid or solid manures, a
contain nutritive matter in dimin
tities: — this, too, was determin
clair. From four ounces of a
luxuriant patch of rye-grass, on w
portion of cow-dung had been
he obtained of nutritive matter
From the same quantity of the
growing on the soil which surr
luxuriant patch, he obtained 12

And, in a second trial, the sa
of grass, on a soil entirely
manure, afforded, of nutritive
grains. On the same soil, exce
nured, the grass afforded only
In these experiments, the plan
the same age, and were exami
same stage of their growth. (*Ho*
384.)

With regard to the constru
management of water meadows,
many practical works of the hi
thority to which the farmer
access, and, in the following ob
therefore, I shall merely very b
raphrase the accounts given by
and others, of the practice of
in the southern counties. In

er, even since the time that Davis wrote, ere has been a great and steady improvement. The land is better levelled, the slopes are evenly preserved, the water-way, queducts, and hatches, better constructed, nd in many of the more recent improvements, in the valley of the Itchen in Hampshire, the sliding-water doors are regulated y a cogged wheel turned with a moveable winch, so as to render them safe from alteration during the absence of the meadow-keeper.

The management of the Wiltshire and Hampshire water-meadows, as well as it n be briefly described, is as follows:—In autumn, the after-grass is eaten off ite bare, when the manager of the mead rovincially the *drowner*) begins to clean t the main drain, and the main carriage, d to "right up the works," that is, to ake good all the carriages and drains ich the cattle have trodden in, so as to ve one tier or pitch of work ready for owning. This is immediately put under ter, whilst the drowner is preparing the xt pitch.

In the flowing meadows this work ought be done, if possible, early enough in the umn to have the whole meadow ready catch the first floods after Michaelmas; water, being the first washing of the ble lands on the sides of the chalk hills, well as the dirt from roads, is then thick d good; and this remark as to the superior richness of the flood waters, is one t is commonly made in Berkshire and er parts of England. The length of the umnal watering cannot be precisely ed, as much depends upon situations d circumstances; but if water can be anded in abundance, the custom is to meadows a "thorough good soaking at ," perhaps for a fortnight or three ks, with an intermission of two or three during that period: and continue the space of two fortnights, allowing an rval of a week between them. The ks are then made as dry as possible, to urage the growth of the grass. This soaking is to make the land sink and h close together, a circumstance of t consequence, not only to the quan- but to the quality of the grass, and icularly to encourage the shooting of roots, which the grass is continually ing, to support the forced growth ve.

le the grass grows freely, a fresh ng is not wanted; but as soon as it s, the water must be repeated for a few a time, always keeping this funda- rule in view, "to make the meadows as possible after every watering, and to take off the water the moment any scum appears upon the land, which shows that it has already had water enough."

Some meadows that require the water for *three* weeks in October, and the two following months, will not, perhaps, bear it one week in February or March, and sometimes scarcely two days in April and May.

In the catch-meadows, which are watered by springs, the great object is, to keep the works very dry between the intervals of watering; and as such situations are seldom affected by floods, and generally have too little water, it is necessary to make the most of the water, by catching and rousing it as often as possible; and as the upper works of every pitch will be liable to get more water than those lower down, a longer time should be given to the latter, so as to make them as equal as possible. (*Davis's Agriculture of Wiltshire*, p. 125—7.)

In Berkshire they first flood their water-meadows about Michaelmas; these are situated principally on the banks of the Kennet. The first flooding they deem the richest in quality: this they keep on the land for about four days, then they dry them for about a fortnight, and after that the water is let on for three or four days more; those meadows which are the most readily dried are the most productive. There are none more so, in fact, than those which have a porous, gravelly, or broken flint bottom, from which the flood-water readily escapes, almost without drains. They begin to feed their meadows with sheep about the 6th of April, and continue feeding till about the 21st of May, when the meadows are again flooded for a crop of hay; the land is then flooded and dried alternately for three days until hay-time.

The number of acres of land in Wiltshire under this kind of management has been computed, and with a tolerable degree of accuracy, to be between 15,000 and 20,000. Some considerable additions, however, have been made to the water-meadows of the district since this calculation was made. (*Davis's Wilts.*, p. 122.) About the same number of acres are formed into water-meadows in Berkshire, and a still larger number in Hampshire. No one has attended more carefully to his water-meadows than Lord Western, on some of those situated on the London clay-formation in the Blackwater Valley in Essex, a soil of all others, perhaps, from its tenacity, the least adapted to their successful formation, and his testimony is very important:—"There is an old adage," says his lordship, "that water is the best servant in agriculture, and the worst master. Water has in itself intrinsic value,—distilled through very first pasture you find on the descent evinces the value placed on the mountain floods by the inhabitants of those districts; and, accordingly, every stream is sedulously directed and conducted over the pastures in a most skilful manner. The very washing of the roads in hasty rains is also attended to and applied to the same purposes." This system of catching the uncertain flood-waters is known amongst farmers by the name of *catch*-work, and though highly valuable, yet they deem it infinitely less important to them than irrigation, which is watering (generally five or six times a-year) from a certain and ever-accessible head of water, as a river, &c. And yet Lord Western's testimony is decisive in favour of even one *catch*-flooding; for he observes, when speaking of the expense of constructing the requisite little channels to disperse the flood-waters over the grass, — "In many cases it will be trifling, in some cases considerable; but when the farmer reflects that one winter's flooding will do more in *many*, I may say in most cases, than thirty loads an acre of the best rotten dung manure that can be laid upon his grass lands, he can hardly shrink from some considerable expenditure." If, then, the effects even of a *catch*-flooding with water are so great, how infinitely superior are the advantages capable of being derived from a regular constant supply of the enriching foul waters, like those issuing from the drains of a large city, which is even now most successfully employed near Edinburgh, but worse than wasted in the case of London! Whatever may be the value, in an agricultural point of view, of the solid contents of the London sewers, yet, to me,

only drawback to the stea
fertility of our country.

There are papers on irri
J. Purdy, of Castle Acre in
Board of Ag. vol. vii. p. 11
Shank, of Wigtonshire, *ibid*
Mr. Beck, of Norfolk, *ibi*
the irrigation of Lombardy
by Don R. S. Coutinho, *ibi*
Aberdeenshire, *ibid.* vol. iv
Denbighshire, *ibid.* p. 266.;
of Norfolk, *ibid.* vol. vi. p.
fessor Rennie, *Quar. Journ.*
p. 24.; on the foul water irri
burgh, *ibid.* vol. x. p. 256.
of Ag. vol. x. p. 558.; *Steph*
Irrigator; *Brown's Rural A*
Sinclair's Hortus Gram. p.
Wiltshire; *Driver's Hampsh*

IRRITABILITY OF P
BOTANY (*ante*, p. 228.), TEM
ACCLIMITATION OF PLANTS.

ISNARDIA (named i
Anthony Isnard, member o
of Sciences). These plants
growing in marshy situation

The marsh isnardia (*I. p*
only indigenous species.

It is an annual, growing
watery places, blowing axilla
sile, small, green, and incons
in July. The herb is flo
with numerous long filament
stems are several, about a sp
or slightly branched, leafy,
rangular. The leaves are op
ovate, acute, entire, scarce
length, bright green, somew
the mid-rib often red or pu
Flor., vol. iv. p. 264.)

climber, common every-where in
hich is excellent as a screen
ainst trellis-work. The common
y often employed for covering
dings or trees, which latter it in-
lls. The stem is branched, either
the ground and bearing 5-lobed
ed leaves, but no flowers; or
flattened and attached by dense
es, which serve for support, not
nt; the flowering branches are
eading, round, bearing ovate, un-
ves. Umbels aggregate, green,
ered, their stalks covered with
escence, and accompanied at the
eral small bracteas. The berry is
a currant, smooth, black, inter-
sh and mealy, with seldom more
eeds. The whole plant is some-
atic; and a very fragrant resin
n the old stems when bruised.

ROUND. See Alehoof.

ISH (*Canatiensis*), is a fast grow-
, with large lobed leaves, which
s walls and houses. It is propa-
yers, or slips taken off and planted
are to grow. (*Smith's Eng.*
. p. 334.; *Paxton's Bot. Dict.*;
yl. Flor. vol. i. p. 323.)

(*Ixia bulbocodium.* The name is
m *ixia*, bird-lime, because of the
re of some of the species.) This
of very handsome plants when in
weet recommends them to be
a mixture of sandy loam and
aves, or peat soil. When they
flowering, they require no water
gin to grow afresh. In October
d be first potted, and set in a
, as they only require to be pro-
n frosts till their pots are well
roots, when they may be set on
of the greenhouse, and watered
and they will flower well. Most
cies will grow well in a south
the open air, planted from five to
deep, in a light sandy soil near a
to be covered with dry litter in
ther; they will then flower much
han if grown in pots, and they
reased by offsets from the bulbs
s. (*Paxton's Bot. Dict.*)

J.

BY-THE-HEDGE. One of the
names of the garlick treacle-
Erysimum alliaria). See Trea-
RD.

DAW. (*Corvus monedula.*) This
n bird is found common in most parts of this country. Jackdaws appear to prefer cultivated districts, frequenting and building in church towers, belfries, steeples, chimnies, &c. The female forms a nest of sticks, lined with wool and other soft substances, and lays from four to six eggs of a pale bluish white, spotted with ash colour and clove brown; the length one inch seven lines, by one inch and half a line in breadth. These birds feed indiscriminately on almost all substances, insects, grain, eggs, carrion, shell-fish, &c. The general colour of the plumage is black. The whole length of a male bird about fourteen inches; the female is smaller in size. (*Yarrell's Brit. Birds*, vol. ii. p. 102.)

JACKFISH. See Pike.

JACOB'S LADDER, Blue or Greek Valerian. (*Polemonium cæruleum.*) This indigenous plant is a common ornament of flower borders in rustic gardens, of no particular qualities, notwithstanding its name of valerian, derived perhaps from the leaves which resemble those of some of the *Valerianæ*. The root is fibrous, not creeping, herb nearly smooth, perennial, one and a half or two feet high; stems angular, leafy, hollow, often reddish, unbranched, panicled at the top; leaves alternate, of many elliptic-lanceolate, entire leaflets, with an odd one of nearly equal size. The flowers, which appear in June, are rather drooping, numerous, blue, occasionally white. All the species are of the easiest culture and propagation. (*Smith's Eng. Flor.* vol. i. p. 286.)

JAMOCK, or JANNOCK. A provincial name for bread made from oatmeal.

JANUARY. The first month in the year. *Farmer's Calendar.* In this season of the year, when frost and snow very commonly impede the progress of the plough, and almost all other out-door work, the flail and the thrashing machine are wont to be busily employed. Manure, however, is carted, especially on to grass-lands, in frosty weather; and now is a good time, when the roads are hard, to carry all kinds of artificial manure: the Essex farmers are still busy with their chalk and their sprats; those of Devon with the calcareous sea sand. This, too, is a good time to mix lime and salt for dressing spring corn; two bushels of lime to one bushel of salt—mix dry, and protect from wet. There are few fertilising mixtures more powerful than this, at the rate of from forty to sixty bushels per acre; apply it broadcast, either by hand or the shovel, in March and April. Cart also pond mud and ditch scrapings, remains of old banks, &c.; all these are very powerfully enriched as fertilisers at a small expense, by being mixed with a bushel of salt or lime, or both, to a cubic yard of the earth. This is a good period to burn lime, an earth which is not near so extensively employed on the heavy lands of the south as it ought to be: the quantity is from fifty to eighty bushels per acre. Look to your water-courses, keep the drains in woods clear. If the weather is open, now is a good time for the sub-soil or sub-turf plough to be at work in fallows or pastures; but do not think that the subsoil plough will render under-draining unnecessary; where you subsoil, you must have your drains a foot below the depth to which the ploughpenetrates. Land intended for pease, beans, and vetches should be ploughed (those early sown on dry land always seed best), and the seed may be sown in dry weather towards the end of the month. If the weather is soft, and the worms or slugs attack the wheats, sow four or five bushel of salt per acre over them early on a moist morning; the expense is trifling—the cure certain. Attend to live stock: give your sheep and cattle rock or other common salt in their troughs; keep a lump always in your horses' mangers. The improved general health of the live stock will well reward your care in this respect; remember, too, that regular good feeding is better than irregular profusion: attend also to their cleanliness and warmth; filth and cold are much more prejudicial to all live stock, and much more materially retard their fattening, than the farmer commonly imagines. Ewes for early spring now begin to lamb; prepare the yard for them: cabbages are now very valuable food for them; they are not only come-at-able in all weathers, even in deep snows, and yield much milk, but they never freeze like turnips. Look to, and mix, the manure of your farm-yard; do not let the horse litter remain in heaps at the stable door, but spread it with that of other stock; see that no liquid manures are running to waste. Look to your fences, and cleanse ditches; see that the water does not lodge on the land. Cut underwood, and remember the poor, for this month, says honest John Worlidge, "is often the rich man's charge, and the poor man's misery." Water-meadows must be preserved by floating from the injury of frost; but they must not be kept too long under water: after ten days the meadow should be dried for a time. To promote early laying, give your poultry buckwheat and barley. Last year's early pullets will begin to lay at Christmas; reserve some, therefore, for this purpose—the French farmers generally adopt this plan. All fat meat sells well this month.

Kitchen Garden.—*Artichokes*, attend to, shelter, &c. *Asparagus*, plant in a hot-
bed—attend to in forcing. *B*
b., earth up early ones, plant i
Beet (red), plant for seed.
plant *e.*, sow *e.*, plant for se
doons, attend to, shelter, &c. *C*
small crop, plant for seed. *C*
attend to those under frames, a
picked, sow *e.* *Celery*, earth
&c., *e.* *Composts*, prepare and
Cucumbers, sow *e.*, prick out.
pare for hot-beds, wheel on vac
Earth up plants disturbed by fro
blanch. *Frost*, protect plants
require it. *Ground* (vacant), d
&c. *Hot-beds*, make and attend
radish, plant *e.* *Jerusalem*
plant *e.* *Kidney beans*, sow in
Liquorice, plant *e.*, dig up thr
plants. *Lettuces*, in frames,
transplant to force, sow *e.*
Mint, force in hot-bed. *Mu*
make, attend to those in produc
tard and cress, sow in hot-be
(winter standing) clean from wee
those in store, sow small crop,
seed. *Peas*, sow, earth up adva
in hot-bed, prepare sticks for
plant. *Radishes*, sow in hot-
borders, *e.* *Rape* (for saladi
hot-bed, (edible rooted) sow. *S*
for seed. *Shelter* tender plants
Small salading, sow. *Spinach*
weeds, sow *e.* *Tansy*, plant
Tarragon, plant in hot-bed. *T*
for seed. *Weeds*, continually
do every thing that can tend
work of the next month, which
more busy than this.

Flower Garden.—Keep you
grass walks neat and smooth,
if any part requires fresh tur
season for cutting and layin
that from a common is best, as
is short and free from nettles,
lay it down firm and even,
the sinking of the newly laid
or two; roll it well after it is
and roll gravel walks in dry wea
attempt to roll in wet weathe
clings to the roller. Dig cl
you intend to plant evergreens
and March—the frost will r
dug earth more friable. If
is very settled and mild, you m
out hardy deciduous shrubs, su
briars, double bramble, doub
cherry, dwarf almond, jasmi
suckles, roses, lilacs, laburnum
rose, spiræ frutex, mezereons,
plant each shrub with a good
round its roots. Prune flow
now where they require it, w
knife, not with shears—when

ı. Plant tulips in mild weather,
ıte in the year; but they will not
ısome as those which were planted
ıber and October: the same re-
ılies to ranunculuses, anemones,
ect all choice bulbs and tuberous-
rennials from severe weather.

ıL Monthly Notices.—January
ı as leader of the months by Numa
, when he added two months to
ban calendar formed by Romulus,
was not admitted to the same
e in this country until a motion
to that effect by the Earl of Mac-
n the 18th of March, 1750, in the
Peers. It was then determined
alendar should be ordered accord-
Gregorian style, the Julian style
iously followed; and accordingly
as accustomed to commence with
ough, as some persons had pre-
nsidered January as the first
the year, any occurrence in Ja-
February was noted as happening
ars, as 1750-1. Numa assigned
y 31 days, the Decemvirs dimi-
m to 29; but Julius Cæsar re-
it the original number.

y received its name in honour of
most ancient king of Italy, who,
h, in common with many others,
the number of the Roman deities.
ir mythology, no individual could
d whose attributes rendered him
riate to preside over the first
the year as Janus. He was con-
possessing two or four faces (*bi-*
quadrifrons): with one, depicted

those of Heathen Mythology, and to prove that those of the latter are corrupted types of the former, Janus is believed to be a sketch of Noah. Noah, having survived the deluge, was the sole recorder of the past, as well as the calculator of the future. Janus is reported to have taught mankind how to plant the vine—Noah is recorded to have done the same. Janus is said to have lived in the golden age of the world—Noah in that period when nature was reviving in all its pristine purity after its late calamity.

The Saxons named this month *Wolf monath*, because, as prey became scarce in their native haunts, these ravenous beasts prowled near the habitations of man, and more endangered his life. As Christianity arose, it was designated *Aefteryula*, or after Christmas. In the now obsolete language of Cornwall it is named *Genver*, an obvious corruption of January, in French, *Janvier*. Our January was divided amongst two of their months—*Nivose*, which extended from the 21st of December to the 20th of January; and *Pluviose*, from the 20th of January to the 19th of February. (*Farmer's Almanac.*)

JASMINE. (*Jasminum*. Linnæus derives the name from *ia*, a violet, and *osme*, smell; some assert that it is from *ysmyn*, the Arabic name of the plant.) The species of this very elegant genus are familiar to every one. The stove and greenhouse kinds thrive well in a mixture of sand, loam, and peat; and cuttings of the ripened wood root freely in soil or sand under a glass in heat. The hardy kinds thrive well in any common soil, and are easily increased by cuttings planted under a glass. They are ten to twelve feet high, blooming deliciously sweet, delicately shaped, white flowers from July to October. It is admirable for trellis work and arbours. The white jasmine thrives best in a light warm soil, but it will grow in any ground in a sheltered situation. The yellow jasmine (*J. humile*), a shrub growing four and five feet high, blows a yellow flower from July to September. It is not sweet like the white, but very elegant in appearance. Both these sorts may be propagated by suckers.

Phillips, speaking of jasmines, says, "They should be woven into the trellised arch or alcove, climb the palisades, rest on the branches of the broad-leaved laurel, cover the dead wall, and run gaily wild over the shrubs of the wilderness walks, whilst, obedient to the scissors of the gardener, they are formed into bushy shrubs and little trees for the near approach to the dwelling, where, in the morning and evening, their star-topped tubes send forth a shower of odours that embalm, refresh, and purify the surrounding air.

> ——— many a perfume breathed
> From plants that wake when others sleep;
> From timid jasmine buds, that keep
> Their odour to themselves all day,
> But when the sun-light dies away,
> Let the delicious secret out
> To every breeze that roams about.—Moore."

JAY, THE. (*Garrulus glandarius.*) The jay is a handsome bird, well known in most of the wooded districts of England; and it also inhabits some of the midland and more southern counties of Ireland, where it is said to have been much more common formerly than now, because, being considered to do injury to young trees, by a statute of the 17 Geo. 2. grand juries were empowered to offer three-pence for the head of each jay, which reward soon had the effect of thinning their numbers. The jay has a peculiar propensity for mimicking the cries of other birds and domestic animals. The jay builds its nest in a thick bush, or tall hedge row. The nest is cup-shaped, open at the top, formed on the outside with short sticks, and thickly lined with fine roots and grass. The eggs are five or six in number, of a yellowish-white ground colour, minutely and thickly speckled all over with light brown. They are one inch four lines long, by one inch broad. The breast and belly of this bird are of a reddish buff colour. The forehead and crown of the head are greyish white, and the elongated feathers form a crest which the bird can elevate at pleasure. On each side of the lower mandible there is a moustache-like spot of velvet black, an inch long. The legs, toes, and claws are pale brown. The whole length of the bird is thirteen inches and three quarters. (*Yarrel*
Birds, vol. ii. p. 116.)

JERSEY STAR THISTLE. (*C*
Isnardi.) See Star Thistle.

JERUSALEM ARTICHOKE
Artichoke.

JOHN'S WORT, or ST. J
WORT. (*Hypericum.* The gener
is said to be derived from *uper*, a
an image. The superior part of t
represents a figure. The comm
is derived from their coming int
about St. John the Baptist's day
most part of the species of this
genus are showy plants. The g
and frame shrubby kinds do well
and peat, and young cuttings root
sand under a glass. The hardy s
well fitted for the front of sh
being dwarf and showy. They m
creased by divisions or seeds, a
the herbaceous kinds, which th
in any common soil. The seed
annual species have only to be
the open ground in spring. Th
nous species are eleven in numbe

1. Large-flowered St. John's W
calycinum.) A shrub, growing wild
places in the west of Ireland and
The root of this species is cree
stems shrubby, erect, twelve or
inches high, with simple, leafy
branches, smooth like every ot
Leaves, ovate-oblong, varying in
coriaceous, evergreen, about t
long, on very short stalks. Th
which appear from July to Septe
two or three inches wide, of a bri
yellow, with innumerable reddish
anthers. This plant is a great or
shrubberies and parks, and excel
shelter for game, bearing any co
climate.

2. Tutsan, or Park Leaves. (*H.*
mum.) This shrub is found in m
lanes, thickets, and woods in Br
Ireland, but not very general. It
taller and more branched than the p
the branches are quadrangular, m
compressed. Leaves ovate, or
heart-shaped, sessile, widely
Panicles terminal, erect, forked,
ered, with angular or winged smo
The flowers, which appear in
August, are an inch wide, yellow,
sets of stamens, and as many sty
leaves and other parts have a
scent when rubbed.

3. Square St. John's Wort, or S
Wort. (*H. quadrangulum.*) This
perennial, and common in moist
and thickets, and about the banks
The root is somewhat woody, cre

light green; stems several,
two feet high, erect, leafy,
rangular, with convex inter-
rom top to bottom with short,
llary, leafy branches; leaves
other in pairs, sessile, elliptical
ise, many-ribbed, veiny, full of
rless, pellucid dots, and bor-
more or less perfect row of
l ones yielding a blood-red
uppermost branches form a
panicle of numerous lemon-
ers, about half the size of the
species.

perforated St. John's Wort.
m.) This perennial species is
undantly in thickets, woods,
on dry banks. The root is
d, and somewhat creeping;
hes to the height of eighteen
round and bushy in conse-
much greater length of its
branches. The whole herb is
a darker green, with a more
t when rubbed, staining the
dark purple, from the greater
coloured essential oil lodged
e and even in the petals: the
y numerous, smaller than the
or ovate, obtuse, various in
owers are numerous, in dense
nal panicles, bright yellow,
treaked with black or dark
species is eaten by goats, cows,
ut is refused by horses and
s plant was found to bleed at
ouch, it was supposed to have
uality, and became the "balm
's wound," giving a blood-red
ry composition, whether of a
oily nature, into which it en-
ntains resin, and the leaves
ed dye to wool and oil.

rate St. John's Wort. (*H. du-*
pecies inhabits rather moun-
s and thickets. In habit it is
ith long, leafy, lateral branches,
s are larger, paler beneath,
no colourless, pellucid dots.
adical shoots are bright red;
drangular in the upper part,
ed or bordered; the petals and
tted and blotched with dark

St. John's Wort. (*H. humi-*
is a pretty little procumbent
, with the lemon-like scent of
d *perforatum*, which tenants
lly, heathy, and rather boggy
e root is fibrous, stem com-
trate; flowers few, somewhat
s elliptical, smooth.

n St. John's Wort. (*H. montanum.*) Though not an ostentatious plant, this species well deserves John Bauhin's epithet of "most elegant." The glutinous dark fringes of its calyx and bracteas resemble the glands of a moss-rose; the stems are erect, round, smooth, about two feet high; the leaves ovate, naked, clasping the stem.

8. Bearded St. John's Wort (*H. barbatum*), which grows for the most part in bushy places in Scotland, on a herbaceous stem a foot or more in height, flowering in September and October: 9. Hairy St. John's Wort (*H. hirsutum*), flourishing in thickets and hedges, chiefly on a dry chalky soil, stem two feet high: 10. Small upright St. John's Wort (*H. pulchrum*), met with very frequent in woods and bushy heathy places on a clay soil; stem twelve to eighteen inches high: 11. Marsh St. John's Wort (*H. elodes*), stems procumbent, creeping. There are other species, which call for no detailed description. (*Eng. Flor.* vol. iii. p. 322—330.)

JOINTED GLASSWORT. See GLASSWORT.

JOINTS. In botany, the places at which the pieces of the stem are articulated with each other.

JONQUIL. A species of daffodil, of which there are several sorts. The great jonquil and the odorous jonquil blow about the middle of March. The lesser or proper jonquil somewhat later. When they blow well and early they forebode a fine season.

JOURNEY. In husbandry, signifies provincially a yoking, or as much ground as can be ploughed over in a day; though it is not applied in the same way in all districts, nor has it the same signification, for in some places it is used to express a much less proportion of labour. See TEAM.

JUDAS TREE. (*Cercis.*) This is a beautiful genus of ornamental trees, flowering early in spring, and looking very pretty planted singly on a lawn, or trained to a wall or trellis; they grow to the height of twenty feet, prefer an open loamy soil, and may be plentifully increased from seeds. (*Paxton's Bot. Dict.*; *Phillips' Sylv. Flor.* vol. i. p. 318.)

JULY. The seventh month of the year. *Farmer's Calendar.* This is the chief turnip-sowing month of the east of England. It is now that the farmer's hopes and fears of a plant of turnips are excited by every cloud, and depressed by every gleam of sunshine. Now we hear on all sides the details of the horrors of "the fly," "the palmer," "the caterpillar," and "the grub," and yet all these dangers must be boldly met, for what is the plight of the light land cultivator without his turnips? Let such, for your Swedish turnip land, a copious supply of cabbage plants ready to fill up all gaps; they will supply by good management almost all the deficiencies in the Swedish turnips. Do not fancy that by any mechanical means you can kill the flies, or that the black caterpillars are bred in the crushed bones; the boiled bones of Manchester are extensively used for turnips in the midland counties, and the fields where these have been drilled are equally attacked with those manured with the fresh or green bones. Rapecake powder has been successfully drilled with the turnip seed in Norfolk and Essex, at the rate of five or six cwt. per acre: this fertiliser is very noxious to the wireworm — the most stubborn of all the predatory vermin of the farmer's crops. Rape and coleseed may be sown this month, either after tares or amongst beans, to be fed off for wheat.

Let your sheep have shade, and water. Ewes, to produce early lambs, should be well kept this month, that they may be the more ready for the ram the beginning of next month. Ewes for this purpose are now commonly bought in. Take the boars from the sows from this month until the middle of November, that the sows may not farrow in winter. Hunters are now taken in from grass.

Horse-hoe potatoes and hoe carrots. Lucern may be cut and hoed this month; do not mow it too close to the ground, close cutting injures it. Fold your sheep on the lands intended to be first sown; wean lambs. Carry earthy manures; cut pease and rye. Buckwheat ("the brank" of Essex) should not be sown after the first

plant, sow. *Finochio*, eart
take up as wanted. *Horse*
to hoeing. Particularly att
beans (dwarfs) sow, runne
tend to advancing crops. *L*
Leeks, weed, &c. and plan
plant, sow, leave for seed
flowers, gather. *Marjoru*
drying. *Melons*, attend to.
Mushroom bed, attend to, m
collect. *Onions*, weed, &
leaves, sow *b*. *Parsley*, so
thin, &c. *Parsnips*, weed,
hoe advancing, leave for seed
gather. *Pompions*, are fi
attend to. *Pot-herbs*, are fi
drying and distilling.
Rampion, is fit for use *e.*
rooted, sow. *Salsafy*, thin
plant. *Scorzonera*, thin,
grass, sow seeds, gather
Small salading, sow. *Spin*
and thin, stir ground b
Succory, sow. *Turnips*, so
advancing crops. *Turnip*
out vacant ground for, dig f
&c., water where necessary
plant.

FLOWER GARDEN. — You
nations and double sweet-wi
let it be done before the end
week in this month. Prop
and pipings. Transplant
auriculas which were sown
also the seedling polyanthu
the perennial and biennial
were not done last month,
October. Take up all bu
their leaves decay. If this
hot and dry, place your pot

he *flowering* rush, soon follow. The
hade, the bittersweet, the great
wolfsbane, are all in full bloom.
oad-flax flowers about the twelfth;
ter-plaintain a few days later; then
rden persicary, and towards the close
month the mountain groundsel and
urple willowhest are in flower.
"the pride of the garden," and
are fast departing.

ERAL MONTHLY NOTICES. — July,
h month of the Roman calendar,
d in consequence the name of
s, to denote its numerical position.
sacred to Jupiter, and had in the
alendar thirty-six days. Romulus
m it five days. Numa reduced it
y, but Julius Cæsar enlarged it to
ne, the present number. In honour
conqueror, Mark Antony changed
from *Quintilis* to *Julius*, hence our
Our Saxon forefathers, who com-
amed their months from certain
ppearances or events, denominated
nth *Hew monath* or *Hey monath*,
is was their hay harvest; also,
eir meadows being then in flower,
led it *Maed monath*. In Holland
the days of the republic, this was
ated *Hooymaand*, or Hay month.
r's *Almanac*.)

E. The sixth month of the year.
Calendar. Your fallows now
your earnest attention; continue
h and cleanse them. Swedish tur-
now being sown in all parts of
; drill these in rows, and, if pos-
e the *manure* drill. There are
tude of, artificial manures, which
er may in need have recourse to:
bones, either by themselves, or
nd fermented with an equal quan-
sheep-dung, ashes, saw-dust, or
tted with urine, are all excellent;
in, these being exhausted, there are
rate of the London Manure Com-
oittevin's, Clarke's, and Lance's
s, the graves or refuse tallow of the
nelters. If you have none of these,
-twenty or thirty bushels per acre
shes, mixed with three gallons of
l, has been found by Mr. George
urn to be excellent. Drill as soon
have mixed the oil, otherwise it
And Mr. Hewitt Davis, rather than
e some kind of manure for his drill,
eeded with only the ashes, and has
excellent crops of turnips with these
When your Swedish turnips fail,
the rows with cabbage plants; hand
se-hoe them. Buckwheat, vetches,
en intended for manure, may be
d in now, just as they are going out of bloom. Plant out cabbages. Weed your wheat, peas, and beans. Soil your live stock. Cut clover, meadow-grass, and sainfoin for hay. If your hay is damaged by heavy rains, add salt to it as you stack it — 14 to 28 lbs. of salt to a load of hay; your stock will prefer such to all others. Cart out your manure, and plough it in as soon as you can after it is spread; it is much injured by exposure to the sun and wind; its richest portions are dried up, its salts of ammonia are dissipated.

Watch your sheep; the fly is now on the wing. Have your shears sharpened, and the hellebore powder and black brimstone ready; the proportions ¼ lb. of hellebore root powder to 1½ lb. of black brimstone. Sprinkle from the head to the tail with a dredging box. Wash and shear your sheep; see that the clot is removed, and that the shearers do not cut too close; have some ointment ready for the wounded places.

Hoe carrots and potatoes. Weed flax. Tie your hop bines, and prune them when needful. Hoe carefully young lucern. Carry chalk, marl, and clay. Clean out ponds; husband the mud. Sow cole seed. Take care of milch cows, that they are not overheated; their health, and consequently their produce of milk, is more injured by sultry weather, and by being irritated by the flies, than the farmer sometimes supposes. If the farmer will pare and burn his soil, this is a good time for this generally injurious operation. Burn clay. This is a proper time to plant holly hedges; they grow slowly, but they are the best of all hedges when sufficiently grown; they succeed best on the level ground, protected from live stock by fencing, or two rows of hurdles. Burn lime; mix lime and salt together, dry, for your wheat, at the rate of two bushels of lime and one bushel of salt; protect the mixture from the weather. For boggy or peaty land, lime is an excellent dressing. Look to the bees, they are now about to swarm. Hire your harvest men. This is a good time to inclose waste land. Calculate the advantages of spade husbandry, compared with horse labour; the expense is much more nearly the same than some persons believe. If possible, prefer manual labour; one good digging is better for the land than two or three ploughings; the soil is better pulverised, the land more completely levelled This is a good time to form tanks for liquid manure. Towards the end of the month, the sowing of Aberdeen, bullock, and the varieties of hybrid Swede turnips commences, and these are followed by the different round turnips. Hand-weed all your corn; cut sow for, plant. *Cucumbers*, sow *b.*, plant *b.*, in forcing attend to. *Cardoons*, thin and plant out. *Coriander*, sow. *Cress, American*, sow, water, plant, earthing up attend to. *Endive*, sow *b.*, plant. *Fennel*, plant. *Finochio*, sow, earth up advancing crops. *Garlic* is fit for present use. *Herbs*, for drying and distilling, gather. *Jerusalem artichokes*, hoe, &c. *Kidney beans*, dwarfs, sow, runners attend to. *Leeks*, thin, &c., transplant *e.* *Lettuce*, sow, plant, &c., leave for seed. *Melons*, plant out. *Mint*, plant. *Onions*, thin, &c., transplant into deficiencies. *Parsley*, sow. *Hamburg* ditto, thin. *Parsnips*, thin. *Peas*, sow, attend to advancing crops. *Potatoes*, hoe *e.* *Pompions*, plant, *b.* *Radishes*, sow. *Rampion*, thin. *Sage*, plant. *Salsafy*, thin. *Savoys*, plant, prick out. *Scorzonera*, thin, *Scurvy-grass*, sow seeds, attend to and gather. *Small salading*, sow. *Spinach* sow, thin advancing; stir ground between crop in rows, &c. *Succory*, sow. *Tarragon*, plant. *Thinning*, attend to. *Tomatos*, plant out, *b.* *Turnips*, sow, thin advancing. *Turnip cabbage*, sow, plant, attend to their watering and weeding. *Wormwood*, plant.

Flower Garden.—Propagate carnations by layers and pipings; double sweet-williams and pinks, by layers and cuttings or slips; perennial fibrous-rooted plants, by cuttings of the stalks. Transplant the large annuals from the seedling bed to the places where they are to remain; let this be done in showery weather if possible. Take up all bulbs, ranunculus and anemone roots, &c., as the flowers and roots decay. Water the delicate plants, if the weather proves dry; give a moderate watering every evening, but never in the heat of the day. Sow some hardy annuals, such as ten-week

probably to the almost uni
light, maturation of fruit, &
during its continuance. Th
it *Desios*, from a surname
mating that she presided
and births. The Romans
Junius, according to Macro
of the same goddess, which
probable derivation of the
which assigns it as being a
youth (*juventus*) of the yea
of the Roman youths (*jun*
the first has the name of Pl
latter that of Ovid, in its
opinion. Romulus assigned
and the number of days
adopted. Our Saxon anc
Lida, which signifies *gentle*
because the serenity of the
pitious for voyages in thei
They also knew it as the *w*
cause their cattle did now
the meadows.

All nature is now puttin
attire; life is teeming arou
sible directions, and, as Pal
happy life too." In the ea
month our lady's lily (*Lilium*
monly flowers. The "elec
are now in full bloom. W
visible all night. The white
volvulus sepium) comes int
the ninth. Starlings now co
lavatera and tiger-lily blo
18th. The berries of the
begin to redden. Dragon f
ing as the month closes.
manac.)

JUNET or JURNUT.
country name for the earth-

ers of the savin (*J. sabina*) are well
wn. The fruit of *J. communis* are
erbial for the flavour they give to gin.
ton's Bot. Dict.) The species are all
green aromatic shrubs, with narrow
s, either spreading and sharp-pointed,
osely imbricated, minute, and obtuse.
fruit is globular or oval, black or
n, with a glaucous efflorescence.
sabina is a native of the south of Eu-
but it is cultivated as an evergreen in
gardens. The plant is a pyramidal
, with small closely-adhering glan-
leaves, which exhale, when rubbed, a
g heavy odour, and have a bitter,
ous taste. By distillation they yield
e quantity of volatile oil, which has
dour and taste of the recent plant.
is a powerful acrid poison, irritating
esicating the skin when it is ap-
to it. When swallowed in large
it causes vomiting, purging, and in-
ation of the stomach and bowels. It
es specially on the liver, the kidneys,
y contiguity, on the womb in females.
been used by young women to cause
al abortion; but it is as likely to
e mother as the child. A cerate of
seful for keeping open blisters; but
nbrane forms on the surface to which
pplied, and this must be regularly re-
before each dressing.
common juniper (*J. communis*) grows
n hills and heathy downs, especially
the soil is chalky. Dr. Sibthorpe
it on Olympus and Athos, in Greece.
like all the species, a bushy shrub,
evergreen, linear pointed, glaucous
, dark green on the under disk. The
s are axillary, small, sessile, male and
e organs in separate flowers. The
although called a berry, is a *galbalus*
eculent cone. It requires two seasons
rive at maturity. The dwarf alpine
er (*J. nana*) is a variety of the *com-*
. It grows upon lofty mountains,
, as its name implies, more humble in
owth. These are the only indigenous
s. The tops and the fruit are used in
ine as powerful diuretics. The former
a bitter, turpentine flavour and co-
the fruit is sweetish, with an agree-
somewhat balsamic, odour, depending
a volatile oil, and a peculiar saccharine
er analogous to the sugar of the grape.
volatile oil is contained in cells in the
of the seeds; hence, in making infusion
niper, the seeds should be bruised.
fusion is made with an ounce of the
fruit and a pint of boiling distilled
It is a useful beverage in some
dropsies. The red cedar (*J. vir-*
is a hardy, handsome evergreen, native of North America, with dark foliage, producing a small blue berry-like fruit in May. It frequently attains to the height of a very lofty tree.

JURY. (From the Latin *jurare*, to swear.) A body of men sworn to decide a certain fact or facts, *according to the evidence* produced before them.

This noble institution, like many others as dearly cherished by all lovers of freedom, commenced among the northern nations of Europe at a very early period. The early notices of this mode of trial, remaining to us, do not speak of its first institution; and, in truth, it most probably originated in some rude form or other as soon as men began to dwell together in fixed habitations.

That trial by jury was employed by our Saxon ancestors from time immemorial is very certain, and over-industrious historians have wasted much time in fruitless endeavours to assign the honour of the first discoverer to the real author. Thus Stiernhook (*De Jure Sueonum*, l. i. c. 4.) ascribes the glory to Regner, king of Denmark and Norway, who was the contemporary of our Egbert. Archbishop Nicholson carries the date of the invention back to Woden, the great captain, legislator, and god of the Northernmen.

Sir Edward Coke appears to have fancied that there is something in the very number twelve, in which the laws of God and man seem to delight; and he instances the twelve judges, twelve counsellors of state, twelve to wager the laws, twelve apostles, tribes, stones, &c. (*Coke on Littleton*, s. 234. b.

In our own laws, trial by jury is mentioned as early as the reign of King Ethelred, but not as a novel institution. (*Wilkins' Laws of the Anglo-Saxons*, 117.) And in Magna Charta it is mentioned more than once, and particularly ordained, That no freeman shall be dispossessed of his lands or goods, unless by the judgment of his peers: and amid all the long continued struggles of Englishmen for the liberty of the subject (from the days of King John down to the time of Fox and his declaration of the office of juries in libel cases), the preservation of the freedom of juries has ever been a darling object with English patriots.

The care of the legislature may be estimated from the fact that, by the act of the 6 G. IV. c. 50., which consolidates the statutes with regard to juries, more than sixty acts or portions of acts of parliament were repealed, relating to juries — acts which extend from the 43 Hen. III. to the 5 G. IV.

Our forefathers, although they valued

John, chap. viii. v. 17., "the testimony of two men is true;" since these thought it impious to require the testimony of twelve men, when God had ordained that the evidence of two should be sufficient.

It would seem, that in the reign of Edward III. the jurors were summoned principally at the discretion of the sheriff or his officers, and that in consequence many corruptions were practised, by reason, as the preamble to the 13 Edw. III. c. 38. expresses it, that many diseased and decrepit old men and unreasonable multitudes of jurors were summoned, to extort money from some of them to let them go in peace; so that the poor men served on the juries, and the rich men, by reason of their bribes, "abide at home." To provide against these abuses, it was by this act ordained that no one should serve on a jury who could not "dispend" at least 20*s.* a-year, and that not more than twenty-four in number, nor any over seventy years of age, should be summoned.

By the 28th of the same king, stat. 3. cap. 9., jurors were directed to be "next neighbours, most sufficient and least suspicious." And by the 11 Henry IV. c. 9. sheriffs nor bailiffs were directed alone to return the jurors to the justices. And by many other acts the qualification and summoning of juries was regulated and enforced: 27 Eliz. c. 6.; 4 & 5 W. & M. c. 25. s. 15.; 3 Geo. II. c. 25. s. 18. By this act, sec. 1., every man between twenty-one and sixty years of age, residing in any county in England, who shall have in his own name or in trust for him, within the same county, 10*l.* by the year above reprizes in lands or tenements, whether of freehold, copyhold, or customary tenure, or of ancient demesne, or in rents issuing out

very, such issues being re
in the county in which ev
lified respectively shall r
also be qualified and lia
grand juries in courts of
peace, and on petty juries
all issues joined in such
of the peace, and triable
riding, or division in whic
qualified respectively shall
further provides that in W
of the foregoing qualificati

Persons exempt from ser
By the 6 Geo. IV. c. 50.
judges, clergymen in ord
tholic priests, ministers o
senting chapels, not follov
employment except that o
barristers actually practisin
and advocates of the civil l
tising; all attornies, solicit
duly admitted in any court
or of ecclesiastical or admir
practising and having tak
nual certificates; all officer
all coroners, gaolers, and k
of correction; all practisin
licentiates of the Royal Coll
in London; all surgeons w
of the colleges of London
Dublin; all certificated
naval or military officers
licensed pilots; all masters
light or buoy service; all
vants; all officers of custo
sheriffs' officers, high const
clerks,—"shall be and are
and exempted from bein
from serving upon any ju
whatsoever, and shall not b

ries. (*Fitz. Nat. Brev.* 14 *E.*;
4 *Inst.* 269.)

qualified from serving as Jurors.
h of Geo. IV. c. 50. s. 3. it is
, except in the case of juries de
iens, persons attainted of trea-
y, or convicted of any crime
ous (unless he shall have ob-
pardon), nor any outlaw, or
nmunicated, is or shall be qua-
e on juries. By the charter
lermen of the city of London,
o have been mayors, shall not
juries.

ranging the Jury Lists.—By
. c. 50. s. 4., the clerk of the
ery county of England and
within the first week of every
s warrant, according to a form
the act, to the high constables
dred, lathe, wapentake, or other
commanding them to issue
s to the churchwardens and
every parish and to the over-
y township within their con-
ommanding them to prepare
a true list of all men residing
respective parishes and town-
d and liable to serve on juries,
ly with other directions con-
e precept. (See 3 & 4 Anne,
Geo. II. c. 25.) And by sec. 5.
the peace is to provide, at the
e county, a sufficient number
ted writs and precepts, which
ex to every writ. By sec. 6.
onstable shall, within fourteen
e receipt of the writ, issue
to the churchwardens and
every parish and township
nstableship, his precept, with a
nber of these printed forms for
where there is more than one
le, each shall have a writ with
exed delivered to him, and each
le for the due delivery of the

ochial Places.—By sec. 7. of
. c. 50., justices of the peace at
y sessions to be holden for that
ore the first day of July in any
r the purposes of the act annex
arochial place to any adjoining
nship.

rdens and Overseers.—By sec. 7.
. c. 50., on the receipt of the
e's writ, the churchwardens and
ll forthwith prepare and make
alphabetical order, according to
d form, of every person, within
or township, qualified to serve
And by sec. 9. the said officers
copy to the door of every place of public worship within their respective parishes or townships, on the three first Sundays in September; subjoining to such lists, a notice stating when and where all objections to the lists will be heard by the justices of the peace.

Appeal to Justices.—By sec. 10. of the 6 of Geo. IV. c. 50., the justices of the peace in every division are directed to hold a special sessions in the last seven days of September in every year, at some place of which notice shall be given by their clerk, before the 20th of August next preceding, to the high constable, and to the churchwardens and overseers of every parish and to the overseers of every township within such division; and the churchwardens and overseers shall then and there produce their list of men qualified and liable to serve on juries, and shall answer upon oath such questions touching the same as shall then be put to any of them by the justices then present; and if any man is improperly inserted in such list, the justices are empowered, upon satisfaction from the oath of the party complaining, or other proof, or of their own knowledge, that he is not qualified or liable to serve on juries, to strike his name out of such list, and also the lunatic, the imbecile, the blind, the deaf, or any having a permanent infirmity.

They are also empowered, on the application of any person omitted, or of the parish officer, to insert the name of any person omitted (such person previously having notice of the application), or at an adjourned session to be held within the next four days; the justices are then to sign the list, and the high constable on the next first quarter sessions of the county, riding, or division, on the first day of its sitting, shall deliver the same, attesting on oath that he received the same from the petty sessions, and that no alteration hath been made therein since his receipt thereof. And by sec. 11. the churchwardens and overseers, or justices of petty sessions, are empowered, in order more correctly to make out their lists, to inspect at reasonable hours, between the first day of July and the first day of October, any duplicate of any tax assessment in the possession of any collector or inspector of taxes: sec. 3 Geo. II. c. 25. s. 1.

When a juryman is duly summoned, he is bound to attend and must remain, unless previously discharged by the chairman or judge, during the sessions or assizes, and if he absent himself he is liable to such fine as the court shall think fit to impose. When sworn, the province of the juryman is to decide upon the facts of the case *according to the evidence* laid before him, disregarding all that he may have previously heard. For [illegible] anon he first displayed the celebrated system which bears the family name, and has been so much perfected by his nephew the celebrated Antoine Laurent de Jussieu. Bernard Jussieu died in 1777; he published an edition of Tournefort on the Plants near Paris, 2 vols. 12mo. All the members of this family have devoted themselves to science. (*Watkins' Biog. Dict.*)

JUSTICE, JAMES. An eminent Scotch horticulturist and botanist, one of the principal clerks of session in Scotland, and a fellow of the Royal Society. He had a villa and garden at Crichton, near Dalkeith, upon which he expended his fortune, and was ultimately obliged to sell it, after devoting himself, in its retirement, to the practice of gardening for thirty years. To acquire information on the culture of bulbous-rooted flowers, he twice visited Holland, and travelled once into Italy for further improvement in his skill and taste. He was unsparing of expense in procuring exotics and new varieties. He was the first to introduce the pine-apple into Scotland, and had, as he states, the largest collection of auriculæ in Europe. He died in 1762 or 1763. He was the author of the following work: —

The Scots Gardener's Director, Edinburgh, 1754. 8vo. Another edition appeared in 1764, after his decease, entitled "The British Gardener's Director, chiefly adapted to the Climate of the Northern Counties, directing the necessary Work in the Kitchen, Fruit, and Pleasure Gardens, and in the Nursery, Greenhouse, and Stove." Edinburgh. 8vo. Another edition dated the same year, arranged as a Monthly Calendar, is very different from the others. There was another edition in 1767. Professor Martyn says, "It is an original and truly valuable work, founded upon reflection and experience."
(*G. W. Johnson's Hist. Eng. Gard.*)

K.

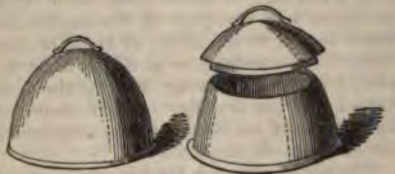
[illegible]
variably causes their decay.
of Bothwell Castle, has even
ceed well on a pretty strong
a loose bottom. (*Mem. Cal*
vol. ii. p. 100.) The depth
less than two and a half fe
naturally deep, it should be w
trenching. If at all tenaciou
tunity may be taken to mix
sea sand, so as to reduce it to
ture. If the soil be wet it m
so that water never shall stan
feet of the surface. If poor,
dung must be added; but d
are preferable (*Trans. Hor*
vol. i. p. 17.), and sea weed
These precautions must all b
attended to, for upon the du
dryness of the soil not only de
uriance and delicate flavour
but their very existence. Co
might be anticipated, is found
beneficial application, either
at the close of autumn, in t
of twenty or thirty bushels p
occasional waterings with a
taining four or five ounces
round every stool during the
regards the situation, it canno
and free from trees. Sea kale
both from seed and slips of
first is by far the best mode, f
may be obtained from slips wit
tainty, yet the plants arising
the strongest and longest live
failure of seed, which is so
plained of, mostly arises from
buried too deep, or some oth
cause. The seed may be ins
from October to the comm

n either case it must not be
e than two inches below the sur-
it is a good practice, previous to
, to bruise the outer coat of the
ut injuring its vegetating power,
reatment the germination is ac-
The plants will in general make
rance in four or five months,
er than six weeks; but, on the
the seed will sometimes remain
ths before it vegetates.

time for increasing it by slips
h. Rooted offsets may be de-
n established plants; or their
have attained the thickness of
ger, be cut into lengths, each
least two eyes. To plant the
res no particular direction: the
st be inserted in an upright po-
r three inches beneath the sur-
best to plant two together, to
danger of failure, at two feet
main. Some persons, from a
e a year, recommend yearling
e obtained and inserted in Fe-
arch; but, as the shoots ought
t for use the first season after
e object is not attained, for
y be cut from the second year.
mode of propagation is adopted,
uld be laid out three feet wide,
eet alley between every two, in
to the plan sometimes recom-
planting three rows in beds
ride, for in such the soil must
ted by the feet during the ne-
les of cultivation.

nths of June and July prove
s should be plentifully watered.
gs require no other attention
first summer than to be kept
eeds, and, if they come up too
o be thinned to five or six in
When their leaves have de-
been cleared away about No-
y must be earthed over an inch
dry mould from the alleys, and
out six inches depth of long
ead, and thus left to stand the
the following spring the litter
d off, and a little of the most
nto the alleys. When the plants
ly made their appearance, they
ned, leaving the strongest plant,
Maher recommends, the three
t each patch; those removed
planted at similar distances if
ut it must be remarked that
planted never attain so fine a
re so long-lived. In this second
earthing must be increased to
ches deep over the crowns, and
of litter performed as before.
In the third spring, the litter being removed, and some dug into the alleys, as before, about an inch depth of drift sand or coal ashes must be spread regularly over the surface. The sprouts may now be bleached and cut for use; for if this is commenced earlier, the stools are rendered much less productive, and much shorter lived. In November, or as soon as the leaves are decayed, the beds being cleared of them, the coating of sand or ashes removed, and gently stirred with the asparagus fork, they must be covered with a mixture of three parts earth from the alleys, and one part of thoroughly decayed leaves, to the depth of three or four inches. The major part of this is to be removed in the following spring, the beds forked, and the covering of sand renewed, this routine of cultivation continuing during the existence of the beds.

The above course is the one also pursued if the plants are raised from offsets or cuttings, as it is much the best practice not to commence cutting until they are two years old. Blanching, as before observed, may commence the second spring after sowing. The most simple mode is that originally adopted, namely, to cover over each stool sand or ashes to the depth of about a foot; the shoots in their passage through it, being excluded from the light, are effectually bleached. Sir G. S. Mackenzie, Bart. scatters dry clean straw loosely over the plants, to effect the same purpose (*Mem. Caled. Hort. Soc.* vol. i. p. 313.); but this mode is troublesome, inasmuch as that the straw must be changed as often as it becomes wet and heavy. The same objection I should conceive is applicable to the plan of Mr. T. Barton, of Bothwell, though he does not give any directions for a renewal of the covering under similar circumstances. He covers the bed entirely with the dry leaves as they are collected in autumn, to a depth of from five to twelve inches, the first being the quantity allotted to the youngest, the latter to the oldest plants; over the leaves a slight covering of long dung is laid, just sufficient to keep them from being scattered by the winds. This covering remains until the cutting ceases in the spring, when it is entirely removed, and the bed dug over. The shoots raise the covering so as to indicate when they are in a fit state for cutting, and thus obviate the necessity of removing more of it than is immediately over the plant; it is likewise stated, that no unpleasant taste is communicated by the leaves. (*Ibid.* vol. ii. p. 99.) But pots are by much to be preferred to any of these coverings. Common flower-pots, of large dimensions, may be employed, care being taken to stop the hole at the bottom with a piece of tile and clay, so as to exclude every ray of light; but those suggested by Mr. Maher, and represented below, are generally adopted. They are of earthenware, twelve or eighteen inches in diameter, and twelve high. Mr. Sabine improved upon them by making the top moveable, which prevents the trouble arising from the escape of the spreading shoots, or the entire removal of the dung at the time of forcing. (*Trans. Hort. Soc. Lond.* vol. i. p. 18.)



Frames of wicker are sometimes employed, being covered with mats, more perfectly to exclude the light.

Previous to covering the stools with the pots, &c. the manure laid on in the winter must be removed; and the operation should commence at the close of February, or at least a month before the shoots usually appear, as the shelter of the pots assists materially in bringing them forward. In four or six weeks after they are covered, the plants should be examined, and as soon as they appear three or four inches high they may be cut; for if none are taken until they attain a fuller growth, the crop comes in too much at once. In order to prolong the season of production, Mr. Barton recommends plants to be raised annually, so that every year a cutting may be had from a yearling crop, which comes in much later, and consequently succeeds, in production, the old established roots. The shoots should be cut whilst young and crisp, not exceeding five or six inches in height; the section to be made just within the ground, but not so as to injure the crown of the root. Slipping off the stalks is said to be preferable to cutting. The plants may be gathered from until the flower begins to form, when all covering must be removed. If, when arrived at the state in which broccoli is usually cut, the stalks and immature flowers are employed as that vegetable, they will be found an excellent substitute. (*Mem. Caled. Hort. Soc.* vol. i. p. 315.) Some persons, however, recommend the same plant to be cut from only once; if we wish to prolong the duration of our beds, which must be renewed as soon as the stools appear declining and produce weakly shoots, this practice of course is preferable; so studious, indeed, are they to prevent over-cutting, that it is recommended to have such an e
beds, that one half may be allowe
nately to lay *fallow*, or to be cut fr
every other year. (*Curtis on the*
Maritima, new edit. p. 23.) W
cutting ceases, all covering must
moved, and the plants allowed to
liberty. For producing seed, a stoo
has not been cut from, or even co
all for blanching, must be allowed
spring. It flowers about June, a
duces abundance of seed on eve
which ripens about the close of July
in August. To force sea kale, ta
established plants, at the end of O
early in November, being trimm
rected above at that season, and
covered with a mixture of moderat
light earth, and sand or coal ash
three inches deep, each stool must b
with a pot, set down close, to ke
steam of the dung; or, as Sir G. M
observes, bricks or planks may be
the height of eight or ten inche
side of the row to be forced, an
with cross spars, having a space o
inch between them. (*Mem. Ca*
Soc. vol. i. p. 315.) But this mo
means so eligible as the first.
employed must be well tempered
for three weeks before it is requi
four if mingled with leaves; oth
heat is violent, but transient.
prepared, each pot is covered
thick all round, and eight inches
The heat must be constantly obs
sinks below 50°, more hot dung m
plied; if above 60°, some of th
should be removed. Unless the
very severe, it is seldom necessar
the heat by fresh linings; when
mometer indicates the necessity, a
the exhausted linings should be t
and the remainder mixed with that
plied. In three or four weeks f
first covered, the shoots will be
ting, and they will continue to
intervals for two or three month
the natural crops come in. To h
cession, some should be covered w
or litter that is little else than s
by sheltering the plants from
cause them to be forwarder than
ground ones, though not so forwa
under the hot dung; and by thi
may be had in perfection from C
Whitsuntide.

Mr. W. Gibbs, of Inverness,
Barton, before mentioned, reco
to be forced in a hot-bed, as
When the heat moderates, a
mould being put on, three or fo
plants, which have been raised w

ossible to the roots, are to be in-
e together, and covered with as
as is used for cucumbers. The
st be covered close with double
exclude the light, and additional
fforded during severe weather.
, however, when the danger of
g is past, removes the light, and
ves to the depth of four or five
ing more as the heat declines,
rame is nearly full. Sea kale,
, will be fit for cutting in about
s. Instead of frames and glasses,
ction of boards and litter that
e the light would undoubtedly
well. (*Mem. Caled. Hort. Soc.*
9 ; vol. ii. p. 100.) This mode
is greatly superior to that of
hot dung over pots, &c. The
erves Mr. Barton, in labour and
ious ; added to which, the diffi-
he old mode of keeping up a
of temperature is obviated. A
lon frame will contain as many
ble of being produced in two
enty yards each, and with only
he quantity of dung. To keep
r succession until the natural
p arrives, the same gentleman
wo three-light frames will be
r a large family ; the first pre-
t the beginning of November,
ond about the last week in De-
Ir. A. Melross, of Ardgowan,
plants along the back of the flue
y ; the pots being put over them,
at of the vinery regularly kept
ay be cut in a fortnight. Twelve
supply a family, and a regular
kept up until the open ground
production, by taking away the
on as cut from, and planting
Mem. Caled. Hort. Soc. vol. iii.

aldwin, of Ragley, also recom-
n, which in a manner is a com-
the other two, and certainly
objection to the frame forcing,
destruction of the plants, whilst
time it is nearly as economical
mption of dung. On each side
foot bed, a trench is to be dug
ep, the side of it next the bed
endicular, but the outer side
s to make it eighteen inches wide
m, but two and a half feet at the
trenches being filled with fer-
ng, which of course may be re-
er found necessary, and frames
e plants, the light is to be com-
luded by boards, matting, &c.
rt. Soc. Lond. vol. iv. p. 64.)
he generality of vegetables, the shoots of forced sea kale are always more crisp and delicate than those produced naturally. Those plants will not do for forcing a second time which have been forced in frames; consequently, a small bed should be sown every year for this purpose, so that a succession of plants may be annually had, they not being used until three years old. Sometimes a plant will send up a flower stalk; this must be immediately cut away, it will then be as productive as the others. But those plants which are forced by whelming dung over the pots are not much detrimented for the natural ground production of the succeeding year. When, therefore, they have done producing, all covering must be removed, and the ground dressed. Mr. Nicol knew an instance of the same plants being forced for seven years, and producing as healthy shoots as if only forced every second year (*Curtis on Crambe maritima*, p. 33.); but to force the same plants but seldom is the best practice. (*G. W. Johnson's Kitch. Gard.*) See Borecole.

KALE, THE WOBURN PERENNIAL. See Cabbage, Borecole, &c.

KALI. A sea weed, from the ashes of which the alkali glass is procured; whence the word alkali. See Kelp, Saltwort, and Glasswort.

KALMIA. The plants of this genus rank among the most handsome of our hardy naturalised shrubs. They do best when grown in a peat soil, though they will grow in a very sandy loam; they may be increased by layers or seeds.

The narrow-leafed kalmia (*K. angustifolia*) is a native of North America. It loves a light moist boggy soil, and blows its beautiful clusters of pink flowers most part of the summer. It throws out plenty of suckers, which flower much earlier than the plants produced from seed.

The broad-leafed kalmia (*K. latifolia*) is a hardy American shrub, which likes a shady situation. It grows twelve feet in height, and blooms reddish-white flowers in May or June, which become of a peach-blossom colour as they expand.

KAMES (HENRY HOME), LORD, was born in July 1696. He was an able and learned Scotch judge, and an ardent and successful friend to agriculture. This warm feeling he evinced through a long life, at every possible period that he could spare from the extensive engagements of a laborious profession. He not only farmed and planted successfully, but he endeavoured to improve these national avocations by every means in his power. He warmly supported the idea of forming a Scotch board of agriculture, which has been since realised by the formation of the very excellent

Highland Society, whose labours have produced such magic effects in the northern parts of our island. But Lord Kames was not content with merely stimulating others in the great work, for in his 80th year he published a spirited volume, entitled "The Gentleman Farmer, being an attempt to improve Agriculture by subjecting it to the test of rational principles," a work which his biographer very justly describes as "a singular specimen of the powers of a vigorous mind, which, even at that advanced age, when the weakness of nature usually gives itself a respite from all laborious exertions, could prosecute its employments with undiminished energy." He died Dec. 27. 1782, in the 87th year of his age. (*Farmer's Almanac.*)

KEEL. (*Carina.*) In botany, when the midrib of a leaf or petal is sharp and elevated externally, it is called a keel. It sometimes consists of two petals joined at one edge, as in the pea tribe, or papilionaceous flowers.

KEEPER. In rural economy, a keeper is one who has the superintendence of parks or preserves, and the care of game or beasts of chace. See GAMEKEEPER.

KEEVE. A provincial name for the vat in which beer is worked or fermented.

KELP, SEA-WEED, BARILLA, &c. I class these manures together, when treating of kelp, since it is to the presence of various salts of soda that sea-weed principally owes its fertilising qualities, for when they are washed out, the residuum is nearly inert. Sea-weed has been analysed by M. Gaultier de Claubry. In the *Fucus saccharinus* and in the *Fucus digitatus* (which is much used in Scotland as a manure) he found the following substances (*Thomson's Chem.* vol. iv. p. 298.) : —

Saccharine matter.
Mucilage.
Vegetable albumen.
Oxalate of potash.
Malate of potash.
Sulphate of potash.
Sulphate of soda.
Sulphate of magnesia.
Muriate of soda.
Muriate of potash.
Muriate of magnesia.
Carbonate of potash.
Carbonate of soda.
Hydriodate of potash.
Silica.
Phosphate of lime.
Phosphate of magnesia.
Oxide of iron.
Oxalate of lime.

By burning these weeds the kelp and barilla of commerce is formed; the first of which has been often advantageously employed in Ireland and on the coast of Scotland as a manure. The Suffolk and the Kentish farmers, however, as well as some of the Scotch, employ the sea-weed in its freshest state, either ploughing it into the soil, or spreading it on the top of their heaps of compost. The first plan, however, I have ever seen productive of the best

effects; and in that conclusion I
ported by the experience of many
farmers.

The salt turf of the sea-shore
long used in many parts of Engl
excellent manure, especially for
and, according to Dr. Holland (
Cheshire, p. 143.), even the salt m
Mersey is extensively used for
crop, at the rate of twenty tons
"The ground thus manured not
a large produce of potatoes, b
state of excellent preparation
ceeding crop of either wheat
The adoption of this practice has
very greatly the value of land a
ton."

There can be no doubt of the
of using the sea-weed, or sea-t
freshest possible state, after it ha
vered with the salt water, as
tide; for if the salt water has be
to drain away from the weeds, a
decomposition has taken place,
as a manure must be materially
The Cornish farmers, when the
calcareous sand from the sea-
careful to obtain it as much
the salt water as possible: and
the juices and other component
plants a variety of ingredients
produce the most luxuriant
vegetation growing at a distan
sea; and their constituents are
noxious to the vermin with whic
vated soils abound. If this co
correct, then the mode adopted
of Thanet and Suffolk farmers,
ing the sea-weed into heaps, a
it to putrefy, is decidedly wro
being thus decomposed, half it
virtues are lost to the soil. T
excuse for rendering dung putri
is spread, viz. that it is a necess
to kill the seeds of weeds, has no
here, for those of marine wee
grow on arable upland soils.

The use of sea-weed as a man
isles of Jersey and Guernsey
very extensive from time immem
in a work upon Jersey, by the
Falle, published in 1694, he ob
"Nature having denied us the
chalk, lime, and marle, has supp
what fully answers the end of t
bandry — it is a sea-weed, but a
valuable to us than the choicest
grows in our gardens. We c
(*varec*), in ancient records se
sometimes *wrecum*, and it grows
about the island. It is gathe
certain times appointed by the
and signified to the people by a

day. There are two seasons
the one in summer, the other
rnal equinox. The summer
rst well dried by the sun on
serves for fuel, and makes a
re; but the ashes are a great
o the soil, and are equal almost
ntity of lime. The winter
read thin on the green turf,
s buried in the furrows by the
credible how with its fat unc-
ce it ameliorates the ground,
f into it, softening the clod,
the root of the corn moist
st parching heats of summer.
ther, the sea does often tear
rocks vast quantities of this
s it on the shore, where it is
red up by the glad husband-

chiefly valued for making
are *Fucus vesiculosus*, *F. no-*
tus, *Laminaria digitata* and
thalia lorea, and *Chorda filum*.
ons of the sea-weeds make
. The Jersey and Guernsey
ociety confirmed this account
t effects of the ashes from sea-
in their Report to the English
ulture, when they observed—
l, that a chabot (half a bushel),
a perch of ground in winter
g of spring, will be a suffi-
Our labourers are unani-
ion, that it gives a full ear
d prevents it being laid —
e any *varech* to sell may at
habot of wheat for a quartier
f *varech*." (*Com. to Board of*
216.)
ng effects of sea-weed are not
better description of soils;
nd of heath lands are bene-
plication of this manure; —
Sherriff, of Haddington, has
effects of sea-weed, or sea-
lled in Scotland, on common
land, in the following terms:
hich is a capital manure for
often be procured at little or
Crops almost incredible, of
, clover, and rye, have, to
ertain knowledge, been ob-
extensive tract of the most
ty wastes and poor rabbit
e powers of this manure; soils
years since, were not worth
per acre. The bent was torn
mon swing plough, burnt, and
d; the soil was then manured
tang, as much as could be
Turnips were immediately
lled to prevent blowing; this

crop was succeeded by rye or barley, and that by red clover and rye-grass. On the clover stubble, and sometimes after the turnip crop, plenty of tang was again laid, the ley ploughed down, and sown with oats, barley, or rye, and frequently with turnips, which in this way have succeeded admirably on the ley with one ploughing." (*Com. to Board of Agr.* vol. iv. p. 122.) It is certain, from the experiments of the late Mr. Knight, that green manures of all kinds are an admirable manure; and it seems well established that the more the juice of the vegetables so employed is impregnated with saline matters, the more fertilising are their effects: thus, in Bavaria, borage is very commonly cultivated for this purpose, and the reason assigned for the preference shown to this plant is, that it contains soda and other salts. (*Gardener's Mag.* vol. i. p. 200.)

I have no doubt that in many situations the sea-weed may be successfully cultivated on the sea-coast, expressly for manure; and it seems that for this purpose hardly any thing is required except placing stones on the shore, to which the fuci can attach themselves, and in two years the crop may be cut. According to Mr. Jamieson (*Miner. of Scottish Isles*, vol. ii. p. 251.), various kinds of stones have for this purpose been employed in Scotland, as basalt, sandstone, and limestone, which last is the best adapted for the purpose, and after that the basalt.

There are also in many parts of the coast of Britain extensive tracts of land which it would be difficult to enclose, and yet these places are either already covered with a coarse turf, or might be so with a little management; and this turf, when cut and carted on to the light upland soils, is found almost invariably to be an admirable fertiliser; — for instance, when spread over land during the winter, and then turned into the soil, for potatoes, the crop is sure to be excellent. No description of fertiliser, perhaps, can be named, which *freshens*, as the farmers say, an over-cropped soil so much as a dressing of from twenty to twenty-five loads per acre of the turf from the sea-shore, soaked with sea-water; and no plant delights in fresh soil so much as the potato. It is, therefore, more than probable, that the excretions of the commonly cultivated corn crops are peculiarly noxious to this plant; and it is certain that the potato, by the deposit which it leaves in the soil, renders it distasteful to the crop by which it is succeeded. Thus the wheat plant rarely looks well on soils where the potato has immediately preceded it. Saline fertilisers, in these cases, are sure to be serviceable, for they unite with, and neutralise the effects, as well as promote the decomposition, of the excretory matters which all plants deposit in the soil.

The chief fertilising qualities possessed by barilla are attributable to the presence of soda. This alkali is found in all marine vegetables, and in most of those which grow on the sea-shore. It has been used in several experiments as a manure since the price of soda has been so much reduced; but these have not been conducted with sufficient accuracy to enable us to judge of its value as a fertiliser. What little has been done, promises well. Thus, it has been found, when a pound of soda is dissolved in fourteen gallons of water, that this solution forms an excellent liquid manure for many culinary vegetables; for instance, the vegetable-marrow plant, when thus treated, has been found to flourish better in common garden mould than other plants growing on a dunghill. And, as I have remarked in another place, nature is here again our instructor: the fertile plains of Syria, and some of the most profusely luxuriant fields of the orientalists, abound in carbonate of soda. This alkali not only enters into the composition of many vegetables, but it promotes the growth of all, by preserving the moisture of the soil, and by accelerating the decomposition of the numerous organic substances found in all cultivated lands. The sewer water of towns and cities, which has been found so very rich and fertilising as a dressing for grass lands, abounds with soda; for that is contained in the soap suds and other refuse washings which such drainage matters always convey. Soda has been found in very sensible proportions in the urine of the horse, by M. Fourcroy; and in that of the ass, by Mr. Brande; and a small portion of this alkali is usually presented in the waste ashes of soap-makers, which many cultivators consider highly valuable as a manure.

As the use of kelp has been of late much greater than formerly as a manure, it will be useful for the cultivator to learn the proportion of alkali contained in the kinds usually met with in commerce, as determined by Mr. Jamieson (*Min. of Scottish Isles*, vol. ii. p. 248.): —

	lbs.	oz.	lbs.
Barilla from Alicant, good -	23	8	in 100
Teneriffe, bad -	8	7	
Kelp from Norway, indifferent -	2	11	
Shetland, indifferent	2	6	
Lewis, indifferent -	2	6	
W. Highlands, much damaged - -	0	5½	
Arran - -	3	8	
Isla, good - -	4	0	
Mull, good - -	4	8	
Kelp from Morven, good -	4		
Skye, good - -	5		
Leith shores -	4		

But, besides the alkali referred contains iodide of potassium, bro potassium, and sulphuret of potas of which probably exert considerab ence on vegetation. It is well kno seeds sown in pure sand, and wate a solution of iodine, germinate very

The residuum, when all the common salt are extracted from th is principally earthy matters, whic a very inert nature, and need no garded by the cultivator as posses peculiar fertilising properties differ marl, which they much resemble i sition.

100 parts of these insoluble m kelp are composed of —

Sulphuretted hydrogen and carbonic acid - -	
Carbon - - -	
Sulphuric acid - -	
Silica - - -	
Lime - - -	
Magnesia - - -	
Alumina - - -	
Iron - - -	
Loss - - - -	

From the quantity of kelp pro the shores of Scotland, and its redu since the peace, which again all unrestricted import of Spanish ba more especially since the discov cheap mode of extracting soda from salt, the application of kelp as a m engaged the serious attention of th of that part of the island, and a c was some time since appointed by t land Society of Scotland to report pretensions; in much of that rep which the following extracts are cordially agree: —

"Your committee are unwillin any theoretical opinion as to th which kelp may operate as a manur the quantity of alkali which it co may naturally be expected to op rendering the animal and vegetabl soluble, and a fit food for plants; the series of facts to be noticed, ke seem to possess other qualities as a Although it may be beneficially a a dressing by itself, yet the comm at present inclined to think that view to raising of green crops, it better to mix it in compost with o stances. The selection of these

n what the farmer can furnish;
mmittee think that good earth or
form a good compost, and if to
re can be added a little vegetable
manure, a beneficial result may
on. In this way, a few tons of
d enable a farmer to extend his
over at least four times the quan-
d."

ative value of kelp as a manure
timated from the following expe-
made in the neighbourhood of
:—A field upon the estate of
possessed by Mr. Hutchinson,
ed, which had been in wheat in
328, hence it was in some measure
austed state: upon one ridge of
there was sown at the rate of
f kelp per acre; on a second,
e of 10 cwt. per acre; and on
t the rate of 4 cwt. per acre.
ridges were manured with the
and horse dung, at the rate of
r acre; and the whole was sown
t, late in the spring of 1829. The
which had got the greatest quan-
p were equal to that which had
and the ridge which had got the
antity was decidedly superior to

Similar experiments were made
ame field, by sowing barley after
us crop of wheat: the result was,
rley manured with the kelp was,
to the estimate of the tenant and
l, a much heavier crop than after
tion of horse and cow dung, and
dge with the smallest quantity of
red the heaviest crop.

n of the lands of Bangholm were
with kelp of inferior quality, at
f one ton per acre, and the land
yellow turnip; the crop, upon
n, is considered to be fully equal
t of the field which has been ma-
h dung. (*Baxter's Lib. of Agr.*
06.)

r of Henfield has given the result
eriments on kelp, from which he
n that "5 cwt. of kelp per Scotch
produce a manifest improve-
any crop." (*Trans. High. Soc.*
320.) Care must, however, be
to apply too copious a dressing of
. Mackinnon, of Corry, draws the
conclusion from his experiments:
e ashes of sea-weed burnt in a
f the ashes thus manufactured,
s were allowed to the acre, and
d in the drills. When the turnips
they had an unhealthy green or
lowish appearance, but after some
al patches in the field seemed to
g luxuriantly, while others seemed
to retain their sickly hue. Upon a careful investigation, it was discovered that wherever the ground was deepest, and the ashes of the sea-weed had been most mixed up with the soil, the turnips were best; and on the other hand, that where the ashes, not being mixed up with the soil, came in contact with the seed, the turnips did not at all thrive. In clearing the ground the weeds were collected into heaps, and burnt upon the spot; and it was observed that on the side of these heaps the turnips were very nearly as good as those on an adjoining piece of ground manured solely with dung." (*Ibid.* vol. iv. p. 246.) There is a good paper on the manufacture of kelp in *Quart. Journ. of Agr.* vol. ii. p. 927.; and on mixing kelp with composts, peat, turf, &c. *ibid.* vol. iii. p. 556.

Every farmer has it in his power, even in the most inland situations, to procure soda for the use of his farm, by means of a mixture of two parts of lime and one part of common salt, and suffering the mixture to remain incorporated in a shady place, or covered with sods, in a dry state, for two or three months; a plan which I suggested some years since (*Johnson on Salt*, p. 32. 3d edit.), and which has been recently successfully adopted by Mr. Bennet in Wiltshire. By this process a gradual decomposition takes place, chloride of calcium and soda are formed, the whole mass speedily becoming encrusted with this alkali. There is another advantage to be derived from the adoption of this process, besides the formation of the soda, viz. that the chloride of calcium is one of the most deliquescing or moisture-absorbing substances with which we are acquainted; and, in consequence, wherever it exists in a soil, the warmth of the sun has, in summer, much less influence upon it than it would otherwise have.

Mr. G. Irwin, of Taunton, bears testimony to the value of common soap-suds. "The portion of the garden invigorated by the soap-suds, only annually exhibits a luxuriance almost equal to anything this fertile neighbourhood can produce." The Rev. J. Falconer, when commenting upon this experiment, says, "This mixture of an oil and an alkali has been more generally known than adopted, as a remedy against the insects which infest wall fruit trees. It will dislodge and destroy the insects which have already formed their nests and bred amongst the leaves. When used in the early part of the year, it seems to prevent the insects from settling upon them. Mr. Speechly, the author of a treatise upon the Cultivation of the Vine, published in 1796, used this mixture with great success, although, from not having employed a garden engine, he applied the soap-suds awkwardly and wastefully. He directs it to be poured from a ladder, out of a watering-pot, over both trees and wall, beginning at the top of the wall, and bringing it on in courses from the top to the bottom."

Mr. Martin, of Warbleton, has recently used soda for turnips, half a cwt. per acre, previously to the last ploughing, thinking, as he observed, that it would destroy such insects as lie in the ground in an embryo state, or prevent their arriving at maturity so as to injure his crop. In respect to the use of soda on corn lands, he said he used it rather extensively last season, and that he had tried several experiments with it, both upon grass and arable land. That in a field of wheat, a very thin poor gravelly soil, he sowed one warp without any manure at all; on another warp adjoining, he used one cwt. per acre; and on a third warp he put one and a half cwt. per acre. The produce of eight rods on each warp was as under: this was on land of a very bad description: —

	per acre.
8 rods without manure, 7 gallons, or	17½ bushels
8 rods with 1 cwt. soda per acre, 10½ gallons, or - - -	26 bushels, 2 galls.
8 rods with 1½ cwt. soda per acre, 15½ galls. or - - -	38 bushels, 6 galls.

KENNEL. (Fr. *chenil*, from *chien*, a dog.) The hole of a fox or other wild beast. In rural economy, a habitation for dogs, especially those of the hound kind: it should be situated a good distance from the house. Large kennels require to be kept clean, well aired, and strewed with fresh straw to prevent the mange or other infectious distempers. Those readers who wish to acquire information on the management of the kennel will do well to consult *Blaine's Encyclopædia of Rural Sports.*

KENT, WILLIAM, an artist and celebrated ornamental gardener, was born in Yorkshire, in 1685. From 1743 to 1748 he was troubled with various inflammatory attacks, which terminated his life on the 12th of April in the last named year. Walpole, Mason the poet, and G. Mason highly panegyrise him, and, indeed, by general consent, he is allowed to have been the first general practitioner of landscape gardening. For the following outline of his style of design I am entirely indebted to Mr. Walpole, his contemporary: — "The great principles on which he worked were perspective, and light and shade. Groups of trees broke too uniform or too extensive a lawn; evergreens and woods were opposed to the glare of the champain; and where the view was less fortunate, or so much exposed as to be beheld at once, he blotted out some
parts by thick shades, to divid
variety, or to make the richest s
enchanting by reserving it to
advance of the spectator. Whe
were wanting he introduced tem
but he especially excelled in the
ment of water. The gentle st
taught to serpentine seemingly a
sure, and, where discontinued b
levels, its course appeared to be
by thickets properly interspersed,
tered again at a distance where i
supposed naturally to arrive.
were smoothed, but preserved t
derings; a few trees were scatter
there on its edges, and when it d
among the hills, shades descen
the heights leaned towards its
point. He followed Nature e
faults. In Kensington Gardens
dead trees, but was soon laug
the excess. His ruling principl
Nature abhors a straight line.
Johnson's Hist. of Gardening.)

KERN. A hand mill, consist
pieces of stone, by which corn
it is written likewise *quern.* T
still in use in some parts of
Kern also signifies to granula
harden, as ripened corn; and i
mon corrupted name for chu
parts of that country.

KERN-BABY (a corruption
baby) was an image formerly
with corn, carried before the
their harvest-home.

KERNEL. (Sax. cẏnnel, a g
general this word signifies the
within a shell; but it has different
sometimes implying any thing i
a husk or integument, as the se
fruits, the grain of oats, &c.
culture the hardy fruits are ge
ranged under the heads of *kerne*
pomes, including the apple, pe
medlar, and service; *stone fr*
peach, nectarine, almond, apricot,
cherry; *berries*, as the mulberry,
elderberry, gooseberry, currant,
cranberry, and strawberry; an
the walnut, chestnut, and filbert.
Encyc. of Gard.)

KERRY COWS. See CATTL

KID. A young goat. (Se
Also a provincial name for a sm
of underwood or brushwood.

KIDED. A provincial nam
pods of beans, &c.

KIDEROW. A local term app
place set apart for keeping a s

KIDNEY-BEAN. See BEA

KIDNEY-VETCH. (*Anthylli*
from ἄνθος, a flower, and ἴουλος, d

the flowers being usually covered
or silky pubescence.) The species
e most part, elegant and free-
plants proper for ornamenting
The hardy perennial and an-
thrive well in a warm situation
oil. The green-house and frame
ed best in sandy loam and peat;
se plentifully from seeds, and
from cuttings. (*Paxton's Bot.*

mon kidney-vetch, or ladies'
vulneraria), is the only species
to these islands. It is found
ld in chalky or limestone coun-
e the soil is dry and rather
l the herbage affords good pas-
sheep. The root of this species
he stems annual, round, hairy,
y simple, ascending, about a foot
radical leaves are simple, el-
long stalks, soon disappearing;
ernate, pinnate, with a terminal
aflet, and several pairs of op-
ll, lanceolate ones; all entire,
l a little glaucous above, hairy,
silky, underneath and at the
he flowers which are numerous,
f crowded terminal heads, ac-
by figured bracteas, are usu-
rarely of a fine red. In Ger-
rding to Haller, the flowers are
ently white. This plant for-
the reputation of possessing
erary properties, whence the
ne. (*Smith's Eng. Flor.* vol. iii.

(Sax. cẏln.) A kind of furnace
admitting heat, in order to dry
of various kinds, as corn, malt,
It also signifies a fabric or
nstructed for the purpose of
nestone, chalk, and other cal-
nes into lime. Kilns are of
ds, and formed in different ways,
o the purposes for which they
ed. See Hops, Malt, Lime,
, &c.

SHES. The ashes made in
e wood, straw, furze, &c. are
ese ashes are useful as manure
any kind of soil. They are
ucceed best when spread just
See Ashes.

CLAVER. See Common Me-

CUPS. A local and provincial
he buttercups, or creeping and
rowfoot. (*Ranunculus repens*,
nd *acris*.) See Buttercup and

SPEAR. See Asphodel.

SHER. (*Alcedo ispida*.) The
well known kingfisher (says Mr. Yarrell) is one of the most beautiful of our British birds, and will bear a comparison with many of those which are brought from climates considered more favourable to the production of brilliant colours. It is also generally distributed, though it can scarcely be said to be very numerous anywhere. It frequents the banks of streams, sometimes inhabiting fish-ponds; and the bird is most frequently seen when flying rapidly along near the surface of the water. Its food consists of water-beetles, leeches, minnows, sticklebacks, and probably many other species of small fish which it can seize upon by surprise. For this purpose the kingfisher takes a station near the water, sitting on the branch of a bush or tree overhanging the stream, or on a rail by the water-side, whence it darts instantaneously upon any passing prey, and will occasionally suspend itself on the wing, hovering and watching for a favourable opportunity to make the plunge which is to secure its victim. The prey is always taken with the beak; and so unerring is the aim, that the bird seldom fails to gain the fish it strikes at, which when thus captured is brought to the usual waiting place, and, after some mutilation to produce death, is invariably swallowed head foremost. The kingfisher is solitary in its habits, and pugnacious in disposition, seldom to be seen with any associate except its mate during the breeding season. At this period a pair take possession of a hole already formed by some burrowing animal, in the bank by the water-side, where the female deposits five or six eggs upon the fish-bones which have been rejected from the stomach; for kingfishers, like many other birds, possess the power of reproducing the contents of the stomach at pleasure. The eggs are of a short oval form, almost round, measuring ten lines and a half in length, by nine lines in breadth; of a smooth and shining white when blown, but previously exhibiting a delicate pink tinge, from the influence of the colour of the yolk, which pervades the transparent albumen and thin shell.

In form the kingfisher is bulky and heavy for its size and length, reminding the observer of the powerful body and short wings of the dipper.

The beak is about one inch and a half long from its point to the feathers on the forehead, and two inches long from the point to the angle formed by the gape. The whole length of the bird is about seven inches. When flying in a bright day the plumage of this bird exhibits a variety of the most dazzling colours. The crown of its head, the beak, and the coverts of its wings, are of a deep

1

and smoked.

KIPPER-NUT, or PIG-NUT. See Earth-Nut.

KIRK. (Sax. cẏꞃce.) An old word for a church, yet retained in Scotland.

KIT. In some places a name given to a milking-pail or vessel in the form of a churn, with two ears and a cover, used to convey milk in.

KITCHEN GARDEN. A piece of ground laid out for the cultivation of fruit, herbs, pulses, and other culinary vegetables.

The kitchen garden is the most important object of the horticulturist's care, inasmuch as that its productions, next to those of agriculture, tend most to the support of mankind.

It often affords the chief support of the cottager, and ought to be the constant attendant of his dwelling. Of more exalted mansions it is always an accompaniment, but it is much to be regretted that a more plentiful use of its products is not adopted in preference to grosser aliment.

The kitchen garden also has for its inmates many plants chiefly valuable as rendering other kinds of food more palatable, or as possessing sanative qualities. These last formerly far exceeded in number the edible plants. The subsequent more general employment of mineral medicines has reversed this state of our kitchen garden. The culture of aromatic herbs is also much less attended to since the introduction of spices. In selecting the site, and in erecting the inclosures, as well as in the after-preparation of the soil, the ingenuity and science of the horticulturist are essentially requisite. He will be called upon to rectify the defects, and to improve the advantages, which nature affords; for it is very seldom

the bottom of a valley, is
avoided. It is a fact, not ve
explanation, that low-lying
most liable to suffer from bligh
frosts; those much above th
sea are obviously most expose
winds. To determine the ap
of a kitchen garden is impossi
to be proportionate to the n
family, their partiality for ve
the fertility of the soil.

It may serve as some crite
that the management of a ki
occupying the space of an acre
employment for a gardener,
require an assistant at the b
of the year. In general, a
persons, exclusive of servan
full rood of open kitchen
walls are usually built in
fifteen to thirty feet in leng
thick, with pillars, for the sa
to their strength, at these
tances; the foundation is a br
thick. The plan of Mr. Silve
chester, is worthy of adoption,
constructed, it is equally dura
one third of the expense.
structed are stated to become
much more rapidly than a sol
same or any other thicknes
appears not a shadow of a
should not ripen fruit equal
forms the wall hollow, ni
breadth, by placing the bricks
as to form two facings; the
good mortar, and the joi
finished. They are placed alt
their faces and ends to the ou
every second brick is a tie,
succeeding course a brick with

foundation, and to compensate
it of strength a waved form is
th the smallness of its substance,
n, are found, however, to be in-
he ripening of fruit. In every
wall should never be lower than

a wall, a close set paling of
height is to be preferred. A
t only an imperfect screen, but
pects is worse than useless, since
n be trained to it, and its roots
e soil in their neighbourhood
erably; as the south fence of a
may be employed without such
lisadvantages. For its formation
awthorn is in general employed,
aps, the worst shrub that could
e of. A hawthorn hedge, says
ms, of Pitmanston House, near
is the nursery of the same
etles, and caterpillars that feed
foliage of the apple and pear;
y spread to the trees nearest the
inally overrun the whole garden.
s deprecated the use of the haw-
roceeds to demonstrate the su-
of evergreen over deciduous
d more especially recommends
which he states to be nothing
w a grower as is generally ima-
a cloudy day in April or May,
eems to be actually refrigerated
hrough a thick hawthorn hedge,
y be accounted for on the same
at cool air is obtained in the
ndia, by sprinkling branches of
water in their verandas. Holly,
most evergreens exhale but
ure from their leaves, except for

should be a walk five feet in width, likewise extending round the area.

Clayey gravel is best employed for the walks, though they are often formed of road-drift, sand, or cinders; grass is inconvenient, not only from its wetness, but from the injury it sustains from the wheelbarrow, &c. Each walk should be laid five inches thick of the material employed, being founded upon stones, brickbats, clinkers, &c. which, serving as an underdrain, will keep it dry in the wettest weather. It should be gently arched, as this form tends also to keep it in a dry state, and to prevent it sinking into holes. Beneath the walks the mould ought to be good, as the roots of the trees extend in general beneath them.

Box and other live edgings being a harbour for snails, slugs, and vermin, are best excluded; and the limits of the beds and walks marked by a single course of bricks, as these are not only durable, but save much labour in keeping them up. On the edges of the cross-paths, parsley, thyme or other pot-herbs, may be employed for this purpose.

The insertion of the fruit trees is the first thing to be attended to, at the proper season, after the formation of the garden, both against the walls and on the borders. In the main compartments no fruit tree of a size larger than the gooseberry shrub should on any account be admitted, for not only are the culinary tribes injured by their presence, but the roots of the trees must either be materially injured, or, what is as objectionable, the beds cannot be submitted to the spade; even the gooseberries, raspberries, &c. should be planted in compartments by themselves, they then can have contribute to the welfare of plants, and to obviate as much as possible their defects, without having recourse to any artificial heat, &c. But the temperature of our climate, even with the most just management, can never be raised sufficiently high, by any practical means of accumulation, for the growth of the plants of warmer countries; nor in winter, to grow certain vegetables which are then in request, that will flourish at other seasons in our unsheltered beds. To overcome this barrier of nature, an artificial temperature is obtained, and the severity of the natural atmosphere excluded by means of glass. This constitutes the hot-house and forcing department; but, as far as it is connected with the inhabitants of the kitchen garden, it is here treated of as preventing, in a great measure, the necessity of ulterior reference, which cannot, without endless repetitions, but confuse and disturb every advantage that is obtained by a systematic arrangement. In pursuance of this opinion, directions for the construction of hotbeds, &c. are given here, since for all crops that require artificial heat the construction of a hotbed is the same, consequently the following will serve as a general guide.

A hotbed is usually constructed of stable dung, of which that made by the best fed horses is to be preferred. It should be about ten days from the stalls, and without too large a proportion of litter. After being thrown into a heap of conic form for five or six days, it must be so turned over that the inner parts are brought to the outside, the clots well separated with the fork, the heap being re-formed conical as before, and left for an equal number of days. By this time and treatment the dung in general acquires a sufficient and steady heat; if, however, it is very dry and fresh, it must be moderately moistened, and left for five or six days more. At the time of forming the heap, as well as at every turning, water should be applied, if its substance appears at all dry, as a regular state of moisture is of first importance to the obtaining a favourable fermentation. There is a considerable difference of opinion with respect to the length of time that dung should continue thus in the heap, some gardeners protracting it even to four weeks; a more decisive rule appears to be, that it should remain until the straw in general assumes a dark brown colour, when it should be immediately formed into the bed. If, of necessity, dung is used that is neither fresh nor strong, a portion of coal ashes, or a larger one of leaves or tan, may be mixed with advantage. If it is fresh, the addition of these is apt to make the fermentation

violent and transitory. Dr. Hu
ever, recommends leaves to be m
times, as heat is thereby genera
a greater length of time. (*Georg.*
p. 63.) In cold, wet, or boistero
the heaps should be covered to
depth with litter.

In making the beds, they
situated as to be entirely free
overshadowing of trees, buildin
having an aspect rather a point
the south. A reed fence surrou
on all sides is a shelter that preve
verberation of the wind, an e
caused by paling or other solid
This must be ten feet high to the
or back part, of a similar he
sides, but in front only six. Th
gate must be of sufficient width
loaded wheelbarrow. An inclo
description, 100 feet in length a
will be of a size sufficiently la
pursuit of every description of
cing. But for cucumbers, me
few inferior articles, a space for
lights is sufficient. Fruit may
slightly by being trained withi
southern aspect; the fence on t
that case, must be of brick or w
assist in increasing the temperat
black. To prevent unnecessary
inclosure should be formed as
stable as possible.

For the reception of the bed,
often recommended to be dug,
termined length and breadth, a
deep if the soil is wet, or eight
if it is dry. In a dry soil and
cannot be productive of much
otherwise, it almost always chil
at the same time it is to be ob
it is never productive of ben
than not being so high it is easi
but gives much additional trou
the time of founding, and after
linings are to be applied. Fro
other considerations, which m
cerned as the future operations
it appears that a hotbed is best
the surface to which a gentle
from the N. towards the S. shoul

The site of the bed being de
stake should be driven perpend
the four corners, as a guide for
gular construction. The dung
thoroughly mixed just before it
as carefully separated and sprea
with the fork, as the bed is form
It is beneficially settled down in
alike by beating with the fork,
proceeds, rather than by treadin
much compressed a high degre
generated, but is soon spent;

menon is often caused if trod to a still
er excess, viz. that no heat at all is
dered.

longest, or littery, part of the dung
l be laid at the bottom of the bed, and
er fragments of the dung upon the
If it is not regularly and moderately
throughout, it should be sprinkled
ith water. As the surface on which
l is founded is usually horizontal, so is
ng laid perfectly parallel with it.
ight recommends it, on the contrary,
equally inclined with its foundation,
may associate well with the new form
he recommends for frames.

breadth of a bed must always be from
five feet — in the depth of winter
d a half feet high when firmly settled:
n it of this size, about twelve bar-
ds are required to a light. In early
a height of three and a half feet is
nt, and as the season advances it may
to three or two and a half feet. In
r early summer, when the only object
sten the germination of seeds, two
eighteen inches, is not less than the
ry height. The length of the bed
ases must be guided by the size of
me.

revent the sudden changes of tem-
re by the external air affecting the
the bed, a practice of Mr. Fowler,
s the first person that ever produced
bers about Christmas, is much to be
nded: he was accustomed to coat the
f the bed with sand (coal ashes or
ight be substituted) to a thickness
feet. "This," observes Bradley,
only prevents a fluctuation in the
ut maintains the bed in a regular one
longer." (*Gen. Treat. on Husb. and*
ii. p. 63.)

he heat declines, *linings*, or, as they
be more properly called, *coatings*, are
se of; which consist of hot fermenting
laid from eighteen to twenty-four
, in proportion to the coldness of the
, &c. all round the bed to the whole
eight, and if founded in a trench, one
y deep must be dug for the coating, it
of importance to renew the heat as
as possible throughout its whole mass;
r a while the temperature again de-
, the whole coating must be taken away
similar one of hot dung applied in its
As the spring advances, the warmth
sun will compensate for the decline
the bed; but as the nights are
yet cold, either a moderate coating
or ten inches thick is required,
wings of grass, or even litter, may
d round the sides with advantage.

depth of earth as well as the time and manner of applying, vary considerably; it should never be put on until four or five days after the bed is formed: before it is applied the edges of the bed should be raised full eight inches higher than the middle, as from the additional weight of the frame they are sure to sink more, and quicker; thereby often causing the earth to crack and injure the roots of the plants. (*Trans. Hort. Soc. Lond.* vol. iii. p. 147.)

The roots of plants being liable to injury from an excessive heat in the bed, several plans have been devised to prevent this effect. If the plants are in pots plunged in the earth of the bed, they may be raised an inch or two from the bottom of the holes they are inserted in by means of a stone. But a still more effectual mode is to place them within other pots, rather larger than themselves; a space filled with air being thus interposed between the roots and the source of heat, an effectual security is obtained. To prevent the same injury occurring when the plants are in the earth of the bed, a moderate layer of neat's dung, laid between the earth and the fermenting mass, is an efficient precaution, and is much preferable to a similarly placed layer of turf, which interrupts too much the full benefit of the heat. A plan recommended by Bradley is well worthy of notice. A woven hurdle, somewhat larger than the frame, being placed upon the dung, on this its woodwork can rest, and the earth is laid within it; thus the whole can be moved together without disturbance. (*Gen. Treat. on Husb. and Gard.* vol. i. p. 47.) This would especially be of advantage when bark is employed, which requires occasional stirring to renew its heat, in case of emergency, when time cannot be allowed for the bed becoming regular in its heat before the plants are inserted. Besides these precautions, vacancies should be left in the mould, and holes bored with a thick pole into the bed, which must be filled up with hay or dung when the danger is past.

For ascertaining the internal temperature of the bed, the thermometer is the only certain guide; as it also is for judging of the temperature of the air within the frame: the ingenious mode of introducing it into the body of the bed recommended by M. Regnier of Paris, is to have the thermometer inclosed in a wooden case of the size and form of an ordinary dibble, which is to be lined with baize, and fitted with a cap of tinned iron to exclude the exterior temperature. The end which enters the earth is shod with perforated copper. (*Mem. Caled. Hort. Soc.* vol. iii. p. 180.) In conjunction with the thermometer, *trying sticks* may be employed for occasional observation: these notwithstanding these precautions, the supply of air can seldom be regular; hence, and from sudden chills, the plants are often checked, sometimes essentially injured. It may be remarked here, that raw, foggy days, if any thing, are more unfavourable than those that are frosty for the admission of air. A complete remedy for all these difficulties is afforded by a plan suggested by Dr. Hales, the celebrated vegetable physiologist, since by it a regular supply of warm air is kept up, and renders it unnecessary to raise the lights, except in the most favourable times. His mode succeeds on the principle that warm air ascends, and simply consists of a pipe passed through the body of the bed, one end communicating with the exterior air, the other opening into the frame, at one of the top corners of which an aperture must be made; the heated air of the frame will constantly be issuing from this aperture, and its place supplied by that which rises through the pipe. (*Lewis's Chem.* 2d ed. vol. i. p. 411.) This suggestion is more practically illustrated by Mr. Keith of Ravelstone, who states that he employs a pipe of lead, about two or three inches in diameter, bent nearly at a right angle, and each limb being three feet long; one of these to be placed horizontally as the bed is forming, with its mouth extending into the open air; that of the other opening into the frames; a cap should be fitted to the first, and by a slit on its under side the quantity of air admitted can be regulated. (*Mem. Caled. Hort. Soc.* vol. iii. p. 185.)

Although stable manure, from its abundance, is generally employed for the constructing of hotbeds, yet there are several other vegetable matters that are also in use for the same purpose. Tanner's bark, from

than ten or twelve, otherwi
not be lasting. When the
must be gently settled witl
never trodden upon, for if
pressed it loses the power
if the bark is fresh, and n
small, it attains a sufficien
fortnight for the insertion of
will continue in heat for two c
the larger the fragments o
the longer time it requires
in an equal proportion it a
temperature and preserves i
middle-sized bark is theref
to be preferred; and, adde
considerations, it is to be
when made of large fragme
sudden excesses often arise,
bed has been constructed
months; on the contrary, if
fermentation soon passes off.

When the crops are ren
heat declines, if well stirred
two of fresh bark mixed w
will acquire and continue
equal further lapse of time
repeated throughout the y
the heat is found to decline.
cessary every autumn entirel
to reconstruct the bed with
when the old is far advanc
trefaction, it will no longer
If the bed is required in a sh
it would of itself acquire a
perature, a small quantity of
ing dung may be placed a
the bed; otherwise this is
practice, occasioning often
always a transient fermentat

The leaves of the oak and
and doubtless of many othe

oderately watered if dry. In a few
very powerful heat is produced, and
or six weeks will have become so
, that it may be broken up, and the
onstructed with its materials, water
gain employed if dryness appears,
y must be well trod down as before.
re many other substances that ge-
heat during fermentation; there is
no vegetable substance that does
en a heap of dry sticks acquires a
ccession of temperature if moistened.
rnet of Kennet, North Britain, recom-
the trial of the refuse matter thrown
essing flax for constructing hotbeds:
efuse," he says, "he has observed,
ft undisturbed, continue at a tem-
e of 64° for many months;" he seems
ate as long as fourteen. (*Mem. Caled.
oc.* vol. ii. p. 219.) This material
ver, to be had in very few districts.
and other green herbage, and even
straw mixed with coal-ashes, have
ed on an emergency with success.
order in which successive crops are
n the same compartment has very
able influence in prolonging the
nce of the soil in fertility. Some
les, as onions and carrots, are ex-
impoverishing to a soil, whilst let-
e but in a small degree prejudicial.
herefore, obvious, that a succession
usting crops should be never grown
ame bed, however plentiful manure
not merely because abundance is
e for a want of economy, but that
plied dung is not so immediately
al as those remains of organised
which, by long continuance in the
e become impalpably divided and
through its texture, and of which
ceeding crop consumes a portion.
plants in general are the least ex-
which have the largest surface of
and *vice versâ*, because the first are
possessed of a larger proportion of
than solid matter than the latter,
are enabled to obtain a greater
of their food from the atmosphere.
be objected to many crops included
rule, and especially to turnips, that
quire a soil of extreme fertility; but
nly an apparent anomaly, for, al-
the turnip, for example, requires a
il, it is only because it requires a
supply of moisture: neither will a
us soil therefore be beneficial; on
trary, a superfluity or deficiency, ac-
to the season, being then afforded,
r immaturity is induced.
re are many other contingencies which
regulate the rotation of crops. The
f different plants strike in different directions, and to different depths; and, as their constituents vary, absorb different matters. Deep-rooted plants, therefore, should be succeeded by such as spread but a little below the surface; perennials always by annuals; crops left for seed, or those that are of a dry solid texture, by such as are succulent and juicy; but, above all, the same species of plant should never be grown in successive crops upon the same ground. This is not even palliated by the excuse that manure is abundant, for, as Sir H. Davy observes, "though the general composition of plants is very analogous, yet the specific difference in the products of many of them prove that they must derive different materials from the soil; and though the vegetables having the smallest systems of leaves will proportionably most exhaust a soil of *common* nutritive matter, yet particular vegetables, when their produce is carried off, will require peculiar principles to be supplied to the land which produces them." (*Lect. on Agric. Chem.* p. 358.) It is known to every cultivator of soil, that land soon becomes *tired* of the same crop; in many instances, peculiar diseases are induced by the repetition. The most beneficial plan of rotation appears to be that where an exhausting and non-exhausting crop alternately succeed each other, for example,

Onions.	Turnips.
Lettuce.	Peas.
Carrots.	Potatoes.
Manure.	Manure.

Mr. Kelly, of Airthrey Castle, Scotland, says, that on poor ground the rotation he finds best is, 1. celery; 2d season, cauliflowers and red beet; 3d, onions; 4th, German greens or peas. By digging deep, and manuring abundantly for celery, the ground is brought into such fine tilth, that the whole rotation is often gone through without any further addition, and without failing in any of the crops. (*G. W. Johnson's Kitchen Garden.*) See FORCING, FRAMES, HOT-BED, MANURE, ROTATION OF CROPS, &c.

KITE. (*Milvus vulgaris.*) "The kite," says Mr. Yarrell, "is readily distinguishable among the British *Falconidæ*, even when at a distance on the wing, by its long and forked tail. The flight of this large bird is singularly graceful and easy, gliding smoothly along with little muscular exertion. It still retains, in some districts, the name of gled or glead, derived, according to Pennant, from the Saxon *glida*. In its mode of taking its prey the kite is distinguished from falcons, and hawks generally, by pouncing upon it upon the ground. The kite preys upon fish, moles, leverets, rabbits, snakes, and particularly the young of various gallinaceous birds before they against birds of prey generally.

The nest, formed of sticks and lined with various soft materials, is usually placed in the forked branch of a tree in a thick wood. Two and sometimes three eggs, of a short oval form, measuring two inches two lines in length by one inch nine lines in breadth, of a soiled white colour, marked with a few reddish brown spots over the larger end, are laid early in the season. The kite measures about twenty-six inches in length, but with expanded wings it measures upwards of five feet; the females are rather larger than the males. The colour of the plumage of the kite is for the most part rufous brown; the feathers of the head, neck, chin, and throat are greyish white; the back and wing-coverts dark brown; broadly edged with rufous; tail feathers, breast, belly, and thighs, reddish brown; tail deeply forked; the tarsi and toes yellow; the claws black.

The swallow-tailed kite (*Nauclerus furcatus*) is only an occasional visitor to this country; it is a native of the southern states of North America. This bird always feeds on the wing. Its principal food consists of large grasshoppers, grass-caterpillars, small snakes, lizards, and frogs. The whole length of the bird is about twenty inches. The head, neck, and under surface of the body are pure white; the back and tail feathers, &c. black; legs and toes greenish blue; claws faded orange colour." (*Yarrell's Brit. Birds*, vol. i. p. 66—75.)

KNAPPIA, EARLY. (*Knappia agrostidea.* It was named by Sir J. Smith in compliment to Mr. M. Knapp, a writer on British grasses.) Of this, one of the least of the British grasses, only one spe-

the calyx scales. Linnæus
tire, and Decandolle has
Smith (*Eng. Flora*), also,
of them. The following ar
species known under the
knapweed. I have treated
under the heads Blue Bo
Thistle.

1. Brown radiant knapwe
This grows in meadows
tenacious and moist. It
flowering in August and S
root is rather woody, with
Stem solid, erect; a foot
angular, furrowed and
Leaves, light green, rough,
radical ones largest, stalked
natifid; the rest scattered,
or linear lanceolate, entire,
the base. Flowers large, nu
light crimson, solitary at th
each branch, accompanied
close to the calyx, which
calyx-scales are membran
næus says, the herb steepe
alum, before the flowers
of a fine yellow.

2. Black knapweed. (
grows in pastures, and by
common, flowering from J
In habit it is like the last,
taller, more bushy, more
and rather less rough.
are somewhat lyrate, with
upper ones ovate; their
darker than that of *C. Jac*
are also of a deeper cri
without any radiant or
The flowers are occasionally

3. Greater knapweed. (*C.*

ason colour, rarely white; their radiant ets are large, each with five deep, long, narrow segments. Calyx-scales ovate, n, somewhat downy, fringed with fine allel teeth. The seeds are crowned with y reddish bristles; and after they are n away, the calyx becomes reflex, and lays the silvery shining hue of its in- (*Eng. Flor.* vol. iii. p. 463.)

NAWEL. (*Scleranthus*, from σκληρος, , and ανθος, a flower; in allusion to dry juiceless calyx.) These are dry herbs which can only be considered as ss weeds. Two of the species are in- nous, viz.

The annual knawel, or German -grass (*S. annuus*), which grows com- in dry sandy soils and corn fields, ering in July. The root is small and ring. The stems numerous, widely ading, and partly decumbent; round, , a little downy, branched, and many- ered at the upper part. Leaves linear, e, pale green, combined at the base by embranous fringed border. Flowers , green, nearly sessile, partly axillary, ly collected into dense forked tufts. x of the fruit spreading, with taper, e segments. The Swedes and Germans duce occasionally the steam arising a decoction of the knawel into their ths, with a view to cure the toothache. eaves are astringent. Goats and sheep his plant, but cows totally refuse it.

Perennial knawel. (*S. perennis.*) This ies is less common; it flowers from ust to October, while the annual knawel s in July. The root is woody, branched, many decumbent or prostrate stems. e or four inches long. The whole is of a glaucous, glistening appearance, ing red with age, especially the stems. leaves are more tapering, crowded, curved, than in the foregoing. Seg- ts of the calyx more obtuse, concave, finally converging. In several parts of ope the roots of this species are attacked he insect called *Coccus polonicus* (*Linn.* . vol. i. p. 741.), which yields a fine son dye: it is said likewise to live on *nnus* and on some *Potentillæ*. A good unt of its economy is given in the *Upsal nsactions* for 1742, t. i. p. 51. (*Smith's . Flor.* vol. ii. p. 282.)

NEE GRASS. A name sometimes n to the rough panic grass.

NEE HOLLY. See Butchers' Broom.

ES, BROKEN. See Broken Knees.

HT, THOMAS ANDREW, Pre- the Horticultural Society of Lon- .R.S. &c. a distinguished vege- hysiologist and horticulturist, was Wormesley Grange in Herefordshire, August 12. 1759. "My father," says Mr. Knight in a late communication to me, "was a man of much learning and acquirements. Having great powers of mind, and living in an extremely quiet and sequestered spot, he was supposed by his ignorant neighbours, in their language, to know every thing." He died at an advanced age when Mr. Knight was an infant, and as evidence of the respect his knowledge obtained him, whenever in childhood his son sought for information upon any unusual subject, he was told that his father would have answered him, but that nobody now could. Being born in the midst of orchards, "I was early led," he continues, "to ask whence the varieties of fruit I saw came, and how they were produced; I could obtain no satisfactory answer, and was thence first induced to commence experiments, in which, through a long life of scarcely interrupted health, I have persevered, and probably shall persevere as long as I possess the power."

He died May 11. 1838, in the eightieth year of his age. The death of Knight was lamented by all men of science, for, as it was soon afterwards well remarked of him by the Duke of Sussex, when addressing the Fellows of the Royal Society, "It would be difficult to find any other contemporary author, in this or other countries, who had made such important additions to the knowledge of horticulture and the economy of vegetation." (*Selection from his Papers*, p. 69.) To this interesting work a memoir of its author is prefixed.

Mr. Knight was author of the following works, besides numerous papers in the Philosophical and Horticultural Transactions:

1. A Treatise on the Culture of the Apple and Pear, and on the Manufacture of Cyder and Perry. London. 1797. 12mo. The third edition in 1808. 2. Some Doubts relative to the Efficacy of Mr. Forsyth's Plaister, in renovating Trees. London. 1802. 4to. 3. Report of a Committee of the Horticultural Society of London. London. 1805. 4to. 4. Pomona Herefordiensis, or a descriptive Account of the old Cyder and Perry Fruits of Herefordshire. London. 1809. 4to. 5. A Letter on the Origin of Blight, and on raising late Crops of Peas. This is appended to Sir J. Banks's Essay on the Mildew. London. 1806. 8vo. 2d Edition.

(*G. W. Johnson's Hist. Eng. Gard.*)

KNOLL. (Sax. cnolle.) A little round elevation; the top of a hill or mountain.

KNOLLS. A provincial term used in some counties to signify turnips.

KNOT. (*Tringa canutus.*) The knot is by no means an uncommon bird in this country from autumn through the winter to the spring, remaining sometimes as late as the beginning of May, and assuming the fine red tints of plumage peculiar to their breeding state, before they leave for those northern districts in which they produce their young. These birds appear to feed principally on aquatic insects, and the soft found almost everywhere, in waste as well as cultivated ground, streets, paths, and barren sandy places. The root is fibrous, long, very tough, and somewhat woody, branched below, simple at the crown. Stems several, spreading in every direction, generally prostrate, much branched, round, striated, leafy at the numerous knots or joints. Leaves alternate, stalked, hardly an inch long, elliptic or lanceolate, entire, obtuse, single ribbed, smooth except at the margin; tapering at the base, very variable in width; their substance rather coriaceous; their colour greyish or glaucous, stipules membranous, acute, often red, with a few remote brownish ribs. The flowers which appear from April to October are axillary, two or three together on simple stalks, small, seeds acutely triangular of a shining black, the food of many small birds. (*Smith's Eng. Flor.* vol. ii. p. 238.)

KNOT-GRASS, VALENTIA. A name by which the powdery sea-heath (*Frankenia pulverulenta*) is known in some districts.

KNOT-GRASS, WHORLED. (*Illecebrum verticillatum.*) This is an interesting dwarf perennial plant, which is not uncommon in marshy boggy ground in Cornwall and Devonshire, flowering in July. The different species are pretty, may be grown in any soil, and increase from seed without difficulty. The root is creeping; herb smooth, branched, procumbent. Leaves small, ovate, acute, or sometimes spatulate, scarcely stalked, rather fleshy. Stipules intra-foliaceous, small, white, jagged. The flowers are small, white or reddish, whorled, without bractes. (*Eng. Flor.* vol. i. p. 335.)

KOBRESIA, COMPOUND-HEADED.

swollen like a tuber, and w
the leaves, may readily be m
The produce is nearly the
Swedish turnips, and the so
one is equally good for the
either be sown in drills, or
and transplanted like cabba
the beds require to be mad
preceding autumn. Two po
will produce a sufficiency o
acre of ground. Hares ar
that on farms where these
the culture of this plant is
practicable. 3840 grains of t
rabi afford 105 grains of n
(*Sinclair's Hort. Gram.* p. 4
BAGE, p. 273.

KOLREUTERIA P
named in honour of the cel
botanist, J. G. Kolreuter.
handsome plant, blowing a
August, which grows well
soil. It should be planted
situation, as it will not flow
exposed; it may be readil
layers or cuttings of the ro
Bot. Dict.)

L.

LABELLUM. (Lat.)
front segment of an orchid
flower; also the lower petal

LABOUR. (Fr. *labeur*;
a general sense, labour implie
human strength in the perf
kind of work.

Without entering into a
tise on the science of politi
may not be out of place to

wealth. Were we placed on the banks
river, or in an orchard, we should in-
ibly perish of thirst or hunger, unless by
effort of industry we raised the water to
lips, or plucked the fruit from its parent
e. But this illustration is an extreme
e; and it is more to our purpose to re-
rk, that the mere appropriation of matter
seldom sufficient. In the vast majority
cases, labour is required not only to ap-
priate matter, but to convey it from place
place, and to give it that peculiar shape
hout which it may be totally useless, and
apable of administering either to our
essities or our comforts. The coal used
our fires is buried deep in the bowels of
earth, and is absolutely worthless, until
the labour of the miner it has been ex-
cted from the mine, and brought into a
ation where it may be made use of. The
nes and mortar used in building our
ses, and the rugged and shapeless ma-
als that have been fashioned into the
ious articles of convenience and orna-
nt with which they are furnished, were
their original state destitute alike of
ue and utility. And of the innumerable
iety of animal, vegetable, and mineral
ducts which form the materials of our
d and clothes, none were originally ser-
eable, while many were extremely noxious
man. The labour that has subdued
ir bad qualities, that has given them
ity, and fitted them to satisfy our wants,
to minister to our comforts and enjoy-
nts, is plainly therefore the only source
wealth. "Labour," to use the words of
am Smith, "was the first price, the
ginal purchase-money, that was paid for
things. It was not by gold or by silver,
by labour, that all the wealth of the
rld was purchased." (*Wealth of Nations*,
4.) Those who observe the progress
d trace the history of the human race in
ferent countries and states of society,
l find that their comfort and happiness
ve in all cases been principally dependent
their ability to appropriate the raw pro-
cts of nature, and to adapt them to their
e. The savage whose labour is confined,
e that of the Australian, to the gathering
wild fruits, or of shell fish on the sea-
ast, is placed at the very bottom of the
ale of civilization, and is in point of com-
rt decidedly inferior to many of the lower
imals. The *first* step in the progress of
ciety is made when man learns to hunt
nimals, to feed himself with their
sh, and clothe himself with their skins.
t labour, when confined to the chase, is
tremely barren and unproductive. Tribes
hunters, like beasts of prey, whom they
ely resemble in their habits and modes of subsistence, are but thinly scattered over the countries which they occupy; and notwithstanding the fewness of their numbers, any unusual deficiency in the supply of game never fails to reduce them to the extremity of want. The *second* step in the progress of society is made when the tribes of hunters and fishers devote themselves, like the ancient Scythians and modern Tartars, to the domestication of wild animals and the rearing of flocks. The subsistence of herdsmen is much less precarious than that of hunters; but they are almost entirely destitute of the various comforts and elegancies that give to civilised life its chief value. The *third* and most decisive step in the progress of civilization, in the great art of producing the necessaries and conveniences of life, is made when the wandering tribes of hunters and shepherds renounce their migratory habits and become agriculturists and manufacturers. It is then that man begins fully to avail himself of his productive powers. He then becomes laborious, and by a necessary consequence his wants are then, for the first time, fully supplied, and he acquires an extensive command over the articles necessary for his comfort as well as his subsistence. The importance of labour in the production of wealth was very clearly perceived by Locke. In his *Essay on Civil Government*, published in 1689, he has entered into a lengthened, discriminating, and able analysis, to show that it is from labour that the products of the earth derive almost all their value. "Let any one consider," says he, "what the difference is between an acre of land planted with tobacco or sugar, sown with wheat or barley, and an acre of the same land lying in common, without any husbandry upon it, and he will find that the improvement of labour makes the far greater part of the value. I think it will be but a very modest computation to say, that of the products of the earth useful to the life of man, *nine-tenths* are the effects of labour; nay, if we rightly estimate things as they come to our use, and cast up the several expenses about them, what in them is purely owing to nature, and what to labour, we shall find that in most of them *ninety-nine hundredths* are wholly to be put on the account of labour.

"There cannot be a clearer demonstration of any thing than several nations of the Americans are of this, who are rich in land and poor in all the comforts of life; whom nature having furnished as liberally as any other people with the materials of plenty, *i.e.* a fruitful soil apt to produce in abundance what might serve for food, raiment, and delight, yet for want of improving it must be our bread, drink, and clothing, did not labour furnish us with these more useful commodities; for whatever bread is more worth than acorns, wine than water, and cloth or silk than leaves, skins, or moss, that is solely owing to labour and industry; the one of these being the food and raiment which unassisted nature furnishes us with; the other provisions which our industry and pains prepare for us; which how much they exceed the other in value, when any one hath computed, he will then see how much labour makes the far greatest part of the value of things we enjoy in this world. And the ground which produces the material is scarcely to be reckoned in as any, or, at most, but a very small part of it; so little that even amongst us, land that is wholly left to nature, that hath no improvement of pasturage, tillage or planting, is called, as indeed it is, *waste;* and we shall find the benefit of it amount to little more than nothing.

" An acre of land that bears here twenty bushels of wheat, and another in America, which, with the same husbandry, would do the like, are, without doubt, of the same natural intrinsic value (utility). But yet the benefit mankind receives from the one in a year is worth five pounds, and from the other possibly not worth a penny, if all the profit an Indian received from it were to be valued and sold here; at least, I may truly say, not one thousandth. It is labour, then, which puts the greatest part of value upon land, without which it would scarcely be worth anything. It is to that we owe the greatest part of all its useful products; for all that the straw, bran, bread, of that acre of wheat, is more worth than the pro-

of in the ships that brought
modities made use of by any
men to any part of the work
would be almost impossible, at
to reckon up."

Labour is the sole source of
value, and, consequently, of
the talisman that has raised
condition of the savage; that
the desert and the forest in
fields; that has covered th
cities, and the ocean with s
given us abundance, comfort,
instead of want, misery, a
Labour, according as it is
raising of raw produce, to the
that raw produce, when raise
of utility, convenience, or or
the conveyance of raw and wr
from one country or place
said to be agricultural, man
commercial. An acquainta
particular processes, and most
methods of applying labour in
grand departments of indust
peculiar and appropriate stu
turists, manufacturers, and m

In thus endeavouring to e
portance of labour, and th
which its successful prosecuti
man, it must not be suppos
ence is made to the labour of
This species, indeed, comes m
observation; it is that, too,
we could not exist, and whi
determines the value of comm
questionable, however, wheth
more productive than the
mind. The hand is not more
execute than the head to cont

f society — in the rudest as well as the
ost improved — we may trace its operation
nd effects. Even in the simplest businesses
his co-operation and subdivision is required;
either hunting nor fishing, any more than
griculture or manufacture, can be advan-
geously carried on by solitary individuals.
s society advances, this division of labour
xtends itself on all sides; one man becomes
tanner or dresser of skins, another a weaver,
third a smith, and so on. The wealth and
omforts of all classes are, in consequence,
rodigiously augmented. In countries where
e division of labour is carried on to a con-
derable extent, agriculturists are not ob-
ged to spend their time in clumsy attempts
manufacture their own produce, and
anufacturers cease to interest themselves
bout the raising of corn, and the fattening
cattle. The facility of exchanging is the
vifying principle of industry; it stimulates
riculturists to adopt the best system of
ltivation, and to raise the largest crops,
cause it enables them to exchange what-
er portion of the produce of the land ex-
eds their own wants for other commodities
ntributing to their comforts and enjoy-
nts, and it stimulates manufacturers and
rchants to increase and improve the
antity, variety, and quality of their goods,
at they may thereby obtain greater sup-
es of raw produce. A spirit of industry
thus universally diffused; and that apathy
d languor which characterise a rude state
society entirely disappear.

Besides that sort of division of labour
ich enables each individual in a united
ciety to confine himself to a particular
ployment, there is another and most im-
rtant branch of the division of labour,
hich not only enables particular indivi-
als, but the inhabitants of entire districts
d even nations, to addict themselves in pre-
rence to certain branches of industry. It
on this *territorial division of labour*, as it
s been appropriately termed, that the com-
rce carried on between different districts
the same country, and between different
untries, is founded. The variations in the
tuation, soil, climate, mineral products,
c. of the different districts of an extensive
untry, render them more suitable for some
an for other species of industry. A dis-
ict where coal is abundant, which has an
sy access to the ocean, and a considerable
mmand of internal navigation, is the na-
ral seat of manufactures. Wheat and
her species of grain are the proper pro-
ucts of rich arable soils; and cattle, after
eing reared in mountainous districts, are
st advantageously fattened in meadows
d low grounds. Nothing can be more
vious than that the inhabitants of these different districts will be able, by confining themselves to those employments for the prosecution of which they have some peculiar capability, to produce a much greater quantity of useful and desirable articles than they could do were they to engage indiscriminately in every possible employment.

Providence, by giving different soils, climates and natural productions to different countries, has evidently provided for their mutual intercourse and civilization. By permitting the people of each to employ their capital and labour in those departments in which their geographical situation, the physical capacities of the soil, their national character and habits fit them to excel, foreign commerce, or the territorial division of labour, has a wonderful influence in multiplying the products of arts and industry.

Having been led thus far into this fertile subject, I will conclude with some apposite and excellent observations by Dr. Paley. "Every man has his work. The kind of work varies, and that is all the difference there is. A great deal of labour exists besides that of the hands; many species of industry besides bodily operation, equally necessary, requiring equal assiduity, more attention, more anxiety. It is not true therefore, that men of elevated stations are exempted from work; it is only true that there is assigned to them work of a different kind: whether more easy or more pleasant may be questioned; but certainly not less wanted, nor less essential to the common good." (*Brande's Dict. of Lit. and Art.*)

LABOURER. One who is employed in coarse and toilsome work. But, in agriculture, the term is applied to a person who performs the manual or most laborious part of the business of a farm. The price of labour has at all times varied; and, as the poorer classes feel, with additional rigour, every evil arising from the pressure of the times, different expedients have been devised, with a view to alleviate their burthens, supply their wants, and render them more comfortable. From these investigations, it appears that, in the middle of the fourteenth century, the usual price of labour was 2*d.* per day, and wheat was sold at from 3*s.* 4*d.* to 4*s.* per quarter. In the middle of the fifteenth century, the pay of a labourer per day was 3*d.*, and wheat cost from 5*s.* to 5*s.* 6*d.* per quarter. In the earlier part of the sixteenth century, the price of labour rose to 3½*d.*, and that of a quarter of wheat to 7*s.* 6*d.* About the middle of the seventeenth century, the pay of a labourer upon an average was (in Essex) 13*d.*, and corn had risen to 40*s.* per quarter. Towards the latter end of the eighteenth century, the daily pay of a labourer was from 14*d.* to 18*d.* in the country, and from 2*s.* to 2*s.* 6*d.* in the metropolis; while the price of wheat was 48*s.* per quarter. The payment of *daily* wages, however, serves but imperfectly to ascertain the *real* price of labour, as a considerable portion of work is performed by the piece, so that a labourer in general earns from 3*d.* to 6*d.* per day more than by the common pay. The curious and philanthropic reader, who feels an interest in this popular inquiry, will be fully gratified by a perusal of Mr. Davies's *Case of Labourers in Husbandry Stated and Considered,* &c. 4to, 1795, p. 200.; and Sir F. M. Eden's *State of the Poor,* &c., 3 vols. 4to, 1797. Mrs. Davies Gilbert, of Eastbourne, a lady whose active interest for the prosperity of agriculture, and the improvement of the condition of the labouring poor, may fairly (as has been justly observed) be set as an example for many country *gentlemen* to follow, urges most strenuously, in many publications (but particularly the *Quart. Journ. of Agr.* vol. xii. p. 252.), the advantages to be derived from manual labour, in preference to horse labour. Many benevolent persons, of distinguished rank, have also recently taken up the cause of the labourer, and formed themselves into a society, very appropriately named "the Labourer's Friend Society." They advocate strongly, and endeavour to promote more generally the system of home colonies, for the cultivation of waste land. See ALLOTMENT and SPADE HUSBANDRY, FARM SERVANTS, WORKMEN, &c.

Farm labourers, being the most valuable class of men that a populous country possesses, should have every comfort provided for them that is compatible with their situation, and comformable to the general interest of the community. Their wages ought to be everywhere and at all times sufficient for the maintenance of themselves and families while in health, with a surplus to provide against the day of sickness, without their being under the debasing necessity of making application to their neighbours for relief. Persons so essentially useful to society should not merely support existence, but have the comforts of wholesome habitations, with sufficient spaces of ground to furnish them and their families with changes of proper vegetable food without much expense.

LABURNUM. See CYTISUS.

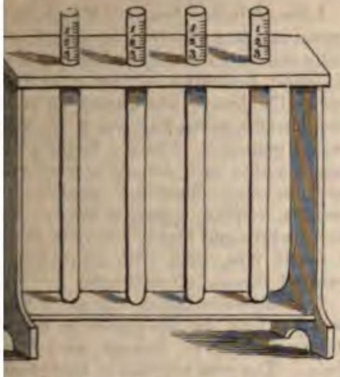
LACTARY. A milk-house, dairy, or place where milk is kept.

LACTEALS, (From *lac,* milk.) See ABSORPTION, and VEGETABLE PHYSIOLOGY.

LACTIC ACID. This substance, in the opinion of Berzelius and some other chemists, exists in milk, and in larger propor-
tion when it has become sour;
imagine that it is the product of
position. It was first recognised
culiar acid by Scheele, but he did
it perfectly pure. It was after
served by Berzelius in many ani
and by Braconnot to exist with
in fermented rice-meal, wheat-
juice of the beetroot, and other
substances: he named it nancéi
is formed, also, during the putref
cess in some animal bodies. La
a colourless, inodorous, syrupy
very sour. It may be so concent
have a specific gravity of 1·215:
moisture from the atmosphere, an
in water and alcohol in all
At 480° Fahrenheit, it is
When added to *boiling* milk, it is
immediately coagulating about 7
weight; but, when cold, it prod
paratively little effect upon it:
agulates albumen. It has the
dissolving fresh precipitated ph
lime; a property which is of gr
tage in the animal economy, and
be rendered useful in manures.
stituents of the lactic acid are,
carbon, 5 of hydrogen, and 5
(*Penny Cyclopædia,* vol. xiii. p. 2

LACTOMETER. (Lat. *lac,*
metrum, a measure.) A term ap
glass tube for ascertaining the
which the cream bears to the m
particular cow, or the produce
dairy. Lactometers of different
been invented; the best is called
or five glass lactometer," and is
scribed by Messrs. W. & S. Jon
Holborn, who make them with gr

The principle of the instrume
if new milk is poured into glass
allowed to remain, the division b
cream, which floats upon the sur
milk, will be so evident that its
be easily measured; and should
from any cow produce more c
that of another, the difference w
by the divisions or marks on
tubes. The lactometer consists
five glass tubes, about half an inch
and eleven inches long, fitted in
right mahogany frame; each tub
fine line drawn round it, ten in
the bottom; three inches from
downwards, it is graduated into i
tenths of inches. At milking
tube is to be filled up to the line
milk. After standing twelve
quantity of cream which floats
surface is shown by the scale of
tenths; each division will theref
sent one per cent. of the whole.



e milk given by a cow at one meal is lon, or eight pints, and the thickness h of the cream which floats upon it es fourteen divisions, multiply the of pints, 8, by the depth of the 14; the result will be that the pro- f the cream of that meal is 112, nt $\frac{12}{100}$. Care must be taken to fill ıbes as soon as the pail is taken from he cow, for if any delay takes place, f the cream will have ascended to- he top. The milk should be taken e middle of the pail, which is to be y dipping a cream pot below the (*Journ. Roy. Inst.* vol. iv. p. 157.; *Cyclo.* vol. xx.)

IES' CUSHION. One of the com- mes of the mossy saxifrage. (*Sax- hypnoides.*) See SAXIFRAGE.

IES' FINGER. A name given to mon kidney-vetch (*Anthyllis vulne-* which, from its soft and downy was supposed to possess vulnerary ies in staunching the blood of slight s. See KIDNEY-VETCH.

IES' MANTLE. (*Alchemilla.*) ecies of this genus of plants are all ent in their root, and somewhat ginous. *A. vulgaris* is slightly tonic. of them are ornamental, and well d for planting in gardens near the of borders, or for adorning rock- They succeed well in any common not over wet, and may be increased eeds or divisions. The indigenous are —

ommon ladies' mantle. (*A. vulgaris.*) nnial, growing in dry, rather moun- pastures. The root is woody, with res; stems from four to eight inches ore or less procumbent, alternately ed, round, hairy, leafy, terminating nerous little corymbose clusters of flowers, or smooth, almost capillary The radical leaves are numerous, footstalks, large, roundish, kidney-shaped, bluntly-lobed, plaited, serrated, of a fine green above; soft and hairy beneath. The stem-leaves are of the same form, but a great deal smaller; alternate, on short stalks, with a pair of large notched stipules to each. Horses, sheep, and goats, eat this vegetable; but it is not relished by cattle, and hogs totally refuse it.

2. Alpine ladies' mantle. (*A. alpina.*) A perennial plant growing on alpine rocks, especially in a micaceous soil. It is rather smaller in habit than the last species, and essentially different, not only in the silvery pubescence of the stalks, flowers, and backs of the leaves, but in the latter being separated to the base into five or six obovate lobes, closely serrated towards the extremity. Nothing can be more beautiful than the silvery splendour of their under sides, especially in exposed and barren spots, when the leaves are agitated by the wind. No figure can do them justice. The upper surface is smooth and naked, of a fine green.

3. Field ladies' mantle, or parsley piert. (*A. arvensis.*) This annual species will generally be found growing in sandy or gravelly fields, especially when fallow, as well as on heathy banks. The root is small and fibrous; stems numerous, about a finger's length, spreading or prostrate, round, leafy, hardly subdivided. Leaves flat, three-lobed, variously cut on short stalks. The whole plant is more or less hairy, and in flavour and scent approaches its natural ally, burnet. (*Smith's Eng. Flor.* vol. i. p. 223.)

LADIES' SLIPPER. (*Cypripedium*, from *Cypris*, one of Venus's names, and *podion*, a slipper; hence the name Venus's or ladies' slipper.) The species of this genus are remarkably handsome when in flower, and on that account deserve a place in every collection. They are all of the easiest culture. The hardy species succeed well in peat soil, either kept in a frame, or planted out in a shady border. The species, natives of America, require to be protected from severe frost and rain. The only indigenous species is the common ladies' slipper (*C. calceolus*): which is very rare, growing only in mountainous woods and thickets in the north of England. It is a perennial, blowing large yellow, solitary, terminal flowers without scent, in June. The stems are solid, twelve or eighteen inches high, downy, bearing three or four large alternate, ovate, rather pointed leaves, clasping or sheathing at their base. (*Eng. Flor.* iv. 51.; *Paxton's Bot. Dict.*)

LADIES' SMOCK. (*Cardamine.*) An interesting genus of the simplest culture and propagation, natives of various countries, generally preferring watery situations. The native species are five in number: —

1. Daisy-leaved ladies' smock. (C. belli-

difolia.) This perennial species grows in moist, grassy, lofty, alpine pastures. The root is rather woody, divided at the crown. Herb two or three inches high, unbranched, erect, bright green, smooth leaves, sometimes a little wavy or angular, the uppermost nearly sessile. Flowers few, corymbose, white, appearing in August. Style short, conical.

2. Impatient ladies' smock. (*C. impatiens.*) This annual species grows in shady, rather moist, rocky situations in the north of England; it is rarely met with in Scotland. The root is small and tapering; the herbage pale green; stem one and a half to two feet high; leaves pinnate; leaflets lanceolate, mostly cut; stipules fringed. The flowers which are numerous, and small, and white, appear in May and June. Pods erect, very slender, composing long clusters, and discharging their seeds with a crackling noise, and great force, on the slightest touch or concussion, by means of the revolute valves. The whole plant is disagreeably bitterish and pungent.

3. Hairy ladies' smock. (*C. hirsuta.*) Also annual in habit. This species is found very frequent in waste or cultivated ground, especially in moist shady places; flowering from March to June. The root consists of many white fibres. The herb is variable in size and luxuriance, deep green, more or less hairy, rarely quite smooth; stem from three to twelve inches or more in height; leaves pinnate, without stipules; leaflets stalked, roundish, oblong, notched.

4. Meadow ladies' smock. (*C. pratensis.*) See Cuckoo Flower.

5. Bitter ladies' smock. (*C. amara.*) This is not a common species, but is found occasionally in watery places, by the sides of rivers and brooks. It is perennial, and before it flowers, greatly resembles watercress, but the taste is bitter and nauseous. The root is toothed, somewhat creeping; stems one to two feet high, more or less hairy, creeping at the base, with several radicles, and sometimes a few slender scions. Leaves pinnate without stipules; leaflets of the lowermost roundish; of the rest, toothed or angular. Style obliquely elongated Flowers, which appear in April or May, always white or cream-coloured with violet anthers. (*Smith's Eng. Flor.* vol. iii. pp. 186-91.)

LADIES' TRACES. (*Neottia*, a bird's nest, in allusion to the interwoven fibres of the roots.) This is a pretty genus of orchidaceous plants. The hardy species will succeed well in chalky soil, or a mixture of loam, peat, and sand; they are all increased by divisions. (*Paxton's Bot. Dict.*)

There are only two indigenous species:—

1. Sweet ladies' traces. (*N. spiral*
grows in open pastures, on a chalk
velly soil, or in meadows in variou
England, flowering in August and
ber. The leaves are awned, all r
broad stalks, spreading, ovate, acut
rather glaucous. Stalk a finger's
more, viscid and downy upwards
with several sheathing, upright,
bractes. Spike spiral, of many,
small white and highly fragrant fl
a single row, each with an ovat
pointed, downy, close bracte.

2. Proliferous ladies' traces. (
para.) This species grows in m
the west coast of Ireland, and f
July. The root consists of two th
downy annual, perpendicular kn
about three inches long, and one-f
inch in diameter near its origin,
downwards to a blunt point. Aft
ing the root decays. Leaves fiv
upright, broadly lanceolate, acut
ribbed, three inches in length. F
broad, sheathing, near an inch lon
erect, two inches high, sheathed n
half way up by the foot stalks of t
most leaves, and bearing in th
part two or three lanceolate, smoot
bractes. Spike an inch long, ova
erect, of about eighteen white fl
three rows, twisted round in a very
able way, and each accompanied by
lanceolate bracte, as tall as its
outside of the flowers and capsule a
every other part of the herb i
Buds destined to flower the follow
are formed among the leaves, at th
of the flower-stalk. In the spri
bud puts forth a pair of oblong k
becomes a separate plant. (*Sm*
Flor. vol. iv. p. 35.)

LADIES' TRACES. Ladies'
quaking-grass. See Briza Medi

LADDER. A framework of
tween two upright pieces. Ladde
rious length are essential requisi
farm, whether for use in repairs to
for reaching stacks, or in cases of

"Garden ladders are of three ki
common wall tree ladder, which dif
those used in other arts in having t
of ten or twelve inches in length, p
at right angles from the upper end
of which is to avoid injuring the
keeping the top of the ladder a
distance from the wall, and thus
the operation of nailing. The ore
der consists of a frame on low wh
basis for several ladders which fit
other, and are capable of being hois
machinery, so as a person near th
mity of the ladder may have acc

a tree with convenience, either to
t or gather the fruit.
three-styled, *forkde*, and *double lad-*
: also well adapted for the ordinary
s of gathering fruit or pruning.
le-joint ladder is used for working
ilinear roofs either of glass, or domes
stone, &c., which require panes re-
or trees nailed. Such ladders are
arly useful for repairing the roofs
ouses and greenhouses. The *step-*
instead of round rods on which to
e feet, has steps or boards, an im-
ent essentially necessary where much
to be done, because less fatiguing
eet. Such ladders have a back or
, by which they stand independently
ther object, and which is removable
ure by drawing out an iron bolt."
's Encyc. of Gard. p. 290.)

R. Provincially, land in a state of
sward. (See LAY.) Also employed
counties, to signify soil and dung.
sed sometimes to express the couch
g-place of a boar or wild beast, or
in dairies.

A, or LLAMA. See ALPACA.

B. The young of a sheep. See

B ALE. The name of a feast for-
given in Oxford and some other
to celebrate the time of shearing

B'S LETTUCE. See CORN SALAD.

B'S QUARTERS. A name given
ild or mountain spinach (*Chenopo-*
um.) See GOOSEFOOT.

B SKINS. (Germ. *lamsfelle.*) The
lamb skins varies according to the
brilliancy, and colour of the wool.
amb skins are more generally es-
than those of any other colour.
lamb skins are seldom to be met
rfectly black; but since the intro-
of Merino sheep into this country,
the white fleeces have, in point of
arrived at a pitch of perfection
ustly entitles them to be ranked
ne of the best fleeces in Spain. The
tion of lamb skins is immense, having
ed on an average in 1831 and 1832,
5,635. Eight tenths of the whole
are supplied by Italy. They are
used in the glove manufacture.
loch's Com. Dict.) See WOOL.

B'S-WOOL. A common name for
ed with sugar, nutmeg, and the pulp
ed apples.

ENESS. In farriery, an affection
feet or limbs in horses and other
by which motion is rendered less
In the horse, it is brought on from
causes — sprains, over-exertion, diseases of the foot, &c. The muscles of the shoulder are occasionally sprained, and in this case the animal cannot lift his foot without great difficulty, indeed he will be observed to drag his toe along the ground. In this case few local measures can be adopted. The horse should be bled from the vein on the inside of the arm, fomentations applied, and a dose of physic given. In this, as in most other cases of lameness, quiet and rest are essential to the restoration of the animal. (*The Horse*, p. 229.)

LAMMAS DAY. In the calendar, the 1st of August. Dr. Johnson supposes this term to be a corruption of *Lattermath*, which signifies a second mowing of grass. Others derive it from a custom which once prevailed in some parts of England, of bringing a lamb alive on this day into the church at *high mass*. Others again derive it from a Saxon term signifying *loaf mass*, so named as a feast of thanksgiving for the first-fruits of the corn. (*Brande's Dict. of Lit.* &c.)

LAMP BLACK. A colouring substance which is in very general use for several purposes. The finest lamp black is produced by collecting the smoke from a lamp with a long wick, which supplies more oil than can be perfectly consumed, or by suffering the flame to play against a metalline cover, which impedes the combustion, not only by carrying off part of the heat, but by obstructing the current of air. Lamp black is prepared, however, in a much cheaper way for the demands of trade. The dregs which remain after the purification of pitch, or else small pieces of fir wood, are burned in furnaces of a peculiar construction, the smoke of which is made to pass through a long horizontal flue, terminating in a close-boarded chamber. The roof of this chamber is made of coarse cloth, through which the current of air escapes, while the soot remains. (*Ure's Dict.*)

LAMPREY, the lesser. (*Petromyzon fluviatilis.*) This fish, about eight or ten inches long, is sometimes found in the rivers Thames, Severn, and Dee. The lampern (*P. bronchialis*) has a body not thicker than a swan's quill, and conceals itself in the mud in the Isis and other British rivers.

LANCEOLATE. In botany a term used to describe leaves which are oblong and gradually tapering towards each extremity, or shaped like a spear or lance.

LANCEWOOD. (*Guatteria*, in honour of J. B. Guatteri, an Italian botanist, and once professor at Parma.) This is a splendid genus of evergreen shrubs, succeeding in a mixture of loam, peat, and sand. They are natives of warm climates and require stove culture. Young plants are readily obtained by cuttings raised in sand under a glass in heat. (*Paxton's Bot. Dict.*)

LAND (Germ.), in the widest acceptation of the word, is used to denote the solid matter of which the globe is composed; in contradistinction to the liquid matter or water (see GEOLOGY): but in its most restricted signification it is confined to *arable ground*. The latter is the legal meaning of the term; and in this sense it is used in all original writs, and in all court and formal pleadings.

LAND-DITCHING, or hollow draining as it is sometimes termed, is chiefly practised in the counties of Essex and Hertford. It consists in digging both main and side drains, similar to those generally adopted in draining land: the former are usually made from 22 to 24 inches, the latter from 20 to 22 inches in depth. The soil is previously ploughed, and the length to which the main drains may be protracted without a vent, depends upon the situation of the land. When the land has a regular declivity, the most proper method will be to carry off as much water as possible, by means of side drains; but if the ground be irregular, it will be requisite to form additional main-drains, so that every advantage may be derived from the valleys, into which the latter must often be conducted to a considerable extent.

The length of the side-drains varies according to the elevation of the soil; in general they need not be more than one rod apart from each other; though in very loose or porous grounds, they may be dug at a distance of one rod and a half. When the trenches are cut to a sufficient depth, they are filled up and covered in the usual manner with straw and bushes. The expense of this method of draining is computed to be nearly 3*l*. per acre.

Land-ditching not only carries off the water from wet or marshy soils, but also meliorates stiff loamy clays, which being thus better enabled to resist the long continuance of moisture on their surface during the winter, promote vegetation very early in the spring, and the grass is rendered of a superior quality. The weeds, &c. change their colour, and are totally divested of their rankness; the corn also increases both in quantity and weight. Another important advantage arising from this practice is, that it will admit of the soil being ploughed at an earlier period of the spring and later in autumn; while it may be tilled with greater facility, and kept clean from weeds at a very small expense.

LANDLORD. One who owns lands or houses, and has tenants under him. See
TENANT, CUSTOMS OF COUNTIES,
AGREEMENT, &c.

LANDMARK, signifies in a
sense anything by which the bounda
property is defined. In ancient ti
correct division of lands was an
of great importance; and variou
were adopted to give distinctness a
manency to the boundaries of ever
property. Stones and hillocks w
most usual landmarks. The impor
this subject among the Israelites
larly, may be judged of from the
ation of Moses, "Cursed be he
moveth his neighbour's landmark."

LANDREEVE. A subordinat
on an extensive estate, who acts a
sistant to the land steward.

LANDSCAPE GARDENING.
of laying out grounds so as to prod
effect of a natural landscape. Its
are the same as those upon which
scape painter proceeds in composi
ture; and though it is an art of w
many others, every body thinks
judge, it requires to be properly
and the possession of powers o
higher order than fall to the lot
men. Mr. Brown, commonly called
lity Brown, was the first who prac
art in this country, so as to render
worthy of the name of artist.
down the principles of this art he
be quite impossible; but this
observation contains the sum o
let selected and beautiful nature
stantly your model, and success mu
Loudon's Encyc. of Gardening may
sulted with advantage by those de
practising the art.

LANDSLIP. A portion of
has slid down in consequence of dis
by an earthquake, or from being
mined by the action of water
means.

LAND SPRINGS. Land spr
sources of water which only come in
after heavy rains; while constant
which derive their supplies from
abundant source, flow throughout t
All springs owe their origin to ra
the case of land springs, the water
sinks through the surface, is speedil
rupted by a retentive stratum, an
accumulating soon bursts out into
which ceases to flow a short period
cause which gave it birth has
operate; but the water which supp
stant springs sinks deeper into t
and accumulates in rocky or gravell
which become saturated with the fl

LAND STEWARD. A perso
the care of a landed estate, and wh

Continent, and particularly in
the landlord is a partner with
nd shares the produce with him,
' the land steward or *fattore*, as
alled, are much more onerous
ain. See BAILIFF.

'AX. A branch of the public
ich was first raised in its pre-
1692. The rate at which this
ed is 4*s*. in the pound on the
. The amount which it yielded
equer in 1837 was 1,192,635*l*.
. vol. xiii. p. 300.)

EY, BATTY, was an architect
lesigner. He was born in 1696,
am, where he continued to re-
blished the following works: —

eometry, applied to the Arts of Building,
lening, and Mensuration. London. 1726.
ethod of improving an Estate by Plant-
lm, Ash, Birch, and other Timber Trees.
to. 1 Plate. 3. Pomona, or the Fruit
ed; being the sure Method of preserving
of Fruit, with Directions for Pruning,
With 79 Plates. London. 1729. Folio.
es of Gardening; or the Laying out of
es, Wildernesses, Labyrinths, Avenues,
1728. With Engravings.

D BUNTING. (*Plectrophanes*
This bird, though a native, as
orts, of the most northern parts
as yet been taken on three or
s in this country. The whole
bird is about six inches and a
he plumage of the upper surface
is dark brown; breast, velvet
r part of breast and belly, dark
n of the head, velvet black, with
bright chestnut; tail forked;
d claws, pitch black. (*Yarrell's*
vol. i. p. 421.)

G. (*Vanellus cristatus*.) The
peewit, is a constant inhabitant
try, and one of the best known

ground as if lame. In October, the lapwings are fat, and in good condition for the table: their eggs are considered a great delicacy. The whole length of this bird is a little more than twelve inches. The plumage on the breast is of a shining black; the back and wing coverts are green, glossed with purple and copper colour; the end of the tail-feathers black. On the occiput there is a tuft of six or seven elongated slender feathers, which the bird can elevate or depress at pleasure. (*Yarrell's Brit. Birds*, vol. ii. p. 417.)

LARCH-TREE. (Lat. *larix;* It. and Span. *larice*.) Of this tree there are three species described by botanists. The larch is one of the most valuable exotics which has been introduced into Britain. In the north of Scotland it has been grown to a great extent, cultivated with particular attention; and found to be one of the most profitable of all trees to the planter, provided the land be well drained, but it will not succeed in swampy situations. It grows with great rapidity, is subject to very few accidents, transplants with but little risk, and produces timber of great excellence and value, not only for domestic but for naval purposes.

In bridges, dock-gates, mill work, and especially in mill axles (where oak only used formerly to be employed), larch has been substituted with the best effect. The small larch is useful for agricultural implements, gates, upright palings, rails, and hurdles. Boats built of larch have been found sound when the ribs made of oak 40 years old were decayed. A fine frigate of 36 guns, named the Atholl, was launched at Woolwich in 1820, built entirely of larch, the growth of the Atholl plantations. It is

Dunkeld House and Atholl House, the two residences of his Grace; and great attention having been paid to these nurseries by his Grace's successors, the plantations have amazingly increased. A very detailed account of the plantations on the Atholl estates and experiments on the wood will be found in the 3d vol. of the *Prize Essays* of the Highland Society, p. 165., drawn up from papers and documents communicated by his Grace's trustees. In a communication to the Board of Agriculture in February 1812 (vol. vii. p. 273.), the Duke of Atholl, speaking of the advantages to be derived from a more general culture of the larch, says, "The lower range of the Grampian Hills, which extend to Dunkeld, are in altitude from 1000 to 1200 feet above the level of the sea; they are in general barren, and are composed of mountain schist, slate, and iron-stone. Up to the highest tops of these, larch grow luxuriantly, where the Scotch fir, formerly considered the hardiest tree of the north, cannot rear its head. In considerable tracts, where fragments of shivered rocks are strewed so thick that vegetation scarcely meets the eye, the larch puts out as strong and vigorous shoots as are to be found in the valleys below, or in the most sheltered situation." And it further appears from a report of that nobleman to the Horticultural Society (*Trans.* vol. iv. p. 416.) that in situations 1500 to 1600 feet above the level of the sea, he has felled trees 80 years old that have each yielded six loads of the finest timber. The growth of larch is not, however, confined to Scotland; but much land has been planted in the northern counties of England. The Society in London for the Encouragement of Arts and Manufactures, so long ago as 1783, offered pre-

the county of Lancaster, 64,1
two to four years old in 24
gives a width between them o
this time W. Mellursh, Esq., o
47,500; Joseph Cowlishaw,
coch Park, 27,400; and
Milnes, Esq., of Foyston, ne
Yorkshire, 200,000 of about
plants. In 1791 Thomas
of Little Braithwait in Cumb
43,300 on 15 acres of h
Mr. Myles, 145,000. John
Belmont in Staffordshire,
larches between the years
and 11,000 more in 1795.
gold medal of the Society
planting 6000 larches of four
6000 larches at three yea
acres, which gives them a st
4 feet 3 inches.

J. Jones, Esq., of Hafod i
was the next great claimant
1800 the gold medal for pl
larches, two-year-old seedlin
85,000 one year transplanted
apart; and 15,000 three ye
larches at 3 feet 6 inches
400,000 larches over 44 ac
In 1802 J. C. Curwen, Esq.,
Hall, in Cumberland, plant
1803 Dr. Henry Ainslie had
years 91,800; and in 1805
Butfield, planted 125,800.
1816, no candidates appeare
premium, in consequence of t
which affected the larch tr
for some years; and which
formation of the cones, depri
of larch plants of the usual

There is no account given
at which these larches were

on the mountain side, in a region in h no other kind of timber tree would to perfection in this country; the in- ng the tree in the soil at an early age, xceeding two years old in the seed-bed; the notching the small plants into the nd by a peculiar instrument, at wide vals not nearer than five and a half to each other; for if planted close, they ust the soil, and prevent its being nou- d by the annual deposition of spines, ccount of the closeness of the trees.

1820 the gold medal was awarded to the e of Devonshire for planting 1,981,065 trees, 980,128 of which were larch. es these instances of the planting the *alone*, there are many others in Eng- in which they were planted along with r trees; but as they would probably be lanted merely as nurses to the hard er, such plantations cannot be con- red as interesting experiments, in regard e value of the larch as timber. From oregoing details, however, we find that ly under the auspices of the Society e Encouragement of Arts and Manu- res, 1,407,036 larches were planted in and in 37 years. It is singular that so h elevated barren land in the counties of s, Sussex, and Kent should be suffered emain unplanted with this and other r, which would find a ready sale in eighbouring government yards.

ntations that are formed *exclusively* of destroy the heath and all other vegeta- but after a few years, a fine grass springs ich is so valuable for grazing, that it has let from 10*s.* to 5*l.* per acre for this pur- which, previously to its being planted, not bring as many pence.

ree varieties of the common larch are oned by botanical writers; one remark- r the young cones being pale green d of crimson, and erect, not drooping. cond has a weeping habit, with pen- branches, but is distinct in botanic cters from the black larch (*Larix pen-*) of North America; both these varieties tives of the Tyrol. The third sort is w, stunted growth, and an inelegant arance, leafing early, and very subject jury from spring frosts. The bark is ous, not yellowish brown. It was raised the Duke of Atholl from seed, pro- d at Archangel in 1806. Both in its ap- ance as a tree, and its value as timber, an larch is much inferior to the rch. From the boiled inner bark, h rye flour, and afterwards buried s in the snow, the hardy Siberian epare a sort of leaven, with which y the place of common leaven tter is destroyed, as it frequently is by the intense cold to which hunters are subject in the pursuit of game. The bark of the larch is nearly as valuable to the tanner as oak bark; this valuable property was first discovered by Mr. T. White, in 1812. (*Com. to Board of Agr.* vol. vii. p. 278.) The larch also produces the substance called Venice turpentine, which is of considerable use in medicine, and flows in abundance when the lower part of the trunk of old trees is wounded or tapped between the months of March and September. When forests of larch in Russia take fire, which sometimes happens, a gum issues from the medullary part of the trunks, during the combustion, which is called *Orenburgh gum*. A saccharine matter, also, resembling *manna*, and called *manna of Briançon*, exudes from the larch in June: and another sort of manna is exuded from its leaves in the form of a white flocculent substance, which finally becomes concreted into small lumps. From the inner rind or bark of the larch, the Russians manufacture fine white gloves, not inferior to those made of the most delicate chamois, while they are stronger, cooler, and more pleasant for wearing in the summer.

The larch is propagated by seed, which is generally ripe in September and December, when the cones may be collected and carefully dried, and put away till April, which is considered the best time for sowing. The most proper season for felling the larch is July.

2. The red larch fir. (*A. microcarpa.*) In this species the cones are oblong, small, thin; scales erect, close pressed, the upper ones much smaller than the lower. It is a graceful tree, with much of the habit of the common larch, from which however its very small cones of a bright purple readily distinguish it. It is a native of North America. This is by no means so well adapted to the planter's purposes as the common larch. According to the Duke of Atholl, trees when fifty years old do not contain one third as many cubic feet as the common larch. The wood is so heavy that it will scarcely swim in water.

3. The black larch fir. (*A. pendula.*) Cones oblong, with numerous spreading scales, which gradually diminish from the base to the apex of the cones. Branches weak and drooping. The leading shoot will often begin to droop at the height of fifteen or twenty feet from the ground, and after gradually acquiring a horizontal direction will bend towards the earth, so as to form a natural arch of great beauty. This species is also a native of North America, where it is found growing on a rich clay soil, mixed with sand, in cold mountainous districts. When cultivated in this country

it is an elegant tree, having a good deal of resemblance to the common larch, but being of a brighter green colour, and much more graceful. The wood is less valuable than the common larch.

There is a report (*Trans. High. Soc.* vol. v. p. 391.) by Mr. Lawson on larches raised by him from seed imported from the Tyrol, which being the native country of the larch, is supposed to mature the most perfect seed.

The larch is affected with many diseases in this country. Some of these have been supposed to arise from a constitutional weakness engendered in the tree from the seed not having been perfectly ripened. The reader's attention may be drawn to several valuable treatises on the diseases of the larch distributed through the volumes of the *Transactions of the Highland Society of Scotland*, &c. In the *Quarterly Journal of Agriculture*, there are also some able papers, "On the probable Cause of the Diseases of the Larch in Great Britain," by the late M. Decandolle (vol. v. p. 403.); "On the Diseases of the Larch in the South of Scotland," by Mr. Webster (*Ibid.* p. 535.); "On the Rot in Larch," by Mr. Gorrie (*Ibid.* p. 537.); and some remarks on the foregoing papers (*Ibid.* p. 574.); "On the Canker in Larch," by Mr. Drummond, vol. ii. p. 221. (*Phillip's Syl. Flor.* vol. ii. p. 8.; *Penny Cyclo.* vol. i. p. 32.; *Paxton's Bot. Dict.; Trans. High. Soc.* vol. iii. p. 165. and vol. v. p. 391.; *Quar. Journ. of Agr.* vol. iii. p. 794.; *Brit. Husb.* vol. iii.) See CANKER, FIRS, and PINES.

LARD. The melted fat of the hog, which is much used for domestic purposes, and in cookery, for ointments, pomatums, and other purposes. Pure lard has little or no taste, and no odour; its melting point is 78·6° to 87·5° Fahrenheit. When long exposed to the air it attracts oxygen, and becomes rancid; whilst a portion of carbonic acid is evolved. Lard is a compound of a solid, firm fat, *stearine*, and a semifluid substance termed *elaine*, in the proportion of 38 of the former to 62 of the latter. Lard should never be used when it becomes rancid. See FAT and ADEPS.

LARK. The common name of the native species of the genus *Alauda* of Linnæus, of which one, the *A. arvensis*, is distinguished as the sky-lark, or laverock; the other, *A. campestris*, Lin., is called the field-lark. As the species of this genus differ from most other insessorial birds in resting habitually, and sleeping on the ground, their feet present a singular but simple modification, which at the same time beautifully adapts them to their office of supporting the superincumbent body on a flat surface; it consists,
in the extreme elongation, in an
straight line of the claw of the hinder
which is at the same time properti
robust; thus the plane of support i
tended at the expense of the preh
faculty, which the habits of the lark r
of little or no value to it.

The sky-lark (*A. arvensis*) is univ
admired for the power and melody
song, and for the beautiful associati
spired by the circumstances under
its notes are most richly poured forth
while soaring aloft to greet the risin
It ascends in the air almost perpendic
by successive flights, to an elevat
which its song becomes inaudible:
scent is generally oblique. The
builds her nest on the ground, a
four or five eggs, which are of a
brown colour, marked with darker
she sits about fifteen days, and
rears two broods in the year. Th
lific species is granivorous: in the
large flocks congregate together; t
very fat at this season, and are capt
great numbers for the table. This
too well known to need descriptio
whole length of an adult male is
seven inches and a quarter. Almost
larks brought to the London mar
taken in the neighbourhood of Dun

The wood-lark (*A. arborea*) is
ately distinguished from the sky-lar
smaller size, its shorter tail, and by
spicuous light-brown streak over
and ear-covert. It prefers hedge
meadows, cultivated lands, and co
that are interspersed with copses,
tions, and small woods, and is seldo
on those open exposed tracts of
where the sky-lark is most abunda
food and other habits it assimilates
to the sky-lark. The whole leng
male bird is rather more than six in

The shore-lark (*A. alpestris*) is n
common in this country, being m
quently met with in America. Th
length of the bird is about seven
(*Yarrell's Brit. Birds*, vol. i. p. 40

LARKSPUR. (*Delphinium*, fr
phin, a dolphin, in reference to the
resemblance in the nectary of the pla
imaginary figures of the dolphin.)
species of larkspur are showy, and
as border flowers, especially *D. Aj*
D. Consolida, both of which are uni
grown among the border annuals. T
baceous and perennial kinds are i
by divisions or seeds, and the an
biennial kinds merely require sowin
open border, where they will flo
seed freely. The field larkspur (*D. C*
grows wild in sandy or chalky cor

is regarded as a simple astringent. ardens this species is called the branching spur, and attains the height of three or feet, blowing vivid blue flowers. (*Pax- Bot. Dict.*)

.grandiflorum is a hardy and beautiful nnial, blowing dark blue flowers in July August. It loves a dry soil, and open tion.

e bee larkspur is a beautiful perennial, ing bright blue flowers in July and ust. Sheep and goats eat the wild lark- horses do not relish it, while cows and totally refuse it. Bees are remark- ttached to its flowers, which are like- gathered by the country people of any, cut small and mixed with tobacco, prove its flavour.

RVA. (Lat. a mask.) A term applied t state, in which an insect exists im- tely after its exclusion from the egg, which precedes the pupa state. The ls commonly called *grubs*, *maggots*, *aterpillars*, are larvæ. Grub appears a general term analogous to larva; rm maggot is most generally applied larva state of dipterous insects; and pillar, in the most common acceptation term, is used to designate the larva of lepidopterous insects. These terms, ver, are used in a very vague manner. *y Cyclo.* vol. xiii. p. 338.)

ST. An uncertain quantity, varying fferent countries, and with respect to us articles. The following quantities fferent commodities generally make a —12 dozen of hides or skins; 12 bar- f meal; 10½ qrs. of cole-seed; 10 qrs. rn or rape seed (in some parts of Eng- 21 qrs. of corn go to a last); 12 of wool, 1700 lbs. of feathers or flax. *Culloch's Com. Dict.*)

ATHS. Long thin stripes of wood, guished according to their length into four, and three feet laths, and into us sorts, according to the different kinds ood of which they are made, and the oses to which they are to be applied. r ordinary breadth is about an inch, their thickness ¼ of an inch: laths are by the bundle, which is generally called ndred, but the number of score in each dred differs with the length.

ATHYRUS. (From *la*, augmentative, *thouros*, anything exciting, in allusion the medicinal qualities of the seeds.) nus belongs to the natural order eæ. It consists for the most part handsome plants when in flower, ted for arbours or shrubberies, y must be supplied with branches t them, as they climb by means of rminating the footstalk, and sometimes without tendrils. Any common soil suits them; they are increased by seeds, and some of the perennial kinds by dividing the roots.

The yellow vetchling (*L. Aphaca*) is an annual, flowering in June. The plant is glaucous, without any true leaves or leaflets, except near the root. The flowers are solitary on long stalks, small, drooping, lemon-coloured. The pod is an inch in length, nearly cylindrical, smooth, and containing six seeds, which produce intense headach if eaten in any quantity, while the roots of *L. tuberosus* are said to be wholesome food. (*Paxton's Bot. Dict.*) See VETCHLING.

Crimson vetch (*L. Nissolia*) is also an annual, flowering in May. It is destitute of tendrils, it has a grass-like form, and bears beautiful crimson flowers, variegated with purple and white. The pod is long and the seeds numerous.

There are five other species of lathyrus: namely, *L. hirsutus*, *L. pratensis*, *L. sylvestris*, *L. palustris*, and *L. latifolius*, which is the only one of importance as a garden flower.

Broad-leaved everlasting pea (*L. latifolius*) is a perennial, flowering in July and August. The herb is glaucous, the stem winged, the leaflets broadly elliptical, bluntish, three or five ribbed, and the tendrils in five branches. The stipules are ovate in their upper part, and broader than the stem. The flowers are large, handsome, of a fine rose colour, and in tufts of five to ten. The legume is long, compressed, and narrow. It is one of the most showy of the herbaceous species of the pea tribe; and well adapted as an ornament to cottages. See EVERLASTING PEA.

LAUREL. (From the Celtic word *blaur* the *b* is dropped, signifying green, in allusion to the foliage of the plants.) This is a very handsome and interesting genus of plants: among the most interesting and valuable of the hardy kinds, is the bay tree (*L. nobilis*), which is injured by severe frost. (See BAY-TREE.) *L. benzoin*, *L. sassafras*, and several others are deciduous, and in some situations attain a great size. They may be increased by layers or cuttings of the roots. The bark of *L. benzoin* is stimulant and tonic, and in North America it is used in intermittent fevers. The tree yields by incision benzoin. In *L. fœtens*, an acrid red or violet juice is particularly abundant. All the species are more or less aromatic and stomachic.

The Portugal laurel (*Prunus lusitanica*), is a beautiful evergreen, which grows from ten to fifteen feet high, blowing handsome spikes of white flowers in June and July. It forms a round head, and is very ornamental upon lawns.

beries. They are increased by layers or by cuttings planted under a glass in a shady situation. The berries are violently purging, but become eatable after fermentation, and are made into a sort of cake by the North American Indians. (*Paxton's Bot. Dict.*; *Phillips's Shrub.* vol. ii. p. 39.) See Guelder Rose.

LAVA. The substances which flow in a melted state from a volcano. They vary considerably in texture and composition.

LAVENDER. (*Lavandula*, from *lavo*, to wash, in allusion to the use formerly made of its distilled water in baths, on account of its fragrance.) The hardy kinds are the only plants of this genus worth cultivating.

Common garden lavender (*L. vera*) is well known and much esteemed for the fragrance of its flowers, and the volatile oil which they yield by distillation with water. It is cultivated in great abundance for the London market, at Mitcham in Surrey. A very poor and light gravelly soil is best suited to this plant, being in such more fragrant, longer lived, and more capable of enduring severe weather than in a rich soil. In rich or moist soils it grows luxuriantly, but is in general destroyed during the winter. The situation cannot be too open. It is propagated by slips and cuttings of the current year's shoots, which may be planted in May and June, as well as by cuttings of those which are a year old; these are to be planted in March, April, and early in May. Both slips and cuttings must be from five to seven inches in length, these, after being stripped to half their length of the lower leaves, are to be planted to that depth either in a shady border, or in any compartment,

of June. The flowers are
and carminatives in medici
of tinctures. The oil is an
fume, and one or two drops
sugar and mixed in water
draught in nervous headac
(*G. W. Johnson's Kitchen*

LAVENDER, SEA. S

LAWN. A space of
with grass, kept short by
nerally situated in front of
sion, or within the view fro
when once established, req
kept neat by the ordinary
mowing, and sweeping, exc
surface perfectly even, by
hollows with screened moul
When lawns become worn
ing of any finely divided ma
them; malt dust applied in
cellent for this purpose;
time an additional quantit
may be sown. (*Pen. Cyc.*

LAWRENCE or LAUR
Was admitted B. A. of Cl
bridge, in 1688, and was
rectory of Yelvertoft, in No
in 1703. To the cultivatio
of the rectory house he assi
and though its soil was shal
worst description of subso
clay, in three years he gre
the choicest fruit. In 172
the rectory of Bishop's We
county of Durham. In
prebendary of Salisbury.
rectory, in 1732. He was
very fond of horticulture,
part of it which includes
fruits. Working in his gar

ng several new experiments, and various observa-
ning to Fruit Trees; particularly a new Method
ling Walls with horizontal shelters. With an
in to fix a meridian line by the brother of the
Edward Laurence. London. 8vo. 1714, 1716.
ird Edition is dated 1723. 4. The Fruit Garden
dar; or a Summary of the Art of managing the
Garden, teaching in order of time what is to be
therein every Month in the Year, containing several
d plain directions more particularly relating to the
With an Appendix of the Usefulness of the Ba-
r. London. 8vo. 1718. 5. A new System of
lture, being a complete body of Husbandry and
ing. In five books. 1726. folio. 6. Paradise
ed; or the Art of Gardening; a Poem. London.
8vo. (*G. W. Johnson's Hist. Eng. Gard.*)

WSON, WILLIAM, an author who
sed to write entirely from experi-
published the following works:—

ew Orchard and Garden; or the best Way for
g, Grafting, and to make any Ground good for a
chard; particularly in the North, and generally
whole Commonwealth; with the country House-
arden, for Herbs of common use; their Virtues,
, Profits, Ornaments: Variety of Knotts, Models
n, and Plots for the best Ordering of Grounds
lks. As also the Husbandry of Bees, with their
Uses and Annoyances: all being the experience
and eight years' labour, and now the third time
d and much enlarged. Whereunto is newly
he Art of propagating Plants, with the true
g of all Manner of Fruits, in their Gathering,
g Home, and Preservation. Followed by a most
e new Treatise, from approved experience, of
of propagating Plants. By Simon Harwood.
4to. 1597, 1615, 1618, 1623, 1626, 1648, 1649. Again
larged in 1665 and 1676. It was printed along
rkham's Way to get Wealth. 1648 and 1660.
tus de Agricultura. London. 4to. 1656 and 1657.

Y. A term applied to land in the
f grass or sward. This kind of ground
nently distinguished into such as has
ng in the state of sward, and such as
ly laid down to grass, or into old and
ys. The proper method of managing
tter is of great importance to the
, and which Young thought should
keeping them perfectly free from
or the following autumn and winter
heir being laid down, when, in the
, they will afford a growth of young
ighly valuable for sheep, with which
hould only be well stocked, and kept
hen, and during the following summer.
ng, in his opinion, being more per-
than mowing a new lay, as directed
tain authors. They may, he thinks,
ucceeded *in spite* of such bad manage-
but never *by* it.

YERING. In gardening, an opera-
y which the propagation of plants is
d by laying down or bending the
, so that a portion of them may be
d with earth. A shoot so operated
called a *layer*, and the point which
es the layers bears the name of *stock*.
plants are so much disposed to emit
that if their branches happen to come
tact with the earth they immediately
to strike. Plants so situated as to
r it impossible to bend their branches
ground, may nevertheless be layered
ving their shoots introduced into a
r box of soil elevated to them, and supported in a convenient position. This is a common practice among the Chinese, who cause branches of trees to root in this manner by partially ringing them, and covering their parts so ringed with a ball of clay, which is kept moist. (*Penny Cyclo.*)

LEADWORT. (*Plumbago*; from *plumbum*, lead.) A genus of pretty, free-flowering plants, growing in any common soil, and increased readily by cuttings. The root of *P. europæa*, it is said, when chewed, will cure the toothach. (*Paxton's Bot. Dict.*)

LEAF. (Sax.) The well-known fine membranous part of a tree or plant, which is put forth and unfolded in the spring, and which in some trees falls off in the autumn. "The leaf," says a writer in the *Penny Cyclopædia*, "is an expansion of the bark of a plant, from whose axil a leaf-bud is developed: but this opinion is hypothetical. The leaf is usually thin, and traversed with one or more veins, composed of woody and vascular tissue; sometimes it is fleshy, and occasionally cylindrical, or nearly so." The functions of the leaf being at once that of respiration, digestion, and nutrition, its surface is covered with stomata, or breathing pores, which communicate with minute hollow chambers in its interior. It is in the leaf that all the peculiar secretions of a plant are prepared out of the under sap which the roots obtain from the soil, and which, carried up to the leaves, is exposed to the air, and undergoes the action of the vital chemistry which converts it into the proper juice. It is then returned to the stem, and forms the different secretions of the plant, as resin, starch, sugar, gum, &c. A leaf is either united to the stem by means of a petiole, or stalk, or it is sessile; that is to say, seated on the branch without an intermediate stalk; the veins pass through the petiole before they can expand into the broad or green part forming the blade of the leaf. Some leaves are furnished with an appendage, which in grasses is a thin membranous body arising from the base of the lamina, and in palms is a coarse net, formed, as it is said, of tissue belonging to the veins of the leaves. When leaves have but one blade, they are simple, as in the apple; but when there is more than one blade, each seated on a ramification of the petiole, a leaf is called compound. Of these, and of the external form of the leaf, there are endless modifications. Between 200 and 300 are enumerated by Bischoff.

The distinction of leaves made by those who have written on botany are the following: a simple leaf is that which is not divided to the middle. A compound leaf is divided into several parts, each resembling terminated by an odd leaflet, as in the cassia; when the leaflets are all nearly of the same form and bigness, it is called an uniform pinnated leaf, as in the liquorice; when they are not so, it is said to be difform, as in the agrimony. A winged leaf is a pinnated leaf, with an intervening membrane. A ramose leaf is that which is still farther divided than the pinnated leaf, as in the osmund royal, female fern, &c. An entire leaf or lobe is that which has no division on its edges, as in the apple-tree, &c. A sinuated leaf is that which is cut about the edges into several long segments, as in common mallows. A serrated leaf is that which is cut about the edges into several acute segments, resembling the teeth of a saw, as in the nettle, &c. A crenate leaf is that which is cut on the edges into several obtuse segments, as in betony, &c. A laciniated or jagged leaf is that which is cut on the edges into several pretty deep portions in an irregular manner, as in the horned poppy, &c.

All the experiments which have been made in order to show how serviceable the leaves of trees and plants are to their well-being, have proved that when the plants have been divested of their leaves, or their leaves have been eaten or cut during their growth, they have been remarkably weakened or destroyed. If the leaves of plants be the means by which their juices are prepared for their support, as has been just stated, it should teach us not to pull or cut off the leaves of trees or plants on any account, while they retain their verdure, and are in health, as they may be greatly injured thereby. Hence, probably, the error of the common practice of feeding down wheat in

easily, but that is, he th
to them; they are a spong
with urine, and if not touc
carting on to the land, w
field much of what might
and they are extremely us
main object of bedding
autumn and winter seaso
vol. xiii. p. 374.; *Lindley*
any.) See BOTANY, *ante*,

LEAF-BUDS. Rudi
branches, made up of
over each other, the out
hardest and thickest, an
minute axis, which is in d
tion with the woody and
the stem. When stimula
heat they extend into bra
ficially removed from the
them, they are capable o
individual from which they
In this case, however, the
a progeny as from seed, b
tension of the parent.

LEAFLET. A part of
or a small leaf formed on
leaf branching out.

LEAGUE. A measur
cipally used in reckoning
The sea league is three na
phical miles, or the 1-20th
consequently about 3·45 E
common land-league is a v
rary measure on the con
chiefly in France. The
have two distinct leagues;
league, containing 2000 to
2·42 English miles, and a l
degree, or equal to about 2

The word is said to h

erving of cultivation; they grow in any rden soil, and may be increased with ility by dividing at the root.

The great leopard's bane (*D. pardalian-is*) is a perennial, native of Great Britain, owing in mountainous pastures or mea- ws. The root is creeping, and consists of eral knobs connected by long fibres; ody at the crown. The stem is two or ree feet high, hollow, round, leafy, and iry; branched and glutinous at the upper rt. The leaves are rather soft and wny, heart-shaped, more or less regu- ly toothed, or wiry; the radical ones ge, obtuse, on long foot-stalks; those out the middle of the stem sessile and sping; upper ones much smaller, pointed. owers, which appear in May, solitary the ends of the branches; two inches de, of a uniform bright yellow; the ear- st overtopped by succeeding ones. The ots are aromatic, and used by sports- n in alpine countries against giddiness. arton's *Bot. Dict.; Eng. Flor.* vol. iii. 446.)

LEASE. (From *locatio*, letting, or *di- sio*, from the French *laisser*, i. e. *di- ttere*, to depart with.) "A lease," says odfall in his *Law of Landlord and Te- nt*, "is a contract for the possession and fits of lands and tenements on the one e, and a recompense of rent or other in- e on the other; or it is a conveyance of ds and tenements to a person for life, or ars, or at will, in consideration of a urn of rent or other recompense. The ty letting the land is called the lessor landlord, and the party to whom the se is made, the lessee or tenant. It has nerally been supposed, that the con- tion between landlord and tenant has dually improved from that of master d slave into a state of total independence d mutual interest in the soil. In support this opinion, we are told (*Kaimes' Hist. Law ect.*) that lands were originally occupied bondmen; but as these men derived no fit from their labour, and had con- uently no interest in being industrious, became necessary to have a free man to nage the farm, who probably at first had e acres set apart to him for his main- nance and wages. In progress of time, it s found more politic to give him an terest in the produce, first, by allowing m a certain proportion in place of wages, d ultimately, by reserving to the master y quantity certain, and permitting vant to retain the overplus. One step, necessary to bring this con- its due perfection, was to give the a lease for years, without which he secure that his industry would turn to his own profit. By a contract in these terms, he acquired the name of tenant, because he was entitled to all the possession for years certain.

"But the notion that the cultivation of the ground was formerly carried on by slaves alone, is contradicted by the evidence afforded by the records and monuments of the middle ages (see *Bell on Leases*, ch. i.), which prove, that while slavery existed in this country, there were also tenants and free labourers of the ground, who held their lands under lease. It appears that the practice of letting lands was known among the ancient British; a proprietor of lands being permitted to let them for a year at his pleasure, though he could not alien or charge them. (1 *Whit. Manch.* s. 4. p. 377.) Those who formerly held large districts and tracts of land being unacquainted with the arts of husbandry and tillage, found it their interest to lease out their demesnes, which for want of care and cultivation, lay waste, and afforded them little or no profit. These leases were granted for years, this mode of letting being thought best to answer the designs and intentions of the lord, as well as the expectations of the tenant: for if they had let them for life, this had given the tenants too great a power over the lord; and, on the other side, if they had leased their land only at will, few would have chosen to bestow any great pains or industry upon so precarious a possession, which the arbitrary will and pleasure of a peevish lord might have defeated. (*Bac. Abr.* tit. *Leases.*)

"Thus, these estates were originally granted to mere farmers or husbandmen, who every year rendered some equivalent in money, provisions, or other rent to the lessors or landlords; but in order to encourage them to manure and cultivate the ground, they had a permanent interest granted them, not determinable at the will of the lord. Their possession, however, was esteemed of so little consequence, that they were rather considered as bailiffs or servants who were to receive and account for the profits at a settled price, than as having any property of their own; they were, therefore, not allowed to have a freehold estate, but their interest, such as it was, vested after their deaths in their executors, who were to make up the accounts of their testator with the lord, and his other creditors, and were entitled to the stock upon the farm. (2 *Bl. Com.* 141.)

"In every lease it is requisite that there should be, 1. A lessor able to grant it. 2. A lessee capable of accepting it. 3. A subject-matter that is demiseable. 4. There must also be the needful ceremonies, &c.;

rent be reserved upon a lease for life, years, or at will, or not; except only in the cases of leases made by tenant in tail, husband and wife, and ecclesiastical persons.

"The usual words (*Co. Lit.* 45.; *Ibid.* 5.; 2 *Black.* 318.) whereby a lease is made, are "demise, grant, and to farm let," and whatsoever words amount to a grant may serve to make a lease. Farm, ferme, fearme, *firma*, is derived of the Saxon word 'feorman,' to fee, or relieve; because in ancient time they reserved upon their leases cattle and other victual and provision, for their sustenance, so that a farmer, *firmarius*, was one who held his lands upon payment of a rent or feorme, though, at present, by a gradual departure from the original sense, the word 'farm' is brought to signify the very estate or lands so holden upon farm or rent."

The beneficial effects, both to the landlord and tenant, of leases of a sufficient duration to encourage men of capital and skill, to properly cultivate the land, I need hardly point out. And it will be very desirable to have as few restraining covenants introduced into these as possible. They merely retard and annoy the good farmer and rarely improve the practice of the unskilful.

"In the northern part of this island, custom and expediency have very generally fixed the duration of the lease at about twenty years. Experience will evince that the time is not always more than enough to allow the possessor of the land to conduct and mature a profitable system of management, and to pay to the owner an adequate rent. All the great operations of

to the occupier, the necessa
on the cultivation of the g
be hazarded; but more tha
of good capital will, like ev
gard as a benefit the power
his business undisturbed, an
cuniary value on security
ence." (*Quart. Journ. Ag*
With regard to a lease in g
covenants, see a good paper
134.) In speaking of rents,
marks, "As to the kind of
constant experience proves t
most satisfactory is a fixed
To rents, payable in grain,
gulated by the prices of gra
obvious objection, that the
nerally be required to pay t
when he is least able to do
prices rise from a deficiency
of the crop." And when
lease and its precautionary
observes, "the greatest er
vain precautions and atten
against every possible con
from the nature of the tran
unforeseen events to which i
it is impossible to do. All t
is to make as precise as pos
tions which experience show
sary. The terms of the con
few and simple, and easily
complied with. Not only ar
nants to be avoided, but s
necessary, since to increase
them too much serves but
lessee, and give birth to f
and since all experience
shows that the interests of e
be sufficiently guarded with

take possession, is a defence to an
e agreement. (*Bullock* v. *Domitt*,
.) And if the tenant covenants
: is bound to rebuild in case of a
or destruction by lightning, or
lown by enemies. (*Paradine* v.
7.; *Chesterfield* v. *Bolton*, Com.
It is an excuse for not taking
farm according to agreement
sor was in arrear of rent of the
emises to his landlord (*Partridge*
3 B. & P. 172.), or that another
an interest in it. (*Rumbal* v.
. & P. 589.) A person who lets
ages to give possession, and if
o so the lessee may recover da-
ıst him. (*Cove* v. *Clay*, 5 Bing-
If a tenant commits a breach
t by waste, or by treating the
nhusbandlike manner, the Court
will not, in such case, compel a
formance of an agreement for a
ll v. *Barclay*, 18 Ves. jun. 63.)
ent to make a lease is a good
quity (*Hamilton* v. *Cardross*,
. C. 125.); and whether the in-
ıall operate as a present lease or
greement for a future lease will
he intention of the parties, to be
om the instrument itself (*Mor-
sett*, 3 Taunton, 65.), in which
ield, C. J., said, "If you collect
e of the instrument the intent
es to give a future lease, it shall
ment only."
f a farm, provided its term does
three years and a rent is reserved,
parole (*Crosby* v. *Wadsworth*,
.); and although a parole agree-
lease of longer duration than
is void by the statute of frauds,
. 3. s. 2., yet the agreement still
nancy from year to year. (*Clay-
ney*, 8 T. R. 3.) A lease from a
commences on the next day.
ft, 275.) The words "from the
date," mean either inclusive or
according to the context and
tter, and the court will construe
to effectuate the intention of the
Pugh v. *Leeds*, Cowper, 714.)
e feast of St. Michael," means
Michaelmas. (*Spicer* v. *Lea*, 11
A general parole demise at an
t, where the bulk of the farm is
d a small part in the open com-
is only a lease from year to year,
r so long as the usual round of
extends. (*Roe* v. *Lees*, 2 W.
.) A lease for seven, fourteen, or
years, "as lessee shall think
a good lease for seven years what-
ay be for the fourteen or the
twenty-one years. (*Ferguson* v. *Cornish*, 2 Burrows, 1032.) And if it be granted for the same terms, unconditionally, the lessee only has the option at which of the above periods the lease shall determine. (*Dunn* v. *Spurrier*, 3 B. & P. 399. 7 Ves. jun. 231.) For every doubtful grant must be construed in favour of the grantee. (*Doe* v. *Dixon*, 9 East, 16.) A tenancy from year to year of glebe land is determined by the death of the incumbent. (*Doe* v. *Carter*, R. & M. 237.) The churchwardens and overseers of a parish may grant leases of the parish lands under the 59 G. 3. c. 12. s. 17., but the churchwardens alone cannot. (*Phillips* v. *Pearce*, 8 D. & R. 43.)

Form of the Lease.—In all farming leases there are always some of the following covenants, according to the intentions of the contracting parties, or the course of husbandry followed in the district. 1. Date, parties, demise, &c. 2. Liberty for lessor to view the necessary repairs, and to take certain excepted trees. 3. Reservation of game, &c. 4. "To have and to hold." 5. "Yielding and paying." 6. Additional rent for converting pasture to tillage. 7. And for improper husbandry. 8. Lessee to pay rent and taxes, and repair, landlord finding rough timber, and to leave in repair. 9. Lessor to make certain alterations in farm, to the extent of . 10. All further repairs and alterations to be at the lessee's expense; lessee to carry materials, to insure against fire, and not to assign without a licence, and to give notice of assignment or underletting. 11. Lessee to paint the house, to ring swine, clean tiles of buildings. 12. Lessee to level mole-hills, cut rushes, deliver loads of straw yearly to landlord. 13. Lessee to provide straw for thatching. 14. Lessee to perform certain work with his teams for the lessor; to provide beer for workmen; to carry building materials. 15. Lessee to keep a dog for lessor. 16. Lessee not to suffer persons to sport over the farm, but to give notice of trespassers. 17. Lessor to bring actions of trespass in lessee's name, and to give notice to trespassers. 18. Lessee to keep up and preserve the stock of pigeons, and to deliver to lessor half the killed pigeons. 19. Lessee to follow the proper course of husbandry. 20. Lessee to cultivate in a husbandlike manner. 21. Lessee to cut drains and ditches. 22. Lessee to observe all the reasonable directions of the lessor, as to cultivation. 23. Lessor to enter, to observe the state of the cultivation. 24. Lessee to summer fallow once in years. 25. And not to have more than two white crops without a summer fallow. 26. To cultivate according to the four shift system.

27. Lessee not to take more than one exhausting crop in years. 28. Lessee not to sow on fen land more than two successive crops of wheat. 29. Lessee to sow clover with second crop, and clover to remain years. 30. Lessee not to plough meadow, or mow fatting lands. 31. Lessee not to mow pasture or meadow-land, during the last five years of term, for two years successively. 32. Lessee to repair fences. 33. And repair hedges, not to buckstall them, but to cut and scour one part of them yearly. 34. Lessee to scour one part of the ditches, and plash one part of the hedges yearly, to plant quick and trees, where needed, not cutting hedges under a certain growth, not selling any for fire wood. 35. Lessee not to cut down and injure trees or make pollards, not to cut pollards under years' growth, or any which have not been previously cut. 36. Lessee not to cut underwood under years' growth. 37. Not to dig pits. 38. Lessor may pursue any remedy in equity for breach of covenants. 39. Lessee may dig clay for farm, or gravel for roads of the farm. 40. Shall kill moles, mow thistles, not carry away brakes. 41. Lessee to spread dung upon the land, leave all dung at the expiration of term without compensation; to spread marl; to lime. 42. Lessee to feed off turnips. 43. Lessee to keep sheep, and fold them on land. 44. Lessee at end of term to leave one part of last year's hay to be paid for by lessor. 45. Lessee to carry out part of last year's dung, and to leave remainder on the premises, to leave also all straw and chaff and stubble. 46. Lessee not to sell straw within the last years. 47. Lessee to consume hay upon the land. 48. Lessee may sell hay and straw, bringing on to the farm, for each ton sold, tons of manure. 49. Lessee to inbarn and stack all the corn-crops, &c., grown on the farm, and to use the straw there. 50. Lessor may stack hay on the farm, during the last year of farm, and enter to sow turnips. 51. Lessor to enter and make plantations, not exceeding acres, making allowance for the same in rent. 52. Lessee in last year to sow one part of arable land with clover, one part with turnips. 53. Lessee not to cut grass more than once in last years of his term, or plant more than one crop of potatoes, in last years, or take a crop of coleseed during last years. 54. Lessee to leave at expiration of term one part of land in fallow, or green crops. 55. Lessee to leave without charge or remuneration all the dung on the premises. 56. Lessee to lay down with clover summer corn. 57. Lessor to have leave to enter, to plough fallows, and sow seeds, during the last year of term. 58.
Lessee to plough and sow, to be
(if lessor neglects) by succeeding t
Lessee to find room in house for
succeeding tenant, and stables for
and permit him to carry out dun
farm. 60. Lessor to allow use o
nine months after the expiration o
61. Lessee to provide the succeed
with loads of straw per mont
as he occupies the barn, after en
62. Lessee to leave on farm lo
63. Lessor to pay for grass, hay,
left on premises. 64. Mode of val
65. Lessor to keep buildings in
allow rough wood for repairing
66. Lessor to find timber for re
Lessor to repair buildings da
storms. 68. Lessor to find ti
notice, and to allow, if upon
plough-bote. 69. Lessor to re-e
not paid, or other covenants bro
see, or upon lessee becoming b
insolvent, or making a bill of sa
over property for the benefit of h
assigning, or pledging lease, or
growing crops. 70. Lessor in
entry to pay for improvements
to valuation. 71. A schedule o
marked plan. (*Woodfall's Lo
Tenant*, 942.)

Stamps on Leases. — By the
184. the stamps of the followin
required for leases: —

"Leases or tacks of any l
ditaments, or heritable subjects
rent, without any sum of mone
fine, premium, or grassum, p
same."

Where the yearly rent shall not amou to £20 -	-	-	-
Where to £20 and		not to £100	
—	100	—	200
—	200	—	400
—	400	—	600
—	600	—	800
—	800	—	1000
—	1000 and upwards		-

Stamps on Agreement for Leas
same statute it is provided tha
the same shall not contain mor
words (being the amount of fifte
law folios, or sheets of 72 wo
duty of 1*l*., and where the same
more than 1080 words, a duty
and for every entire quantity of
contained therein, a further dut

An agreement for a lease wh
requires a 1*l*. 15*s*. stamp. (*Clay
tenshaw*, 7 D. & R. 800.) The
quired for a lease is regulated by
expressed to be paid (whether fi
and not by that which is actually
v. *Lewis*, 10. B. & C. 673.; *D
dyl*, M'Clelland, 217.)

'orfeiture of Lease.—Provisoes in leases
re-entry are to be construed like other
racts, not with the strictness of con-
ms at common law. (*Doe* v. *Elsam*,
k M. 189.) Acceptance of rent after a
iture is a waver of the forfeiture (*Arns-*
. Woodward, 6 B & C. 519.) if the
of the forfeiture was known to the
r at the time. (*Roe* v. *Harrison*, 2 T. R.
)

ustom of the Country with regard to
es.—Custom of the country cannot con-
l the express terms of a lease; but if the
is silent, then the custom of the country
be adopted (*Smith* v. *Jersey*, 2 B. & B.
), and evidence of that custom may
eceived, although there is a written
ement which is silent on the particular
. (*Webb* v. *Plomer*, 2 B. & Ald. 746.;
r v. *Armitage*, Holt, 197.) See Cus-
or Counties.

pairs.— The implied duty to repair is,
e common law, cast upon the tenant.
xtent of this obligation, however, is in
t degree to be taken in connection with
xtent of the tenant's term : the mere
y tenant, it is evident, could hardly be
ted to perform those substantial re-
to a farm house, that would be required
easeholder for a long term. (*Ferguson*
Espinasse, 590.) These two kinds
pairs have been sometimes, there-
divided into *substantial* and *ordinary*,
he custom of the country usually is for
enant to repair the house, and the
rd the farm buildings, and the tenant
ly bound to use the premises in a
t-like manner (*Horsefall* v. *Matthew*,
7.); and the mere neglect of repairs
not render him liable for waste. (*Herne*
mbow, 4 Taunton, 764.)

ltivation.—The mere relation of land-
and tenant is a sufficient consideration
he tenant's promise to manage a farm
n husbandlike manner (*Pawley* v.
ker, 5 T. R. 373.), and according to
ustom of the country, and this may be
rced although there is a written agree-
t as for the out-going tenant to carry
he way-going crop. (*Wriglesworth* v.
lison, 1 Douglas, 201.) In this case
d Mansfield remarked, "The custom is
l—it is just; for he who sows ought to
, and it is for the benefit and encourage-
t of agriculture. It is, indeed, against
general rule of law concerning emble-
ts which are not allowed to tenants who
w when their term is to cease, because
held to be their fault or folly to have
n when they knew their interest would
re before they could reap; but the cus-
of a particular place may rectify what
rwise would be imprudence or folly." And the custom or usage to be binding need not be one followed from time immemorial: it is sufficient if there be a general usage (*Dalby* v. *Hirst*, 3 Moore, 536.); and that it is the *prevalent* course of husbandry. (*Legh* v. *Hewett*, 4 East, 164.) In this case Lord Ellenborough in giving judgment said, "*The custom of the country* with reference to good husbandry, must be applied to the approved habits of husbandry in the neighbourhood under circumstances of a like nature; and perhaps a contract to occupy an estate in *a good and husbandlike manner*, simply would have imposed the same duty on a tenant, because the same sort of evidence drawn from the approved practice would have been brought forward to show what was good husbandry." (See also *Pawley* v. *Walker*, 5 T. R. 373. and *Brown* v. *Crump*, 6 Taunton, 300.)

Contracts to cultivate.— These are usually introduced into the farmer's leases, generally in the vague manner of binding him to cultivate according to the custom of the country, or, what is often as bad, obliging him to farm his land according to old and obsolete systems, instead of allowing him to adopt all the improvements which science and experience shall suggest. It is advisable, however, to have certain restraining covenants introduced into all leases for the landlord's security, a protection which the legislature has carefully extended; thus by the 56 Geo. 3. c. 50. s. 1. it is provided that no sheriff or other officer shall sell or carry off from any lands any straw, chaff, or turnips, or manure, in any case, nor any hay or other produce, contrary to the covenant or written agreement. And by a subsequent section of the same act, the assignees of a bankrupt or insolvent are prevented from taking any crop, hay, straw, or manure, in any other way than the bankrupt would have been entitled to do.

LEASH. A term applied to game, &c. by sportsmen, and which implies three, as three hares, partridges, &c. It also signifies a line to hold a dog by.

LEATHER (Germ. *leder;* Dan. *läder.*) The prepared skins of animals. The principal object of the art of converting skin into leather is to render it strong and tough, durable, and often water-proof, and to prevent its destruction by putrefaction. The skins are first cleansed of hair and cuticle, then impregnated either with vegetable tan and extract, as in the production of what is called *tanned* leather. In this process the tannic acid, which is the active principle of the astringent vegetables employed, combines with the gelatin of the skins, and forms an insoluble tannate of gelatin. It is this formation which ren-

Turkey leather is tawed and afterwards slightly tanned. Morocco leather, as it is called, is chiefly prepared from sheep-skins. Shammoy leather is generally sheep or doe-skin, prepared by dressing, lining, &c., and dyed, if necessary, and then finished in oil. Russia leather acquires its peculiar odour from birch tan. There is an excellent abstract of the manufacture of different kinds of leather in *Aikin's Dictionary of Chemistry*, which those who wish to pursue the subject further may consult. The leather manufacture of Great Britain is of very great importance, being inferior, in point of value and extent, only to those of cotton, wool, and iron. "If we look," says Dr. Campbell, "on the instruments of husbandry, on the implements used in most mechanic trades, on the structure of a multitude of engines and machines — if we contemplate at home the necessary parts of our clothing, — breeches, shoes, boots, gloves, — or the furniture of our houses, — the books of our shelves, the harness of our horses, or even the substance of our carriages, what do we see but instances of human industry exerted upon leather? What an aptitude has this single material in a variety of circumstances for the relief of our necessities, and supplying conveniences in every state and stage of life! Without it, or even without it in the plenty we have it, to what difficulties should we be exposed." (*Polit. State of Great Brit.* vol. ii. p. 176.) The number of persons engaged in all the various branches of the leather manufacture in Great Britain is estimated at between 200,000 and 300,000, the total quantity of all sorts of leather at 65,000,000 lbs., and the entire value of the

1835	2,104,318	285,9
1836	2,042,471	322,5
1837	1,647,000	255,8

(*M'Culloch's Com. Dict.*;
Brande's Dict. of Science.)

LEAVEN. (Lat. *levar*
piece of sour dough used
render light dough or p
very imperfect substitute
as it communicates to th
tringent taste, which few
ought to be used only wh
be procured. As, however
ment cannot always be obt
during winter, I shall state
methods of preparing, as
serving it, under the article

By the law of Moses, lea
forbidden during the pas
Jews, who were taught to re
vigil of the feast as unclea
scrupulosity, purified their
contaminating influence. S

LEECHES. (*Hirudin*
haurio, to draw.) A genus
red-blooded worms, or Anel
provided with a sucker at
body, and a mouth at the
sess a few native species;
the fresh waters, as the hor
mopis sanguisorba, *H. stag*
officinal leech (*Hirudo med*
inhabit the ocean, where th
upon fishes, as the skate-suc
muricata). The species emp
cal purposes belong to the
suga, the true English or
It is composed of from 90
is convex on the back, whic

on each side. The stomach occupies
irds of the length of the animal, and
led into eleven compartments, each
ed with two cæcal sacs; it is closed
hincter valve at its lower end. The
as no heart, but, instead of it, four
pulsating vessels, one on each side,
the dorsal, and the fourth on the
inal surface. Nothing is known of
de in which the blood circulates.
eathing organs are the vesicles al-
nentioned. The nervous system is a
of ganglia, or knots, connected by
filaments. Leeches are herma-
e: they are viviparous, but the young
elled in cocoons, which are pierced
young leech when it attains a certain
The great demand for leeches may
rred from the extent to which the
s carried on; four only of the prin-
lealers in London annually import
00. Norfolk supplies the greatest
the leeches brought into the London
, but some are taken in Kent, Suffolk,
and Wales, and large numbers are
d from Lisbon and the south of
. The leech dealers of Bretagne
orses and cows into the ponds that
hes may fatten and propagate more
ntly by sucking their blood. Chil-
re employed to catch them by the
and the grown-up persons wade into
llow waters in the spring and au-
and catch the leeches that adhere
naked legs, or more generally the
s beat, as they wade in, the surface
water with poles, which sets the
in motion, and brings them to the
, where they are taken with the
nd put into bags. They are also
by a sort of net made of twigs and
which is used in the summer, when
ches retire into the deeper waters.
100,000,000 are annually used in
. The leech makes a triangular
and continues to suck until its
ar powers are paralysed by the dis-
of the animal, compressing the
ng cells, and causing suffocation;
drops off. Leeches should never
n off forcibly, as the teeth are left
wound, and cause erysipelas. The
de of applying them is to dry them,
n placing them in a hollow made in
napkin, to apply it over the spot,
d it there until they all adhere. By
thod any number may be applied as
one. After they fall off, a bread
ter poultice should be applied over
e. Leeches will not adhere if any
mell, as that of sulphur or tobacco,
ent in the room during their appli-
A very interesting account of these valuable little animals, and of the best method of preserving them, will be found in the *Penny Cyclopædia*, vol. xiii. (*Thomson's Dispens.*; *Johnson on Medicinal Leech*; *Brande's Dict. of Science.*)

LEEK. (*Allium porrum.*) The leek is a hardy biennial, for although it attains perfection in size and for culinary purposes the first year, it does not run to seed until the second, the perfecting of which it also often survives. The whole plant is eaten, being employed in soups, &c., and is by some persons boiled and eaten with meat. There are four varieties; the Musselburgh, and the large London leek, which are by far the best; the Scotch or flag, which is larger and hardier; and the Flanders. It is raised solely from seed, which must be sown first in the end of February, a small crop for transplanting in June and July, as well as in part to remain where sown; again for the main crop in the course of March or early in April; and lastly, towards the close of April or beginning of May, for late transplanting. These sowings are performed in general broadcast and raked in, though some gardeners employ drills, the plants to remain after thinning; the leek, however, is so much benefited by transplanting as obviously to point out the error of this practice. When the plants are three or four inches in height, in eight or ten weeks after sowing, they must be weeded, hoed, and thinned, where growing too close, to two or three inches apart; water also being given, in dry weather, will with the above treatment strengthen and forward them for transplanting in another month, or when six or eight inches high. They must be taken away regularly from the seed bed; the ground being well watered previously, if not soft, and easily yielding. When thinned out, they may be left to remain in the seed bed six inches asunder as they do not grow so large as the transplanted ones, which must be set by the dibble in rows ten inches apart, and eight in the lines, being inserted nearly down to the leaves, that the neck, by being covered with the earth, may be blanched; water in abundance must be given at the time of planting, and the long weak leaves shortened, but the roots left as uninjured as possible. The bed should be hoed over occasionally, as well to kill the weeds as to loosen the soil. By this treatment, and by cutting off the tops of the leaves about once a month, as new ones are produced, the neck swells to a much larger size. The several sowings above directed will yield a supply from August until the following May, when they advance to seed. A portion should be always taken up and laid in sand previous open exposures, it never comes to maturity, and by the first sharp autumnal frost it is entirely destroyed. Good varieties never flower before May or June, and ripen their seed in September. The heads should be cut when changed to a brownish colour, with a foot in length of the stalk left attached, for the convenience of tying in bundles, three or four together to dry; — when they are perfectly dry, they may be hung up and kept in the head until wanted, or immediately thrashed out and stored. As the husk is very tough, it is usual, when small quantities have to be operated upon, to rub them against a tile, which breaks it more easily than any other mode that can be adopted. (*G. W. Johnson's Kitchen Garden.*)

LEES. The dregs or feculencies of liquors, which, after being separated by fermentation, fall to the bottom of the vessels. All the various kinds of lees, such as those of wine, beer, ale, oil, &c., may be made use of as manures when they can be had in sufficient quantities.

LEET. An inferior court held within a manor, and called the king's court, on account that its authority to punish offences originally belonged to the crown, and from thence descended to inferior persons. Leet is the precinct or district within the cognizance or subject to the jurisdiction of a court-leet.

LEGS. The extremities that form the support of animals. Of the four legs of a horse, the two before have several parts, each of which has a peculiar name; thus by the name of fore-leg, we commonly understand that part of the fore-quarters that extends from the hough to the pastern-joint,

duce gum; certain *Astrag*
canth; the tamarind and o
whose interior is filled wi
pulp; *Cassia acutifolia* and
cassia yield senna; *Glycyrr*
ice root; *Ceratonia*, the wil
Scripture; finally, many ar
and some are dangerous
which the common laburnu

LEICESTER SHEEP.

LENTICULAR. A b
nifying lens or pea-shaped.

LENTIL. (*Ervum Lens*
land in Celtic; some of t
pest in cultivated ground,
too prolific weeds.) An e
vetch or tare kind, cultivat
of England as fodder for
til is an annual, growing
about eighteen inches, with
like those of tares, but s
ducing pale purple flower
ceeded by small flat pods,
or three round, hard, smoo
There are two sorts of lent
the yellow, but the latter a
quantity of fodder. The s
are generally sown in Ma
the proportion of one an
bushels per acre. Lentils
dry fodder for cattle, and
cutting into chaff as troug
and horses.

LESSEE, LESSOR.

LETTING FARMS.

LETTSOM, JOHN CO
born in 1744, of Irish qu
the little island of Vandy
in the West Indies, where
planter. He died Novem

f the milky juice which exudes
nts when broken.) There are
ous species of lettuce, all bien-

-scented lettuce (*L. virosa*),
about hedges, old walls, and
of fields on a chalky soil, not
The whole herb abounds with
l milky juice, having the smell
ut only slightly narcotic, and
produce the consequences at-
use of that drug. This juice
uddenly, in large drops on the
h from the calyx and tender
the plant is in flower, but not
s, evincing a considerable de-
bility in the plant. The root
. Stem solitary, two or three
und, smooth, sparingly leafy,
ched, panicled at the top, a
below. Leaves horizontal,
h, finely toothed, radical ones
bovate, undivided, depressed.
erous, panicled, light yellow.
lettuce (*L. Scariola*). This
nd in waste ground and dry
of fields. The whole herb is
lky, bitter, but less fetid than
g. Stem two or three feet
panicled. Leaves numerous,
orizontal, variously pinnatifid
thin midrib furnished with a
rominent prickles; their base
stem. Flowers, small, pale
ed.
lettuce (*L. saligna*). This
in chalky waste ground, or
narshes. The whole plant is
Stem about two feet high,
brown or whitish, somewhat
fy throughout. Leaves glau-
except the midrib beneath;
e or pinnatifid, entire, sessile.
nall alternate tufts composing
very small, pale yellow, open
nly, and soon fading. (*Smith's*
ol. iii. p. 344.)
ell-known cultivated lettuce
here are many varieties, which
into families, the cos and the
he first are more grown in
n winter; the second at all
more usually in winter, on ac-
r superior hardihood. The cos
characterised by being of an
th, and, with the exception of
, require to have their leaves
er for blanching; the cabbage,
lose to the ground, produces
art, in the manner of a cabbage,
assistance. The cilicias are
intermediate between the two.
the cabbage varieties are in general sweeter than those of the cos at the same age; but at full growth, this is reversed: hence the latter are preferred for salads, and the former for soups.

The cabbage varieties succeed better in a hotbed than the cos.

CABBAGE VARIETIES.

Drumheaded.
Brown Dutch.
Tennis ball.
Hardy green, or Capuchin.
Prussian.
Prince's.
Common white.
Large white.
Imperial.
Grand admirable.
Large Roman.

COS VARIETIES.

Brighton.
Black-seeded green.
Early Egyptian.
Green.
White or Versailles.
Silver.
Spotted or leopard.
Green and brown Cilicia.
Lop.

Lettuces thrive best in a light rich soil, with a dry substratum. In a poor or tenacious one they never attain any considerable size, but run to seed prematurely. Like most other crops, that soil is to be preferred which is rich rather from prior cultivation than the immediate application of manure. It is of advantage to trench it; and if manure is necessarily applied at the time of insertion, it should be in a state of forward decay. For the first and last crops of the year a warm sheltered situation is required; but for the midsummer ones a border that is sheltered during the meridian, but far from being confined or under the shadow of trees, is to be preferred. Lettuce is propagated by seed, that for the first crop should be sown in a frame, on a warm border, or slender hotbed, at the end of January or early in February; at the close of this last month a larger quantity may be sown in any open situation, and repeated once every three weeks in small proportions until the end of July for summer and autumn use; to be continued, at similar intervals, until the close of September for winter and early spring. The sowing is always performed broadcast, moderately thin, each variety separate, and raked in even and light, care being taken that the bed is trampled upon as little as possible. It is usual when the plants are about a month old, or two inches in height, to thin them to three or four inches apart, those removed being pricked out at similar distances. Those from the sowings in January and February, in a similar situation to that in which they were raised; and thence until August in any open situation. Those of the August sowing must be divided into two portions; the largest being selected and planted in an open compartment for late autumn use, and the smaller on a warm border for winter and early spring.

When planted out finally, they must be set in rows a foot apart each way, which is abundant for the largest variety, and not more than necessary for the smaller. At are planted to withstand the winter (which they easily do if sheltered with hoops and matting during severe weather), and continue in a state fit for use, are best planted on the summit of ridges, as this is a great protection from excessive wet, from which they always suffer. In every stage of growth they must be kept free from weeds, well watered, and the earth around them frequently stirred for the extirpation of slugs and snails, which are particularly injurious, and are very prevalent in moist seasons.

When the cos varieties have attained an advanced growth, they require their leaves to be drawn together with a shred of matting, to render the interior blanched, care being taken that it is not performed so tight as to bruise them. Under every favourable circumstance for a vigorous growth, the plants, especially of the cos varieties, and during dry seasons, will yet run up to seed before the heart is perfectly blanched: to retard this, it is an effectual practice at the time of tying them up, to cut out the centre of each with a sharp knife. The plants raised from the September sowing may be divided as directed for those of August, but in addition, some of the cos varieties may be planted on a warm border, to have the shelter of frames and hand-glasses. Some of the strongest of these may in succession, during November, December, and January, be planted in a moderate hot-bed, or on the borders of the stove, being removed with as little injury as possible to the roots, to bring them forward for immediate use.

Whilst in frames they require much attention. Being watered and shaded until established, they must afterwards have as much light and air admitted as possible, as

left at least a foot apart; neit
able for two varieties to fl
other, as only mongrel va
obtained. Each stem is
attached to a stake, as a s
pestuous weather. It is t
that the branches must be
seed ripens upon them, an
the whole is ready, as some
or three weeks before othe
quently the first and best se
and lost. It must be wel
it is beaten out and stored.
is considered to be best the
but when three years old, it
getate.

The juice of the lettuce
termed *lactucarium*. It p
narcotic properties, and is us
(*Le Quintin's Compl. Gard.*
G. W. Johnson's Kitch. Gar

LETTUCE, LAMB'S
SALAD.

LETTUCE, THE WAL
LETTUCE.

LEVELLING. In hus
rendering the ground even
of impediments to the co
tions of tillage. This is gen
the plough, but sometimes
employed for the purpose.

LEVER, in mechanics, an
moveable upon a *fulcrum*
having forces applied to two
The lever is one of the mech
and being the simplest of th
first that was attempted to b

Examples of the applicati
are of constant occurrence in
arts. The crowbar, the han
pincers, &c. are levers of

resistance is opposed to its motion,
ght. A very moderate contrac-
muscle thus gives considerable
the limb. (*Gregory's Mech.*

ET. A young hare, in the first
age.

EA or LAY. Land in the state
r grassy surface.

A provincial name adopted by
or an argillaceous limestone, which
ith its associated beds, is charac-
peculiar fossils. See GEOLOGY.

(Lat. *bark.*) In botany, the
ing of the bark of exogenous
consists of woody tissue in great
nd very thick-sided, intermixed
lar tissue. It appears to be
nually, at the same time as the
zones of wood, and is intended
to convey downwards the secre-
rated in the bark and leaves.
s the principal seat of lactiferous

RIES, FARMERS'. Collections
n agricultural and horticultural
re now becoming very general
the country, through the in-
ity of farmers' clubs. They can-
being eminently useful to the
agriculture, by diffusing among
tors of the soil the latest dis-
d improvements in husbandry,
he different opinions and theories
l on matters having reference to
and its collateral sciences of
botany, natural history, geology,
y, and vegetable physiology, &c.
of parties is further eminently
o each, for they have thus access
number of standard works, many
re frequently expensive, and the
arge a number would in most in-
beyond the small farmer's means.
eus which may be gradually in-
e following list of practical works
icals may be found useful to per-
nplating the formation of agricul-
ries or farmers' clubs:—

lements of Prac. Agriculture, 3d
8vo. 18*s.* The publications of
y for the Diffusion of Useful
viz. *British Husbandry*, 3 vols.
.; *Cattle*, 1 vol. 10*s.* 6*d.*; *The*
ol. 8*s.* 6*d.*; *Sheep*, 1 vol. 10*s.* 6*d.*
ricultural Chemistry, 6th edit.
son, *On Fertilisers*, 12*s.* Bayl-
s and Tillage, 5th edit. 10*s.* 6*d.*
Soils, 3d edit. 7*s.* Von Thäer's
of Agriculture (Shaw's Trans-
omplete Grazier, 8vo. 17*s.* Sir
ir's Code of Agriculture. George
Hortus Gramineus, 30*s.* Hillyard's *Practical Farming and Grazing*, 10*s.* Liebig's *Organic Chemistry*, 2d edit. 16*s.* Baxter's *Library of Agriculture*, 30*s.* Loudon's *Encyclopædias of Agriculture* and *Gardening*, each 2*l.* 10*s.*; *Farmer's Encyclopædia*, 2*l.* 10*s.*; of *Rural Architecture*, 3*l.* Main's *Farmer's Manual*, 6*s.* Prof. Johnston's *Lectures on Ag. Chemistry*. Main's *Planter's Assistant*, 6*s.* Jackson's *Treatise on Dairy Hasbandry*, 2*s.* 3*d.* Harley's *Dairy Husbandry*, 8*s.* Kollar, *On the Insects injurious to Farmers*, &c. (Misses Loudon's Translation). Rogers's *Vegetable Cultivator*, 7*s.* Stephen's *Book of the Farm*, 2*s.* 8*d.* Periodicals: *Journal of the Royal Agricultural Society of England*. London. 3*s.* 6*d.* *Journal of Agriculture*. Edinburgh. Quarterly. 5*s.* *British Farmer's Magazine*, 3*s.* Liverpool. Quarterly. 5*s.* Shaw's *Farmer's Magazine*. London. Monthly. 1*s.* 6*d.* *Veterinarian*. London. Monthly. 1*s.* 6*d.* Newspapers: *The Mark Lane Express*, the *Farmer's Journal*, and *Bell's Weekly Messenger*, &c. Weekly. Johnson and Shaw's *Farmer's Almanack*. Annual. 1*s.* Some of the old works contain much valuable practical matter, particularly the *County Reports*, and the works of Marshall, Jethro Tull, and Arthur Young.

LICHENS. Plants of a very low organisation, which grow on the bark of trees or rocks, when they form a kind of incrustation; or upon the ground, when they consist of irregular lobes, parallel with the earth's surface. Occasionally, in all situations, they are found in a branched state; but their sub-divisions are generally irregular, and without order. Their fructification consists of hard nuclei, called ***shields***, which breaks through the upper surface of the ***thallus***, or main substance of the lichen, are of a peculiar odour and texture, and contain the reproductive particles. Lichens abound in the cold and temperate parts of the world. The greater part are of no known use; but some, as the reindeer-moss (*Cenomyce rangiferina*), the Iceland moss (*Cetraria islandica*), and various species of *Gyrophora*, are capable of sustaining life, either in animals or man. The Iceland moss, when deprived of its bitterness by soaking in an alkali and then boiling, becomes, indeed, a diet recommended to invalids. Others are used as tonic medicines, as *Variolaria faginea* and *Parmelia parietina*. Their principal use is, however, that of furnishing the dyer with brilliant colours; orchall, cudbear, and perolle, with many more, are thus employed. (*Brande's Dict. of Science.*) See MOSS.

LICKS. A term applied in North America to sandy tracts of land, upon which common salt forms an efflorescence, and woods, or when covered with earth, or inverted vessels, would clearly indicate to the most careless observer, that light at least influenced the colour of vegetation: every gardener, in truth, takes advantage of this fact, when he is blanching his culinary vegetables. But it was not till after the days of Priestly, that the other chemical effects which light produces upon a growing plant, were so much better understood.

It is probable that this influence commences at a very early period in the life of the plant, with even the germination of the seed. Ingenhouz, says Dr. Thomson, found that seeds always germinate faster in the dark than in the light. (*Exper. sur la Veg.* 11.) And his experiments were repeated by Sennebier with equal success. (*Mém. Physico-Chem.* vol. iii. p. 41.) But the Abbé Bertholin, who distinguished himself so much by his labours to demonstrate the effect of electricity on vegetation, objected to the conclusions of these philosophers, and affirmed that the difference in the germination of seeds in the shade and in the light, was owing, not to the light itself, but to the difference in the moisture in the two situations, the moisture evaporating much faster from the seeds in the light than from those in the shade; and he affirmed that when precautions were taken to keep the seeds equally moist, then those in the sun germinated sooner than those in the shade. (*Journ. de Physic*, 1789.) But when Sennebier repeated his former experiments, and employed every possible precaution to insure equality of moisture in both situations, he constantly found the seeds in the shade germinated sooner than those in the light. We may conclude, therefore, that light is injurious to germination; and hence

carbonic acid is arrested
of light; but then, namely,
chemical process commence
of the action of the oxyge
the organic substances, com
blossoms, and fruit. This
all connected with the life
organism, because it goes o
exactly as in a living one.
composing the leaves of
being known, it is a matte
ease and certainty to cal
them during life should abs
by chemical action where
light is withdrawn. The
parts of all plants contai
or volatile constituents i
change into resin by th
oxygen, should absorb n
parts which are free from
Those leaves, also, which c
constituents of nutgalls, c
which nitrogen is present,
more oxygen than those w
tain such matters. The co
inferences has been disti
the observations of De Sau
the tasteless leaves of the
absorb only 0·3 of their v
in the dark during twenty
leaves of the *Pinus Abie*
volatile and resinous oils
those of the *Quercus Robur*
acid fourteen times, and
of the *Populus alba* twenty
quantity. This chemical
very plainly also in the lea
ledon calycinum, the *Cacal*
others; for they are sour l
morning, tasteless at noo
the evening. The forma

leaves of the poplar, the beech,
r the holly, are dried under the
with exclusion of light, then
with water, and placed under a
e filled with oxygen, they are
bsorb that gas in proportion as
ge in colour. The chemical na-
is process is thus completely es-
The diminution of the gas which
only be owing to the union of a
ortion of oxygen with those sub-
ich are already in the state of
to the oxydation of the hydrogen
getable compounds which contain
ss. The fallen brown or yellow
the oak contain no longer tannin,
of the poplar no balsamic con-
(*Organic Chem.* p. 28.)
tion of light upon the growing
every point of view full of in-
e cultivator: "If all the branches
xclusive of one," said Mr. T. M.
nd he was one of the ablest of
getable physiologists), "be much
continuous trees, or other ob-
branch which is exposed to the
cts to itself a large portion of the
sap, which it employs in the form-
aves and vigorous annual shoots,
shaded branches become languid
lthy. The motion of the ascend-
t of sap appears therefore to be
by the ability to employ it in the
branches of the tree; and this
asses up through the alburnum,
h substance the buds and leaves
But the sap which gives existence
eds the root, descends through
and if the operation of light give
the exposed branch to attract
y the ascending or alburnous
sap, it appears not improbable
peration of proper food and moist-
soil, upon the bark of the root,
ability to that organ to attract
y the descending or cortical cur-
." (*Selection of Paper*, p. 160.)
ndolle, I believe, first observed
cculent shoots of trees and her-
lants, which do not depend upon
support, are bent towards the
which they receive light, by the
n of the cellular substance of their
that side, and I believe his
be perfectly well founded. The
of light upon the tendrils and
e Ampelopsis and ivy appears to
iametrically opposite effects, and
an extension of the cellular bark
that is exposed to its influence;
circumstance affords, I think, a
y explanation why these plants
seek and approach contiguous opaque objects, just as they would do if they were conscious of their own feebleness, and of power in the objects to which they approach, to afford them support and protection. The tendril of the vine is internally similar to that of the ampelopsis, though its external form and mode of attaching itself, by twining round any slender body, are very different. Some young plants of this species which had been raised in pots in the preceding year, and had been headed down to a single bud, were placed in a forcing house, and the shoots from these were bound to slender bars of wood, and trained perpendicularly upwards. Their tendrils, like those of the ampelopsis, when first emitted pointed upwards, but they gradually formed an increasing angle with the stems, and ultimately pointed perpendicularly downwards, no object having presented itself to which they could attach themselves. Other plants of the vine under similar circumstances were trained horizontally, when their tendrils gradually descended beneath their stems, with which they ultimately stood very nearly at right angles. A third set of plants were trained almost perpendicularly downwards, but with an inclination of a few degrees towards the north, and the tendrils of these permanently retained very nearly their first position relatively to their stems; whence it appears that these organs, like the tendrils of the ampelopsis and the claws of the ivy, are to a great extent under the control of light. A few other plants of the same species were trained in each of the preceding methods, but proper objects were placed in different situations near them, with which their tendrils might come into contact, and I was by these means afforded an opportunity of observing with accuracy the difference between the motions of these and those of the ampelopsis under similar circumstances. The latter almost immediately receded from light, by whatever means that were made to operate upon them; and they did not subsequently show any disposition to approach the points from which they once receded. The tendrils of the vine, on the contrary, varied their positions in every period of the day, and afterwards returned again during the night to the situations they had occupied in the preceding morning, and they did not so immediately or so regularly bend towards the shade of contiguous objects. But as the tendrils of this plant, like those of the ampelopsis, spring alternately from each side of the stem, and as one point only in three is without a tendril, and as each tendril separates into two divisions, they do not often fail to come into contact within their reach, and the effects of contact upon

the moving fluid of the plant passes through its tendrils, and that there is a close connection between its vascular structure and its motions." (*Ibid.* p. 166.)

"The stems of the potatoe," he adds in another place, "as of other plants, rise perpendicularly under the influence of their unerring guide, gravitation, so long as they continue to be concealed beneath the soil; but as soon as they rise above it, they are to a considerable extent under the control of another agent, light. Each inclines in whatever direction it receives the greatest quantity of it, and consequently each avoids and appears to shun the shade of every contiguous plant; gravitation labouring to give a perpendicular, the other a horizontal direction to the leaves, and the comparative power of one agent increasing, as that of the other decreases." (*Ibid.* p. 300—306.)

The opinions of Liebig as to the chemical changes produced in plants, by the action of light, and its withdrawal, seem confirmed in some degree by those of Davy. "In the changes that take place in the composition of the organised parts," said that excellent philosopher, "it is probable that saccharine compounds are principally formed during the absence of light; gum, woody fibre, oils, and resins, during its presence; and the evolution of carbonic acid gas, or its formation during the night, may be necessary to give greater solubility to certain compounds in the plant. (*Agric. Chem.* p. 223.) And after giving a variety of experiments to elucidate the action of vegetation on the atmosphere (see Gases, their Uses to Vegetation.), he adds, "These facts confirm the popular opinion, that when the leaves of vegetables perform

which generally blow from
of the globe, have a salutar
constant agitation and mo
brium of the constituent p
sphere is preserved; it i
purposes of life: and tho
the superstitious formerly
wrath of heaven, or the
spirits, and in which they s
and confusion, are demonst
to be ministrations of Di
and connected with the ord
of our system." (*Ibid.* p. 2

LIGHTNING. An elect
produced by the passage
tween one cloud and anot
a cloud and the earth.
lightning with electricity,
been previously suspected
rectly demonstrated by the
Franklin, in the year 1749
ment of drawing sparks by
Since that time the scien
has been greatly advance
the cause of some of the
nected with lightning is not
even at the present day.

There are three phenome
for which theory fails sati
count. The first is the fo
which is almost always zig
lines, making a greater o
with each other. The secon
repetition of the flashes
cloud, which often follow
quick succession, contrary
place in the case of elec
which generally recover th
or discharge the whole of
at a single stroke. The thi

ing and the electric spark: the
anation should consequently apply
but this the theory has not yet
to give.

eory of an electric fluid, and the
tained differences in the conduct-
of different substances, suggested
of protecting buildings from the
e effects of lightning by metallic
has been disputed whether con-
ver have been or can be of use in
and the question will not pro-
satisfactorily answered until the
nature of electric action are better
d. See Electricity and Thun-
ict. of Science.)

**TS, NORTHERN, or AURORA
IS.** A luminous meteor, gene-
aring in the northern part of the
presenting a light somewhat re-
the dawn or break of day. The
es which it exhibits, and the
assumes, are so proverbially un-
at it is not possible to comprehend
ler any general description. In
nd Islands, and other countries in
udes, the northern lights are the
attendants of clear and frosty
n winter. They are most frequent
. A very interesting account of
r, and of the works treating on
ct, will be found under the head
Borealis," in *Brande's Dict. of*
c.

OUS. (Lat. *lignum*, wood.) In
y, a part is so called, when it is
of a hard inelastic substance,

N. (Lat. *lignum.*) The woody
his most important proximate
f vegetables exhibits itself in a
forms, constituting the different
f hard and soft wood, and various
oducts, such as hemp, flax, cotton,
n by fine mechanical division it is
o a pulpy state, it is formed into
hen by different re-agents all the
atters are extracted from wood,
ble residue is lignin; its ultimate
ts are carbon, oxygen, and hy-
e two latter elements being in the
ive proportions as in water; so
y fibre may be considered as a
of carbon and water, and, ac-
Dr. Prout's experiments, almost
equal weights. Lignin is very
le, but under certain circum-
is attacked by *dry rot*, arising out
wth of a parasitic fungus, which
rapid decay. Damp timber in
where air has not free access, is
y subject to its attacks; and when
made its appearance, the well-seasoned timber in its neighbourhood becomes liable to the same disease. The dry rot may be prevented by impregnating the timber with certain saline solutions, and of these, solution of corrosive sublimate has been found most effectual; this (the bichloride of mercury) combines chemically with the albumen of the wood, and the compound is very indestructible. (See Dry Rot.) Lignin has also a strong attraction for alumina, and hence linen, cotton, paper, and other forms of this fibre, may be aluminised by steeping them in hydrated alumina diffused through water, or more effectively by soaking them in certain aluminous solutions, drying them, and afterwards washing out the excess of the salt. It is in this way that cotton goods are impregnated with alumina for the purpose of dyeing and calico printing. Other metallic oxides exhibit similar attractive powers, especially the oxide of iron. The analogy that exists between the composition of sugar, gum, starch, and even vinegar and lignin, suggests the possibility of the conversion of those substances by an exchange of their proximate elements into each other; and it has accordingly been found that by carefully roasting pure and fine sawdust, it is rendered partially soluble in water, and that a part of it is converted into a nutritious substance, probably intermediate between sugar and starch, and which, when mixed with a little flour, yields a palatable bread, not very unlike that made by some of the inhabitants of the northern parts of Europe of the bark of trees. Mixed with sulphuric acid lignin passes into gum, and from this sugar may be obtained by boiling it for some hours in a very dilute sulphuric acid; this sugar, when purified, much resembles grape or honey sugar. By this process rags may be converted into nearly their own weight of this peculiar saccharine matter.

The production of vinegar by the destructive distillation of wood, was originally suggested about the middle of the seventeenth century, by Glauber, a celebrated German chemist of that time; it has lately become a very important branch of manufacture in this country. Upon the whole there are very few natural products equally important with lignin in their applications to the useful and ornamental arts. See Pyroligneous Acid.

LILAC. (*Syringa*, from *syrinx*, a pipe. The branches are long and straight, and are filled with *medulla;* hence the old name of the lilac, pipe-tree. The English name of the genus is from lilac or lilag, the Persian word for the flower.) The species of lilac are well known elegant shrubs.

The common lilac (*Syringa vulgaris*) is a in May.

The Persian lilac (*S. persica*) is a native of Persia, and seldom exceeds five or six feet in height, blowing light purplish pink flowers in May. The lilacs love a good garden soil, and may be propagated by layers, shoots, and suckers from the roots.

LILY. (*Lilium*, derived from the Celtic word *li*, signifying whiteness; on account of the beautiful white flowers of the original species.) This is a fine ornamental and well-known genus of exotic plants, almost all of which are remarkable for the delicacy and beauty of their flowers. Most of the species succeed in a rich light soil, but the American species should be grown in peat. (*Paxton's Bot. Dict.*)

Miller, in his Dictionary, mentions thirteen species, with their varieties: but there are now more than thirty-four known species, besides innumerable varieties: the finest for garden ornament are as follows: —

The superb martagon. (*L. superbum.*) A beautiful plant, blowing many bright orange flowers spotted with violet. It loves bog soil.

Purple martagon, which grows three or four feet high, blooming reddish or white flowers spotted with purple. It blows in July. It is sometimes called Turk's cap. It is a native of Germany.

Scarlet martagon. (*L. chalcedonicum.*) Native of the Levant, blowing a bright scarlet flower in June and July. It likes a good soil.

Turk's turban (*L. pomponium*) blows a pretty pendulous red flower in June in the shape of a turban. In Kamschatka the bulb of this species is cultivated the same

be kept over night in a
The bulb roasted is emolli
ative. All descriptions o
pagated freely by offsets
which should be taken up
decays, and parted and r
October, five or six inche
dry soil. The bulbs of
never be transplanted till
decayed, as they will not
turbed. Many varieties o
duced from seed, which
same way as tulip seed.

LILY-OF-THE-VALI
ria majalis, from the Latin *c*
This very elegant sweet-sc
perennial is not reckone
tribe. It grows in wood
the foot of hills, flourishi
its fragrance in May and
are thread-shaped, creep
tangled. Leaves two, r
three or four inches lon
many-ribbed, smooth-stal
longer than the leaves, e
folded, clasping each other
base with several purplish
stalk solitary, simple, radi
cylindrical, bearing a simp
of several pendulous, c
flowers, with rather distant
as large as a black currant,
are varieties with double
flowers, sometimes seen
not easy of cultivation, and
than the wild kind, whic
most favourite of our nati

This vegetable is eate

.ILY, THE DAY. (*Hemerocallis*, from
ρα, a day, and κάλλος, beauty; alluding to
beauty and duration of the flowers.) This
n ornamental genus of exotic flowering
its of the simplest culture, thriving well
ay light loamy soil, and readily increased
divisions. The most common species
the yellow day-lily (*H. flava*), a native
iberia, blowing yellow flowers in June,
the fulvous or copper-coloured day-lily
fulva), a native of the Levant, blowing
ous flowers in July and August. (*Pax-*
Bot. Dict.)

ILY, THE WHITE WATER. Can-
, or water-socks. (*Nymphæa*, from
phe, a water nymph; alluding to the
tation of the plants.) These are beau-
plants, well worthy of cultivating in
r collection. The stove species should
rown in tubs of water, placed in a
part of the house, with some rich
y soil at the bottom. The hardy kinds
be grown in ponds, canals, &c. They
ll increased either by seeds, dividing
oots, or separating the tubers. (*Paxton.*)
e great white water-lily (*N. alba*) is a
iful perennial, native of Great Britain,
ps the most magnificent of our native
rs; growing in clear ponds, and slow
. The root is tuberous, horizontal,
ng down numerous long, stout radicles,
are fibrous at the extremity; leaves
ng, a span wide, oval, heart-shaped,
nearly parallel or close lobes at the
entire, smooth. Every part of the
is slightly vascular, perspiring rapidly,
hough so succulent, drying very soon.
ers four or five inches wide, white
yellow stamens and pistil; the upper
e of the calyx leaves white, often
l with pale red, generally destitute of
The stems are superior to oak-galls
eing grey. The roots are astringent, and
k infusion is said to be useful in lepra.
oots are used in Ireland and Jura for
g a brown colour. The Egyptians
e roots boiled, and convert the seeds
bread. The Swedes also have used
oot in prevailing dearth, as a substitute
orn; though it requires to be pre-
ly divested of its bitter taste by fre-
t washings. According to Gleditsch the
of this species and of the yellow lily
qually useful in tanning and currying.
e leaves of the *N. alba* afford a good
ration of design: the stomata are
dant on the upper surface, which is
sed to the air, whilst on the under,
h floats on the water, are innumerable
rbing pores. This plant is eaten by
, but disliked by goats, and totally re-
d by cows and horses.
he white water-lily looks very handsome in sheets of water, or ponds in ornamental grounds, blowing its large flowers in June and July. They have a faint sweet scent, and expand in sunshine, in the middle of the day only, closing towards evening, when they recline on the surface of the water or sink beneath it. The same circumstance is recorded of the Egyptian *N. Lotus*, from the most remote antiquity. The stimulus of light, which indeed acts evidently on many other blossoms and leaves, expands and raises with peculiar force these splendid white flowers, that the pollen may reach the stigma uninjured; and when that stimulus ceases to act, they close again, drooping by their own weight to a certain depth. When the flower-seeds ripen in August, the plant sinks again to the bottom. In transplanting the water-lily, the pond must be entered, the stem of the plant felt for, and the roots dug up with a large ball of its mud left round them; place it in an old fish-basket, and remove it speedily, to sink it in the place intended for its removal. As the basket rots, the plant becomes fixed in its new situation. Propagate by throwing the ripe seed-vessels into large ditches of standing water, when the young plants appear the following spring.

LILY, THE YELLOW WATER. (*Nuphar*, from *naufar* or *nyloufar*, the Arabic name of *Nymphæa*.) This, like the last described, is a genus of very beautiful plants, admirably adapted for growing in ponds, cisterns, or lakes; and they are increased by dividing the roots or by seeds which have only to be thrown into the water where they are intended to grow. (*Paxton.*)

The only indigenous species are, 1. The common yellow water-lily, or water-can (*N. lutea*), which is met with very frequent in the wild state in rivers and pools. The whole plant is rather smaller than the white water-lily. Footstalks two-edged, flattened on the upper surface; leaves entirely smooth and even rounded at the end, and generally at the lobes, which meet and lap over each other. The flowers, which appear in July, are about two inches wide, cupped, all over of a golden yellow, with the scent of brandy or ratafia, whence they are called *brandy-bottles* in Norfolk. They perhaps communicate this flavour by infusion to the cooling liquors or sherbets, so much used in the Levant. The seed-vessel, a coated berry, when ripe, bursts irregularly, not dissolving away into a mass of pulp like the *Nymphæa*. The roots, like those of the white water-lily, are astringent, and contain a quantity of fecula. If moistened with milk, they are said by Linnæus to destroy crickets and cockroaches. Hogs will eat this aquatic plant, but *all the other* species of live stock reject it.

2. The least yellow water-lily. (*N. pumila.*) This is much smaller than the preceding: it flourishes principally in the highland lakes of Scotland. The footstalks are less convex beneath than those of *N. lutea*, and more concave above. The leaves are only about three inches long, shining at the back; their lobes not close together. The flowers, which blow in July and August, are lemon-coloured, tinged with green, scarcely 1½ inches wide, and essentially distinguished by the great sharply-notched border of the stigma. (*Smith's Eng. Flor.* vol. iii. p. 14.) The marsh-trefoil is often called the dwarf water-lily.

LIMB. The border of a flower, also the branch of a tree.

LIME. (Germ. *leim*, glue.) This very useful earth is the oxide of a metal called *Calcium*. It is obtained by exposing chalk and other kinds of limestone, or carbonates of lime to a red heat,—an operation generally conducted in kilns constructed for the purpose; the carbonic acid is thus expelled, and lime, more or less pure, according to the original quality of the limestone, remains. In this state it is usually called *quicklime*. The purest quicklime is obtained from the calcination of white marble. When sprinkled with water it becomes very hot, and crumbles down into a dry powder, called *slaked lime*, or *hydrate of lime*, owing to the water becoming consolidated and an essential part of the lime. When exposed for some weeks to the air it also falls into powder, in consequence of the absorption of moisture; but a portion of carbonic acid is also absorbed, and the lime partially converted into limestone. The uses of lime are very numerous. Its most important application is in the manufacture of mortar and other cements used in building. It is also very extensively used in this country, and in some parts of the Continent and North America, as a manure to fertilise land.

LIME *as a manure*. There is some reason to infer that lime has been used as a manure from a very remote period. M. P. Cato, in the oldest agricultural treatise which has escaped to us, describes, in his sixteenth and thirty-eighth chapters, with much minuteness, the best means of preparing it. And although, in the early writers on rural affairs, we find but few notices of its use as a fertiliser yet we may reasonably conclude, that its employment was nearly as extensive and as early as that of chalk or marl, which were in very primitive times largely and skilfully used for a similar purpose. Pliny attests the use of it by the Roman cultivators as a dressing for the soil in which fruit trees were planted.

Of all the earthy manures, lime
tainly the most powerful and
its effects on the soil; and if it
not so extensive on the clays a
lands of many districts of our is
desirable, this does not arise f
limited powers of this earth, but ra
a variety of other causes; such a
pense, the impurity of the lime e
and an ignorance of its most ec
mode of application.

The common varieties of lime, us
English farmers, are procured by
either chalk or limestone. Such
therefore rarely, if ever, chemical
for it almost always contains a p
silica (flint), alumina (clay), and
oxide of iron. These, however,
often present in sufficient quantiti
fluence the fertilising powers of th
any material extent, as will readily
by the analysis of the limestones,
chalk usually employed by the lime
Common limestone is composed of

Carbonate of lime	-	- 9	
Water	-	-	
Silica	-	-	
Alumina	-	-	
Oxide of iron		-	
			10

The slate-spar limestone contain

Lime	-	-	- 5
Carbonic acid		-	- 4
Silica	-	-	-
Oxide of iron		-	-
Loss	-	-	-
			10

Common chalk is composed of

Lime	-	-	-
Carbonic acid		-	-
Water	-	-	-
			10

united with various small proportio
other earths. There is also a ver
derable proportion of lime made
North of England from the m
limestone, (called by the Yorkshire
" hot lime,") all of which differ c
ably in composition; that from Sun
contains in 100 parts.

Carbonate of lime	-	-	
Carbonate of magnesia		-	4
Clay, water, &c.	-	-	
Oxide of Iron	-	-	
			10

This " hot lime," which is well k
the farmers in the neighbourhood

d other parts of the north of can only be applied in limited for the calcined magnesia of the remains for a considerable period caustic form, without absorbing cid gas from the atmosphere, and e its effect is very pernicious to s of plants. It is only when pure, hat magnesia is prejudicial to ve- by exposure to the atmosphere, it and slowly absorbs carbonic acid es carbonate of magnesia, and in forms a part of many cultivated me of the most fertile soils of in fact contain it, in this form, able quantities.

ion of the fire upon the chalk nestones merely deprives them of and carbonic acid gas, or fixed rmer must not fall into the very ror of supposing that anything is he fire to the lime; on the con- ses very materially in weight, by ived of its carbonic acid gas, a ver, which it gradually recovers e to the atmosphere, which always is elastic vapour.

e which I have used has been made from chalk, at an expense ve pence or six pence per bushel. h I made from the magnesia was from the neighbourhood of d. This requires less fuel to into lime than the common lime- r the ordinary kinds, about one coals is required for five or six the limestone; and from my own ts, I am inclined to agree in opi- many of the farmers of the mid- ies, that the lime procured from is rather more powerful in its clay soils, than that made from

r case the shape of the kiln, and gradual application of the heat, naterial circumstances to be re- those who burn their own lime. one and chalk should be placed (which I think is best of an egg noderately-sized pieces, free from ed chalk or stone; and care must to have the earth thoroughly which perhaps the best indications tness, and the alteration of the he flame issuing from the top of hich, when the lime is sufficiently s its red tinge. The price of the adiness of access to the limestone of necessity governs the price of in some districts of the north it is ne farmers for not more than one hree halfpence per bushel.

mical uses of lime to vegetation may be conveniently divided into two heads; first, its direct action upon vegetation; and secondly, its chemical operation on the matters contained in all cultivateable soils.

In its direct action, as a food or constituent of plants, its uses are highly important; for hardly a single plant has yet been analysed, in which the presence of lime has not been detected, in combination with an acid. It must be regarded indeed as an essential ingredient in almost all vegetable substances, as a direct food of plants.

It is found in the commonly cultivated crops of the farmer, however, in very varying proportions: thus the ashes of the oat plant contain more than five per cent. of lime; in two pounds' weight of the seeds of wheat are commonly found about twelve grains of carbonate of lime; in the same quantity of rye, about 13·4 grains; in barley 24·8 grains; 33·75 grains in the oat, and 46·2 in the same weight of rye straw. It abounds also with magnesia in the wood of trees: the ashes of that of the oak contain about 32 per cent. of the earthy carbonates; those from the poplar 27 per cent; from the hazel 8; of the mulberry 56; and from the hornbeam 26 per cent. The proportion however of lime found in plants varies with the composition of the soil on which they are produced. Thus the ashes of the leaves of the fir (*Pinus Abies*), growing upon a limestone hill, were found to contain 43·5 per cent. of the carbonates of lime and magnesia, but the ashes from the leaves of another fir growing upon a granite soil yielded only 29 per cent. of the same earthy salts. There are very few soils fit for cultivation from which this earth is entirely absent, and its addition is commonly found by the farmer to promote the fertility of most barren lands—the most sterile heaths, for these are the very lands whose soils contain hardly a trace of lime; in that of Bagshot, for instance, it exists in a very minute proportion. The attraction of lime for the aqueous particles of the atmosphere is considerable. In my own experiments 1000 parts of lime previously dried in a temperature of 212° gained by exposure for three hours to air saturated with moisture, at a temperature of 60°, 11 parts. Professor Schubler found that the same weight gained in 12 hours 26 parts, in 24 hours 31 parts, in 48 hours 35 parts, when it appeared to have become saturated with moisture, for in 72 hours it had not again increased in weight. Lime therefore is not without its uses even in this respect to vegetation. Lime and chalk differ in their action, and in their value as fertilisers in several respects; thus lime dissolves and renders soluble the organic matters of the soil, which chalk does not; its action too, as a direct food of plants, is more rapid, from the superior readiness with which it mingles with the soil. And again, its carriage is considerably lighter, for in the process of lime-burning almost all the water and carbonic acid gas of the chalk are driven off. These amounted in some specimens of Kentish chalk, which I examined, to more than 58 per cent.; so that when the farmer carries 42 tons of recently well-burnt lime, he conveys as much real earth on to his land, as is sometimes contained in 100 tons of chalk.

The chemical action of the lime on the soil is also very considerable; mixing with the heavy adhesive clays, it renders them more friable, less liable to be injuriously acted upon by the sun, and much more readily permeable by the gases and vapour of the atmosphere. It renders them, the cultivator tells you, "more easily workable." And, again, the action of lime upon the organic substances always more or less contained in the farmers' soils is very considerable; and this benefit is not merely confined to the vegetable remains in the land, but it extends with equal energy to the dead and the living animal matters, with which, in a countless variety of forms, the soil is tenanted. There are few substances, in fact, more destructive to grub-worms, animalculæ, &c. than lime; and where these are destroyed by the action of the lime, the soil is, as a natural consequence, enriched by their remains. On soils which abound in sulphate of iron, which is commonly the case with those containing an excess of peat, the action of lime is not only highly beneficial in decomposing or rendering soluble the mass of inert vegetable remains, but the lime decomposes the sulphate of iron, and, uniting with its sulphuric acid, forms the well-known fertiliser, the sulphate of lime or gypsum of commerce.

When lime is applied to the soil, it gradually becomes converted, by exposure to the atmosphere, into carbonate of lime (chalk); its action as a solvent ceases, and its presence is now only useful as a direct food or constituent of the farmer's crops. This, however, affords an opportunity for the beneficial repetition of the dressing with lime, so far as its solvent powers are available. But then, as might, for the above reasons, have been anticipated, the farmer finds that the after-limings never do so much good as the first; and as by each successive application the lime reduces still more and more the quantity of organic matters in the soil, so it follows as a natural consequence that after each succeeding dressing, the benefit produced becomes less

and less, and finally the cultivator
us that "the land is tired of lime.
result has been experienced to a
siderable extent in the north of
where the cheapness of fuel and th
ance of the common limestone ha
many instances, tempted the farm
to his land lime in excessive quanti
such over-limed soils, the only
the addition of organic matters.
cases, peat will, in moderate quan
occasionally found an excellent dr

The quantity of lime used per ac
cessity varies with the soil, and the
with which it is procured. The he
and peat soils require the largest
tions; the light lands need a much
quantity to produce the maximum
I have used it at the rate of 25 bu
acre, mixed with earth, on light
never more than 100 bushels per
clays. This is the proportion c
used on the heavy soils of the
counties, and the deep clays of t
of Kent. In Scotland they apply s
as much as 360 bushels per acr
Ireland still larger quantities ha
successfully employed; and on so
peat mosses of the north of Engla
than 1000 bushels have been u
good effect. The employment of s
proportions, however, can rarely be
even when the lime is obtainable
low rate.

I have used lime, and have bee
at other liming operations for ma
I have chiefly employed it either
dressing, or which, for light soils,
prefer, mixed with ditch scrapi
banks or pond mud, at the rat
bushel of lime to a cubic yard
And then, after thoroughly mixi
together, and allowing the mass t
for a month or six weeks, I hav
succeeded in forming a most enrich
post, which, on even the gravelly
Essex, has produced at the rate
to twenty-five cubic yards per acre,
wheat, clover, and potatoes (to wh
in general, lime is prejudicial),
powerful effects, certainly incre
one third the produce of the nat
It is only in the state of mixture w
or peat, or salt, that I have found
fitably useful for light gravelly so
I have varied the application in
of ways and proportions, but still,
gravels or sands, the result was n
tirely satisfactory. But I have w
as a dressing for the black hungry
of Spring Park, near Croydon,
peat mixed together, at the rate of
of lime and three parts of peat,

ixed with one part of salt in a dry
and suffered to remain for three
previous to its being used in a dry
By applying this mixture at the
f from 40 to 50 bushels per acre,
f turnips have been grown under my
ons fully equal to any produced by
cubic yards per acre of farm-yard
st: and in 1840, the produce of
thus dressed fully equalled that of
djoining lands of the same field,
had been manured with the ordinary
st. And an excellent neighbouring
, Mr. Foster, of Great Totham, in
840, made an experiment with tur-
ntirely confirming those I had else-
instituted. He applied a mixture
re of 30 bushels of lime with 15
of salt, to ten acres of a field con-
twelve acres. The land previously
crop of rye, which was fed off with
and on the two acres to which the
d lime were not applied, the sheep
cake given to them, and, moreover,
nd was sub-soiled to a depth of
n to twenty inches. The field pre-
had a good summer fallow. The
d salt was spread broadcast after the
ughing, and harrowed in before the
The turnips were of the variety
green rounds. The land slopes to
uth, and its soil is a light, mouldy
soil. In examining them in company
Ir. Foster, in the last week in August,
ressed himself abundantly satisfied
he result. The crop of turnips was
y good all over the field; if there was
e of difference, it was in favour of

inferior.

I have found the lime and salt equally beneficial as a dressing for wheat and barley; but a description of those experiments will more properly be found under the head SALT and LIME; for when the application is made to the land, the lime and salt have, in fact, entered into new combinations; the compound applied is no longer a dressing with lime and salt, but with a mixture chiefly composed of chloride of calcium and carbonate of soda, with a portion of undecomposed lime and common salt.

I have several times mixed lime, in cases where I suspected the presence of grub and the seeds of weeds, with farm-yard compost, but never successfully. Convinced of the ill effects of the lime being thus mixed, I have long since abandoned the practice. There is, in fact, no beneficial object to be attained by this mode. The natural well-regulated fermentation of the dung effects all that the lime can do, and in a better manner; for the lime dissolves, and to a considerable extent decomposes the finer and richer portions of the compost; and it certainly renders the straw and other coarser portions of the manure drier and more difficult to dissolve in the soil. The practice therefore seems worse than useless.

In the application of lime to heavy clay land, I have always found that it was best used, either in its simple uncombined state, or after an ultimate mixture with sandy or light calcareous earths, or peat, or salt. But by no means of applying it (and I have varied my experiments in a variety of ways with considerable industry) on the land, believe that the lime will produce effects nearly equally important when it is ploughed into the soil. This trial was made in December 1839 on a field of five acres, whose soil is a cold, stiff, deep, hungry loam, that had previously borne a very poor crop of turnips, which were fed off with sheep. This field has a declination towards the south-west, and has always produced crops of a very inferior description. In the middle of December, after spreading 80 bushels per acre of lime (made from chalk) from the cart's tail, by the shovel, it was immediately ploughed in and drilled with the common red wheat. The effect was excellent, every one of the neighbours agreeing that the land never produced such a crop before. And that this was owing to the lime, was evident from the inferior produce on the spots where the lime had not been spread.

The exact quantity, however, per acre, Mr. Foster is unable to state, owing to his being prevented in the hurry of harvest from keeping it separate: he estimates it however at about 4½ quarters per acre, and he is clearly of opinion that this large produce (for his land) arose not so much from the thickness of the crop, as from the largeness of the ears.

In the boggy unreclaimed lands of Spring Park, the effect produced by the direct use of lime at the rate of 200 bushels per acre is excellent. The cost is there four pence per bushel, and it is that made from chalk. But on the light hungry black gravels of that farm, as well in fact as upon the clays of that district (and the same remarks apply in general to almost all light soils and situations), the lime is never productive of such powerful effects as when mixed with the earthy matters from ditches, ponds, old banks, or headlands. But here let me earnestly impress upon the farmer the necessity and the great advantage of paying much more than common attention to the mixing of the lime with the earth.

The lime should not only be of the best and *recently* burnt description, but should be mixed as thoroughly and as finely as possible with the earth. By this means the heat generated in the mass by the slaking of the lime is considerable, and is productive of several advantages: it kills more completely insects of all kind,— seeds of weeds, and the more stubborn roots of weeds. And the mixed earths are rendered considerably more friable, and capable of a much more even and economical distribution on the farmer's crops, than by the ordinary careless way of mixing them. On peat soils, and on those abounding in the tough inert remains of the heath plants, lime is best applied in its purest state, unmixed with any other substances to weaken its effect. Its action on such soils is not difficult of explanation. It dissolves and renders soluble the organic matters of the soil, and it decomposes the sulphate of iron (or green vitriol) which it often contains. In such lands, too, we rarely find any lime: it furnishes, therefore, to them a portion of an earth whose presence is absolutely essential to the profitable growth of all the most valuable vegetables. How excellent such an addition is to these soils, even when applied only at the rate of four bushels per acre, has been proved by some extensive experiments of the Scotch planter, the growth of whose young woods has been very materially and rapidly promoted by merely placing a handful of lime under each plant. Now we have already seen how copiously this earth is found in the ashes, not only of the fir, but in those of all other timber trees. So unvaried, indeed, is the presence of the salts of lime in vegetables, that they have been supposed to produce a similar supporting effect that the same salts of lime yield in the bones of animals. And it is certainly worthy of remark that the phosphate and carbonate of lime, of which the bones of all animals are chiefly composed, are precisely the salts of lime the most universally present in vegetables.

Lime must, therefore, be classed amongst those manures which commonly serve to promote the *permanent* fertility of the land, for unless it is washed out by the moisture of the atmosphere, or the flood waters, it can only be removed from the soil by becoming the food for the cultivator's crops. In poor peaty soils no other manure can be compared to it, either for powerful effect or for rapidity of action; and its usefulness is nearly as great on the stiffest clay land. Whenever, therefore, the *permanent* improvement of such soils shall be considered with that general and that patient attention which the importance of the object demands, at that period the fertilising powers of lime will be still more generally appreciated, and its services be far more extended than at present.

The quantity of lime applied by per acre of necessity varies with the description of the soil; that which contains most organic matter will, of necessity, bear a larger proportion than that which is more free from vegetable or animal remains. The quantity usually applied is much too large, and the dressing too often repeated without proper consideration; and it is not until the land becomes absolutely overcharged with lime, that the farmer begins to have a suspicion that his land is *tired* of it. In Ireland it is etimes applied to old pasture leys in- ded for potatoes, at the rate of 400 hels per acre; and on some of the moors Derbyshire, 1500 bushels per acre have n found not too large a quantity. gric. Rep. of Derbyshire, vol. ii. p. 437.) Scotland the quantity usually applied light land is about 160 bushels per acre; stiff clay soils from 240 to 360 bushels. m. *Rep.* vol. ii. p. 533.) On the stiff s of the Weald of Kent, the quantity ally employed is about 100 bushels per , and that is often repeated every five rs, on the fallow before wheat, for many rs. (*Agric. Rep. of Kent*, p. 88.) Lime be as readily produced by burning stone with peat as with coals; the heat duced is amply sufficient, and the heat e easily managed. (*Farmer's Mag.* vol. p. 488.)

I conceive," says Mr. Hillyard of North- tonshire, "lime to be a stimulant only, not a manure. Lime gives solidity to t land, the means of retaining moisture, in some degree prevents the rays of the from penetrating so deep into the soil, drying up the roots. Lime also en- rages the growth of clover; but it does do the good that is equal to the expense, n applied to land that has for a length ime had it periodically laid on. It is the mon practice in this county to lime and g the land for turnips nearly at the e time, just before sowing. To put on erials that must cause such different ef- s cannot, I think, be quite right, and refore it would be better not to put the lime till the next spring, before ing barley and seeds. I have heard of e being laid on a stubble or clover ley, and en slaked ploughed in, thus depositing it he bottom of a furrow, where it can do little if any good, and it naturally will lower. It should be laid on the land r it is ploughed, and, by harrowing well, orporated with the soil. Very little be- it," concludes Mr. Hillyard, "is derived m laying on a small quantity of lime: it uires twenty or five and twenty quarters acre to do a very essential good." *rac. Farm.* p. 34.)

"In the county of Dublin," says Arthur ung (*Young's Tour in Ireland*, p. 373.), hey lay 160 barrels, or 640 bushels on an re; strong loam or limestone finds the eatest benefit from it, and the farmers say lasts as long as limestone gravel. In the unty of Cork, Mr. Aldworth found lime to ve a vast effect on strong loam or lime- ne. (*Annals of Agric.* vol. xxxiv. p. 72.) n all poor, thin, light soils, and others, on quarry of stone, especially limestone, that ve been long in tillage, lime is found to do no service. Upon wet cold loams, that have not been sufficiently drained, lime does no good: and when they are dry, unless they are rich, this manure will operate very little (*Eastern Tour*, vol. iv. p. 82.); on cold, wet, tenacious clays, it has often failed, and also on strong stony land. Lord Holderness found some very good land of this description almost ruined from a long course of liming. Where there is a great mass of vegetable or animal matter not putrid, and which cannot putrefy sufficiently, there lime does the business at once, and has an effect which has been thought astonishing.

Some excellent practical remarks upon lime burning, by Sir G. C. Stewart Monteath were published some time since. He observes: "Having been engaged in burning lime for the supply of an extensive district of country for agricultural improvements, and being distant from coal sixteen miles, it was desirable to find out the best constructed kiln for burning lime with the smallest quantity of coal, and having been aware, from experiment, that the kilns generally employed in Great Britain for burning lime are of a construction too narrow at bottom, and too wide at top, many kilns of this construction being not more than 3 or 4 feet wide at bottom, and 18 feet wide at the height of 21 feet, were found to waste the fuel during the process of calcining the lime, or, in other words, did not produce more than two measures of burnt lime shells for one measure of coal; but it is to be understood, that in whatever construction of kiln lime is burnt, the fuel required to burn limestone must vary according to the softness, or hardness, or density of the stone, and the quality or strength of the coal used. The same measure of coal, in Scotland called chews, when employed, will burn a greater quantity of lime in a given time than the same quantity or weight of small coal, the chews or small pieces of coal admitting the air to circulate more freely through the kiln. Though this fact should be well known to lime burners, yet they frequently employ small coal in burning lime, from its being procured at a less price, though really at a greater expense, as it requires a much larger quantity to produce the same effect, and a longer time to admit of equal quantities of lime being drawn out of the same kiln in a given time.

For a sale of lime for agricultural purposes in a limited district, I have found kilns of small dimensions to be most profitable; the construction of a kiln I have employed for many years was of an oval shape, 5 feet wide at bottom, widening gradually to 6 feet at the height of 18 feet, and continuing at that width to 28 feet high from the bottom. A kiln of this construction has been found to burn lime in much less time, and with a smaller proportion of fuel, than kilns of larger dimensions, narrow at bottom and wide at top, as heat is well known to ascend more rapidly in a perpendicular than in a sloping direction, from which arises the superiority of a narrow kiln, with sides nearly perpendicular, compared with one with sides that slope rapidly.

These narrow kilns will admit of being drawn out of them every day, if fully employed, more than two-thirds, or nearly three-fourths of what they contain, of well-burnt lime; and afford fully three of lime shells for one measure of coal, when large circular kilns will not give out more than one-half of their contents every day, and require nearly one of coal for every two measures of lime burnt. In a country sale of lime, the quantity sold every day is liable to great fluctuations: two or three cart loads will sometimes only be required from an establishment which, the day before, supplied forty; and as lime is known to be a commodity when exposed to the action of air, which becomes more bulky and heavy, and in that state does not admit of being carried to a distance without additional labour, it has been an object of importance with me to find out a construction of a kiln which will allow of lime being kept for several days without slacking, and at the same time to prevent the fire escaping at the top of the kiln, if the kiln stands twenty-four hours without being employed, especially during the autumn and winter, when the air is cold and the nights long. I now employ kilns of an egg shape, and also oval; the oval-shaped kilns are divided by arches across the kiln, descending four feet from the top: the object of the arches across the kilns is to prevent the sides of the kiln falling in, or contracting, and also to enable you to form circular openings for feeding in the stone and coal at the mouth of the kiln; upon this plan, a kiln of any length might be constructed with numerous round mouths. In the model of the kiln sent to the Highland Society, Booker's conical cover may be seen revolving upon an iron ring placed upon the circular mouth, and having placed a lid to the cover, I am enabled to prevent the escape of heat at the top, and by cast-iron doors at the bottom, the air is prevented passing through the kiln; so that, by these precautions, the lime burner can regulate the heat, and prevent its escape for several days, when the fire would be extinguished, at this season, in the course of twenty-four hours. This is an object of
great importance, as it enables the li
be burnt as well, and with as small a
tity of fuel, in the winter as the s
season, and to supply the farmer w
well burned lime, and at any time
year, which cannot be done in the co
construction of kilns, open both at t
bottom, for the reasons I have
stated. From the great expense att
the driving of fuel from a distance of t
five miles from my own coal-pits,
adopted the practice of coking th
which is a saving of eight-twentieth
weight; and I find that an equal m
of coal and coke furnish the same qua
heat in burning lime, which is so
paradoxical, but not the less tru
coal is found to have little effect u
stone till it is deprived of its bitum
coked in the kiln; for, during t
the smoke is emitted from the top o
kiln, little or no heat is evolved.
in which coke is the fuel employ
yield near a third more lime sh
given time than when coal is the
that coke may be used occasionally
greater quantity of lime is requi
certain time than usual, as it is well
to lime burners that the process of
is done most economically when the
full action, so as almost constantly t
column of fire from the bottom to
of the kiln, with as short intervals
sible in working the kiln.

In working a kiln with narrow
mouths, the stone and coal should
fully measured, so that the workm
proportion the fuel employed to the
of stones, and it is obvious, that the
of coal to be used must depend upo
lative quality, and the hardness of t
to be burnt. If this measure was
to kilns of any construction, the lim
would be found better burnt.

Circular kilns are constructed wi
lar eyes or openings at the bottom,
more than eight feet wide at eight
from the base, and contracted to
five feet wide at top. In lighting
at the commencement of burning, so
should be taken not to allow the fir
main below the upper grate. Th
two iron grates at the bottom of th
the upper grate consists of iron bar
or ten inches distant from each othe
the kiln, between which the pieces o
lime fall down upon a lower grate wi
bars one inch from each other, wh
lows the lime ashes to fall throug
into an ash pit; these lime ashes ar
very useful as a top-dressing fo
ground, and are a clear gain to th
prietor of lime-kilns for public sale.

e for agriculture in an ex-
of country to the extent of
al bushels annually, the value
shes which fall through the
mounts to more than 150*l.*
ower grate is three feet above
d the upper grate is the same
the lower one. The kilns I
eburn are upwards of thirty
nearly perpendicular, which
the great heat in this con-
iln, and which is found to
e equally than circular kilns
asions. (*Trans. High. Soc.*
)

ne quarries of Scotland are
Mr. Carmichael (*Ibid.* vol. v.
erves, when speaking of the
aluable earth, "how sterile
n the soil, how cheerless the
how scanty the resources of
lime came into general use."
ethod of calcining limestone
imestone quarries in Scotland
r. (*Ibid.* p. 441.)

ravel.—There are some traces
in the Isle of Anglesea; but
is seen only in quantities
ere it is very common. It is
only common gravel, of a
ixed with stones as large as
d also with loam or clay: it
ffervescence with acids, and
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. For bogs, it exceeds every
as its weight assists in the
f that loose and spongy soil.
ays, the use of it is unrivalled,
e effect of a dressing of lime,
bility yet more than chalk
roys moss infallibly. Upon
t is used, it is found very du-
in many instances, in great
enty to forty years. In lime-
all blue gravels should be
it is an invaluable treasure
d. (*Annals of Ag.* vol. xxxix.

ng was of opinion, that the
y calcining limestone was
r for agricultural purposes
rom chalk, of which last de-
d evidently but a poor opi-
liser. He thought too, and
at this earth was not so ad-
applied, when mixed with
r, as when applied in its simple
lusion in which he was no
near the truth, although he
ets observed by a farmer at
lter, in Essex, which rather
st this conclusion: "It de-
e Rev. P. Raymond, "all the seeds of weeds in the crop—twenty-five bushels of lime to twenty loads of dung per acre. It is found, however, to be rather detrimental to turnips. Crude lime, laid upon light dry land, at the rate of one bushel to the rod, has produced benefit for seven years: it is generally in this parish carried on to stiff clay, with great advantage, mixed with dung. It is of still more use to wheat than barley. (*Johnson on Fertilisers*, p. 294.)

There is perhaps no other country so richly endowed with this earth as our own island, for to say nothing of its great strata of chalk, how endless are the masses and varieties of limestones. Let us not therefore neglect but extend by every means in our power the use of the treasures we possess, for by so doing we may not only increase the fertility of lands already (like the more tenacious clays for instance) in some degree productive of food, but we can bring into cultivation by the judicious employment of this powerful earth the most sterile peats, the trembling bogs, the most worthless heaths: the inferior plants, such as the acid sorrel, are banished by its influence, and the soil which once only held the stagnant water impregnated with unwholesome vegetable and mineral matters, is now made to produce the most useful of the cultivator's crops, and the improvement too is of even national importance, for such lands not only furnish additional employment to the labourer, but they now purify an atmosphere which their exhalations in an unimproved state once corrupted.

LIMESTONE. A generic term for those varieties of carbonate of lime, which are neither crystallised nor earthy; the former being *calcareous spar*, the latter *chalk;* when burned they yield *quicklime.* See GEOLOGY, CHALK, LIME.

LIME or LYME GRASS. See ELYMUS.

LIME-KILN. A furnace or rough structure erected for the purpose of converting limestone into the lime of commerce by keeping it for some time in a white heat.

The forms of lime-kilns vary; but the best is that of the frustrum of a cone, which permits the ignited mass in the upper part to settle down freely, as the lower portion is drawn out. In some places, the kilns are sunk in the earth, in the form of inverted cones, and lined with brick. It is calculated that such kilns will burn 150 bushels of lime in twenty-four hours. When chalk is used, and it is dry, five bushels may be burnt with one bushel of coals; but the dampness of the chalk lessens considerably the power of the fuel. Peat is sometimes used instead of coals, and some burners prefer it to coal. Whatever the fuel may be, be strong enough to lay down the succeeding autumn. Trees raised from seed are far preferable to those raised from layers. The Russian bass-mats are made from the inner bark of the lime-tree, while the wood, from its being light and white, is much used by the carver and musical instrument maker.

The charcoal is used in the manufacture of gunpowder, and is considered as scarcely inferior for that purpose to the charcoal produced from the alder and willow. If we possess no evidence sufficiently conclusive to prove that the lime-tree in any of its forms is truly indigenous in Britain, we have at least enough to show that it has long been naturalised, and that its introduction must have taken place at a very distant period; for upon referring to the earlier works, such as Turner, Gerard, &c. we find it (in the form of *T. E. microphylla*) spoken of as a well-known, and in their estimation apparently as a native tree. By many botanists (says Mr. Selby), several species of lime are enumerated as inhabitants of Europe, and Sir J. E. Smith makes three distinct species of those cultivated and grown in Britain, viz. *T. europæa*, *T. grandifolia*, and *T. parvifolia*, the two latter answering to the *T. platyphylla* and *T. microphylla* of other authors. We are, however (continues Mr. Selby), inclined to adopt the views and follow the opinion of the author of the *Arboretum britannicum*, and to consider these not as specifically distinct from *T. europæa*, in its usual form, but as marked varieties, or, as Mr. Loudon designates them, *races*, originally produced from the seed of one, and which have been kept distinct, and perpetuated by means of layers, grafting, and other artificial modes of propagation; a view

and it was extensively used
and in that style of garder
tectural, as it bore cuttin
or shears with patience,
impunity. Examples of th
in some parts of England,
upon the Continent, in Fr
where pyramids, arches, a
formed of this tree, and
produce an imposing effe
mental tree in picturesqu
lime is well worth cultiva
in the first class, in point
quently attaining a hei
ninety feet, and a trunk
circumference to such a
lime holds an important p
teria Medica of France,
nental countries; but its
are merely those of a dem
Bot. Dict.; *Smith's En*
p. 17. 21.; *Loudon's Arb.*
Forest Scenery; *Selby's*
Trees: *Phillips's Syl. Flor*

LINDEN-TREE. Se

LINE. In angling, a
or horse hairs twisted tog
on a rod, and furnished a
hook, for catching fish. T
for making lines is horseh
be uniformly twisted, as
thus be considerably incre
occasionally employed, bu
equal to hair. The best
are sorrel for turbid wate
gray for clear streams. A
may be imparted to fishi
mersing the hair in a liq
alum, soot, and walnut
gether.

the total number of persons
about 185,000. (*M'Cul-*
.; *Statist. of the Brit. Em-*
9.; *Brande's Dict. of Sci.*
Dict. art. "Dundee.")

una vulgaris.) A species
void the inconvenience of
eneric appellation to the
nts familiar to every body
ths, Mr. Salisbury has ju-
our common ling *Calluna*,
which is doubly suitable,
r. Salisbury and Dr. Hull
press a *cleansing* property,
de of ling, or whether we
ommon sense of the word,
dorn, which is very appli-
owers. This shrub grows
ere, on dry moors, heaths,
wastes, as well as in woods,
is sandy or turfy. The
repeatedly and irregularly
es deep green, minute, ses-
d, somewhat arrow-shaped,
d on the young branches,
ngular figure, like a close-
hey are generally smooth,
iety are densely hoary all
ers are stalked, drooping,
teral clusters, soon over-
shoots. The inner calyx,
st conspicuous part of the
ning permanent rose colour.
ar in June and July. Grouse
as well as some quadrupeds,
d young shoots. There is
l variety, and a very beau-
one, cultivated in gardens,
om a copious multiplication
semble little roses. (*Smith's*
ii. p. 225.) See HEATH.

by which common name they are most generally known, I shall only have to describe in this place two species, the common linnet and the mountain linnet.

1. The common linnet (*Linota cannabina*) is a very elegant bird of a small size, which is deservedly esteemed for its song. Linnets exist in great numbers on most of the uncultivated lands of this country, appearing to prefer commons and fields of furze. The plumage is in general chestnut and greyish brown, but in the breeding season the lower part of the breast is tinged with a blood-red colour, and it is then called the rose linnet, and at other times the brown linnet. The female constructs her nest of small twigs and bents of grass, lined with wool and hair, in hedges and furze bushes on heaths. The eggs are four or five in number, of a faint bluish-white colour, speckled with pale purple and reddish brown; the length nine lines by six lines and a half in breadth. The whole length of the male bird is five inches and three quarters. The female is somewhat smaller.

2. The mountain linnet, or twite (*L. montium*). This species (says Mr. Yarrell) is distinguished from the common linnet, and from both the redpole linnets, by the greater length of its tail, which gives this bird a more elongated and slender appearance; and by having a reddish tawny throat, but it does not exhibit any red colour either on the head or breast at any season of the year. There is, however, a tinge of red on the rump of the male in summer, and in the general character of the plumage of both sexes there is considerable similarity to that of the other species of the genus. This bird is a winter visitor only to the

small, oval, oblong, flattened laterally, acute at the extremities, glossy, brown; but internally white. It is inodorous, and tastes mucilaginous and oily. The husk or testa yields much mucilage to water, and the kernel a large proportion of oil to pressure. Besides upwards of 11 per cent. of oil, linseed contains wax, an acrid soft resin, extractive, a yellow colouring matter, starch, gum, tannic acid, albumen, gluten, emulsive, and some salts. When the seeds are burnt, the ashes contain oxide of copper. The infusion of linseed in boiling water yields a demulcent mucilage, which is much used as a domestic medicine in coughs, and in cases of acrimony in the urinary discharge. The linseed should not be boiled in the water, as that extracts the oil as well as the mucilage, and renders the decoction nauseating.

Linseed is much used in the economy of the farm, for feeding cattle and other purposes. A bushel of linseed averages in weight about fifty-one pounds; this weight, when crushed, produces about a quarter of its weight of linseed oil, and the remainder is cake. The great bulk of this seed is obtained from the Baltic and the Black Sea, and recently considerable quantities have been received from Egypt and Hindostan: of this last, the general character is, that although the seed is good, the impurities with which it is mixed are very considerable, such as the seeds of rape, &c.; for which reason the oil obtained from it does not possess the drying qualities of that expressed from the unmixed linseed, and the dealers in consequence will not give so much for it. This arises not from any intentional adulteration, but from the bad farming, and want of cleanliness of the orientalists.

Linseed oil contains a very considerable quantity of mucilage, which it almost entirely deposits by time; and hence, old linseed oil is more valued by the painter, but for the grazier, perhaps, its nutritive powers decrease by time. It is said by some persons, that it is to the presence of this mucilage that we must attribute the fattening quality of linseed oil when mixed with other substances, for linseed oil by itself is almost as powerful a purgative as castor oil, for which purpose indeed it is very commonly employed by the farmer; but on the other hand, we must remember, that in small doses even castor oil is very fattening. Linseed is in fact commonly given to some birds, parrots for instance, for this purpose. Its purgative properties are very inferior to those of castor oil.

LINSEED CAKE. Linseed cake is a well-known and valuable article for the
food of live stock, almost equally
cattle, sheep, and horses. It is the re
or refuse, left after the oil is expre
linseed. 1000 parts of it, acco
Davy, contain about 151 parts of
matter. Its price has induced
tempts to economise its application
been often given as recommende
Hillyard, mixed with other
whose value he thus estimates:—

"The weekly cost of feeding e
including the expense of getting
ing, and cutting the turnips and
attendance, will be —

	s.
10½ Bushels of turnips -	2
1¾ Cwt. of hay - -	5
Turnips - - -	2
1¼ Cwt. of cut and uncut hay -	3
¾ Bushel of meal -	3
1 Pint of linseed oil -	0
½ Bushel of linseed -	3
3 Gallons of meal -	1
Cut and uncut hay -	3
Turnips - -	2
21 Oil cakes, at 3½*d.* -	6
3 Gallons of meal -	1
Cut and uncut hay -	3
Turnips - -	2

"No food," adds Mr. Hillyar
given to stall-feeding beasts that
them so soon or so well as linse
It certainly is expensive feed,
expensive as it appears to be,
consideration that it fattens quick
that have been fed with it, do
long drift to market, lose their
handling, as those do, fed with
cake or linseed, and whose d
of equal value. Some winters
with linseed instead of cake, an
answer very well, although it a
trouble of feeding. My mode of
it has been to break it in a little
and steep it in cold water in
a size sufficient for one day's fe
way it will have been steeped
before it is mixed with cut hay
or (which is better) bean meal.
in hot water, two days will do;
longer than three, it is apt to
sour, which, in my opinion, is n
well for the beasts. Boiling it
some, but it thus becomes more
and mixes better with the cut
meal, and it prevents the nume
of weeds, found in foreign lin
vegetating. One stone of lin
mixture of other food, will do a
wards feeding as two stone of c

e husk of the seed after the oil
ressed out. Linseed, without
l with meal, is of too relaxing a

, at Christmas, 1838, that I could
lish oil-cake at home at less than
0s. per ton, I determined to feed
ive beasts then in my stalls, in
g way, and I never had beasts
better meat; but as the pro-
aring the food is very trouble-
uld not recommend this way of
hout the owner of the beasts
e that all is done right:—

	s.	d.
daily, of half a bushel y, which is 5 lbs each, and ut at night; 1 cwt. and not uarter - - -	3	6
ed, 2 lbs. daily, 56s. per weight, 50 lbs. per bushel -	2	0
toes, 2 lbs. daily, 1½ gal- - - -	1	6
hich is feeding, but may when the beasts have taken seed, as it is only given to mixture palatable), about a - - -	0	9
mangle wurzle -	2	6
bean meal, mixed, 3½ - - -	1	9
	12	0

mixed food could be pressed to-
rm a cake, it would be a feeding
the cost 11*d.* per stone. As a
this mixture is both palatable
ive to beasts, they will not eat,
in the night, where they have
any of the sweetest hay that can
re them." (*Prac. Farm*, p. 89.)
rmers use ground linseed mixed
and chaff for their stock, deeming
economical plan than the em-
f linseed cake. Others use the
round. The saving by this mode,
doubtful, for it is by no means
t the oil possesses any very ma-
ning properties; and if it does
he cake is decidedly the cheapest.
present prices (1841), 51 lbs. of
worth 7*s.* 6*d.*, while 51 lbs. of
l. per ton, are only worth about
dmitting that the oil does con-
fattening properties, yet it must
bered that the value of the oil
om a bushel of linseed is worth,
urposes, about 4*s.* But, on the
, I am aware that a very intelli-
er near Rumford, Mr. S. Poole,
40, fed his bullocks with a mix-
sed oil and cut chaff, and also
cks with linseed cake and hay,
the oil to be the cheapest of the two, and in all respects equally fattening, but then it is certain that this mode requires more attention in the mixture of the oil and chaff than the other plan. He commenced with about a quarter of a pint per day, and gradually increased it to a pint.

Many have been the experiments upon feeding cattle with linseed. "Two Scots were fed on English linseed cakes; two Devons on unboiled linseed; two others on boiled linseed; and another pair of Devons on foreign; all of them having as much hay and chaff as they could eat. It was a losing concern in every case. The value of the manure was not equal to the difference of the cost, and the selling prices; and, strange as it may appear, the greatest loss was sustained, when the beasts were fed on oil cake; the next when foreign cake was used; the next when boiled linseed was used; and the least of all when the simple unboiled linseed was given." (*Brit. Husb.* vol. ii. p. 213.)

LINSEED JELLY is easily made by adding to six quarts of water one quart of linseed, boiling it for ten minutes. This, mixed with other substances, is sometimes given to live stock as food, and, mixed with milk, is very nutritive for calves.

LINSEED OIL is an excellent purgative for sheep, from 2 to 3 ounces; for horses, in doses of from 16 to 24 ounces; for cattle, from 12 to 20 ounces. The quality of linseed oil may be determined in the following manner: "I fill a phial with it, and hold it up to the light; if bad it will appear opaque, turbid, and thick; its taste is acid and bitter upon the tongue, and it smells rancid; and strong oil, from fine full-grown ripe seed, when viewed in a phial, will appear limpid, pale, and brilliant; it is mellow, and sweet to the taste, has very little smell, is specifically lighter than impure oil, and when clarified dries quickly and finely." (*Quart. Journ of Agr.* vol. v. p. 467.)

LIP. In botany, the lower petal of any irregular flower.

LIQUID MANURE. Liquid manure is not a mode of fertilising the land altogether of modern origin, for a fermented mixture of water and night-soil has, from a very early period, been employed by the Chinese farmers; those of Italy certainly practised irrigation in the days of Virgil (*Georgics*, b. i. v. 106-9.), and Cato adds that they employed a mixture of grape-stones and water to fertilise their olive-trees (b. xxxvii.). Columella praises very highly the use of putrid stale urine for vines and apple-trees (b. ii. c. 15.), commending also the lees of oil for the same purpose. More modern agricultural writers have united in praising various liquid preparations; thus Evelyn (whose ingredients most of the authors recommend), in his *Treatise on Earth*, p. 123-60., gives several recipes, some of which have served as the basis for recent modes of preparing liquid manure, such as the dung of cattle, urine, salt and lime, and nitre. Of these artificial mixtures, salt one part, and lime two parts, mixed together and allowed to remain in a heap for two or three months (Mr. Bennett turns it over three or four times in this period), is fully equal, if not superior, to any thus recommended, most of which I have tried. When mixed with water and spread over land intended for wheat, at the rate of from 25 to 35 bushels of the salt and lime to 10 or 15 tons of water per acre (and it answers very nearly as well when carried on the land dry), excellent results are produced. The wheat which I have thus grown on clover leys has been superior in height, and strength of straw, to any I have seen produced under different modes of treatment, and the seed very bright and heavy.

All substances, whether organic, earthy, or saline, which are employed to fertilise the soil, or become the food of plants, can only be rendered thus serviceable to vegetation when they are presented to the roots of plants in solution, or in a fluid state; and although this may appear at first rather a sweeping position, yet such is the real fact, the compost of the farm-yard, the crushed bones of the turnip cultivator, the oil and bones of fish, the gypsum of the grazier, the earths, lime, magnesia, and even silica, and all the saline manures, are dissolved by some process or other before they can be absorbed by vegetables. Every attempt which has been hitherto made to make plants imbibe the most minutely divided powers which chemistry can produce, has been entirely fruitless. Davy ineffectually tried the finest impalpable powder of charcoal, and with much perseverance I have fruitlessly employed the earths, saline substances, and organic matters, for the same purpose.

This absolute necessity for every substance which is the food of plants being of a soluble nature did not escape the sagacity of the early Greek and Egyptian philosophers; it is true they carried their conclusions with regard to subjects of natural philosophy too far, as in this instance, when they asserted that water is the only food of plants; yet they must have patiently noticed many facts in vegetable economy, unaided as they were by the light of modern vegetable chemistry, before they could have arrived at a conclusion so nearly approaching the truth. The idea
bably of Egyptian origin, for the c
of that country could not fail to
magic fertilising powers of the wa
Nile, whose annual overflow is p
most extensive natural irrigation
vantage of by the cultivators of t

The same wild dream of water
sole food of vegetables was agai
so lately as 1610, by M. Van H
celebrated Dutch chemist, who
very plausible, deceptive experi
willow-tree, which he watered
rain water; researches, however,
accuracy (owing principally to
as usually collected, not being
was shown in 1691 by Mr.
Although, therefore, it is now
tained that water is not the o
plants, yet it certainly contribu
sally and largely to their supp
it has been well observed by
manure can be taken up by
plants unless water is present;
or its elements, exists in all the
vegetation. (*Lecture* 15.)

It must not, however, be co
these carefully considered concl
the results of often-repeated lab
riments, are erroneous, because
water, *apparently* pure, as in w
or in irrigation, promotes the
bulbs, grass, &c., since the
spring water, even rain-wate
foreign substances, as I have cl
tained by experiment; and
chemically pure water is employ
plants, they cannot be made to
have fruitlessly varied the att
veral ways. All the experim
Thomson were equally unsuc
plants vegetating only for a c
and never perfecting their see
experiments were made by Has
Saussure, and others, with the
vourable result. Duhamel fou
oak which he had raised from
common water, made less and l
every year. The florist is well
bulbous roots, such as hyacinths,
which are made to grow in w
they are planted in the earth
year, at first refuse to flower,
even to vegetate. Moreover, i
unanswerably shown by many v
experiments (*Rech. sur la Vég.* p.
varied repetition of which I have
assisted, that the quantity of n
or solid matters absorbed by t
plants is always in proportion
purity of the water with which
nourished; thus some beans we
vegetate under three different

he first were grown in distilled
second were placed in sand and
vith rain water; the third were
arden mould. The plants thus
when accurately analysed, were
ield the following proportions of

fed by distilled water	-	3·9
fed by rain water	-	7·5
grown in soil	- -	12·0

, all attempts to make plants
the pure earths have failed ut-
they have been watered with
; yet a totally different result I
iably experienced when I have
an impure solution or liquid ma-
trials have been entirely sup-
those of M. Giobert, who, having
the four earths, silica, alumina,
nagnesia, a soil in the most fertile
, in vain essayed to make the
rish in it when watered with pure
y: but every difficulty was re-
n he moistened it with the water
nghill, for they then grew most
y; and M. Lampadius still fur-
strated the powers of such a foul
ure, for he formed plots composed
ingle earth, pure lime, pure alu-
silica, and planted in each dif-
etables, watering them with the
inings from a dunghill, and he
they all flourished equally well.
e matters of a soil ever constitute,
most fertilising portion; and if
ificial means the richest mould is
f these, as by repeated washings
boiling water, the residuum, or
solid matter, is rendered nearly
is fact, first accurately demon-
M. Saussure (*Rech.* 150.), I have
rmed by a variety of experiments

uble matters or liquid manures
by plants are sometimes imbibed
roots unaltered,—in other cases
lecomposed during their absorp-
earths, gypsum, and other salts,
es of the first class; oil, and other
mal matters, of the last. Davy
some plants of mint, which he
egetate in sugar and water, ap-
bsorbed the sugar unaltered, for
ed a considerably larger propor-
sweetish vegetable extract than
he same weight which he had
common water; and it is an as-
fact, that the roots of plants will
reject the various earthy sub-
a soil, or even when placed in a
tion, in a very remarkable man-
when equal parts of gum and sugar were dissolved together in water, and some perfect plants of Polygonum Persicaria placed with their roots in the solution, it was found that they absorbed 36 parts of the sugar, but only 26 of the gum; and when in precisely the same proportions and manner Glauber salt, common salt, and acetate of lime were used, then it was found that the roots of the Persicaria separated these salts from the solution with much ease, absorbing 6 parts of the Glauber salt, 10 parts of the common salt, but not a trace of the acetate of lime. (*Thomson*, vol. iv. p. 321.)

These facts will not be uninteresting to the irrigators or occupiers of the English water-meadows, since they may in some degree serve to account for the beneficial action of water on such lands — a question not nearly so well understood as it ought to be, and on which widely differing opinions are commonly held by practical farmers. It is a theme intimately connected with the subject of this article, for irrigation is, in truth, a mode of applying the weakest of liquid manures, on a very bold scale, to grass-lands. See IRRIGATION.

The employment of artificially prepared liquid manure (though little known at present in England) is very extensive on the Continent: the Swiss farmers call it *gulle;* in France it is denominated *lizier;* and by the Germans, *mist-wasser*. They prepare it throughout many of the German states, and in the Netherlands, by sweeping the excrements of their stall-fed cattle into underground reservoirs, mixing it with four or five times its bulk of water, according to the richness of the dung: five reservoirs are generally employed, of such a size that they each take a week to fill; and thus each has four weeks allowed to ferment before the mass, which in this time becomes of an uniform consistence, is removed, by means of a portable pump, in water carts, or large open vessels. A similar plan is adopted in the north of Italy, and from time out of mind has been practised by the Chinese. In that empire, however, the cultivators chiefly employ night soil, which is made into cakes for this purpose with lime or clay, in all their large cities, to prepare their liquid manure.

It is from long experience an admitted fact among the German farmers, that there are no manures so powerful in their operation as those which are liquids, such as human urine or bullocks' blood; so that no English farmer need fear deception as to their asserted value. This very fact was submitted some years since to the consideration of Professor Hembstadt, of Berlin, by the Saxon and Prussian authorities, who were anxious to apply the contents of the city drains towards fertilising the barren lands in the neighbourhood of Dresden and Berlin. This talented agriculturist undertook, in consequence, a series of valuable experiments, which, varied in every possible way, were carried on for a considerable period; the result of them, so highly advantageous to the prosperity of Germany, Hembstadt then published. They were repeated with unvaried success by Professor Schübler, and the results may be stated in the following order:—

If the soil, without any manure, yield a produce of three times the quantity of seed originally sown, then the same quantity of land will produce—

5 times the quantity of seed sown, when dressed with old herbage, grass, leaves, &c.
7 times, when dressed with cow dung.
9 times, with pigeons' dung.
10 times, with horse dung.
12 times, with *human urine.*
12 times, with *sheep's dung.*
14 times, with human manure, or *bullocks' blood.*

Thus, it will be seen, that, of seven usually employed fertilisers, the liquid manures, urine and blood, were found to be decidedly the most powerful.

Both with regard to the quantity of liquid manure applied per acre, and the mode of spreading it, much must depend upon the circumstances under which the cultivator is placed, and the richness of the liquid he employs. If the impurities dissolved, or mechanically suspended in the water, are equal to 1 part in 10, then 20 to 30 ton per acre of the liquid manure I have found amply sufficient, under ordinary circumstances, to produce the most excellent results; if the fluid mass is purer, then more must be applied. For gardens, and small plots of ground in general, the liquid may be readily and evenly distributed over the beds by means of a watering-pot or garden-engine; for fields it must be carried in water-carts, and distributed either by being let into a transverse trough, pierced with holes in the manner of those employed for street waterings, or the Flemish plan may be adopted (especially when the manure is of too considerable a thickness to flow readily through holes), of taking it into the fields in the water carts, open at the top (furnished with slight moveable covers), and then distributing it out of the cart very evenly by means of a scoop; and I have invariably perceived the advantage of ploughing the liquid into the soil *as soon after it was spread on the land as possible.* The cultivator will find great advantage if he uses the garden-
engine, watering-pot, or cart, from
the liquid manure, before he pum
of the reservoir, either through stra
sand, or a basket; the pieces of s
other coarsely divided matters t
rated by the strainer, he will dis
very slightly to the fertilising pow
liquid, and yet they all materially
even distribution of the manure.

The expense, per acre, of such
cation of liquid manure, I thus
supposing the cow-herd to be em

Three tons of cow or other fres
dung - - -
Labour in mixing and occasionall
stirring it with from 20 to 25 ton
of water - -
Carting, and spreading it on the fiel

If it shall occur to the farm
quantity of solid manure thus a
soil will not, in reality, much e
tons per acre, and that this is,
ance, a very small allowance,
remind him that the quantity
veyed consists of the soluble
portion of the manure, and is,
extract without any of the stra
inert residuum usually carried
soil; besides, it is a very erroneo
common conclusion, that to pr
tility a manure must be use
quantities. I have observed in
that a flooding with river wat
ductive of heavy crops of grass i
meadows, does not carry on t
more than two tons per acre of
vegetable substances; and, in th
experiments of the late Lord
at Fairmile, with whale blubber
than a ton and a half per acre w
The Essex farmers find three-q
ton of sprats amply sufficient; a
per acre of gypsum is the ordina
ful allowance for grass land.
evenness, therefore, with which
is spread over the land is a
portant consideration as regar
nomy of manures. There is no
cultivated plant which more
liquid manure than the potato.
luxuriates near to wet ditches
which have received the dra
dunghill it grows with the great
I have invariably found that, t
mixture intended as a manure f
the addition of five or six b
per acre is productive of great
as regards the quantity and q
potatoes.

r leys intended for wheat, the ld be turned into the soil as sible after it is spread; and if n is performed in moist cloudy ery material advantage will be in the succeeding crop. The the sun is certainly prejudicial y-spread liquid manure, comly-divided animal and vegetable

nks for receiving or preparing manure, I may remark that I found them best made of flints t in good mortar or Parker's y may be *bedded* in clay, but recommend the use of clay for k, since worms are sure eventetrate through it; and I advise be something like a decanter, top than at the bottom, in the oduced at Eastbourne, and in hiefly by the advice of Mr. ert.

rn has given the annexed estting, walling, plastering, and tank of the following dimenngth within, 13 feet 6 inches; 6 inches; depth, 6 feet, equal yards.

	£	*s.*	*d.*
. per cubic yard -	0	7	6
uding brick and mortar	6	8	0
d cement - -	0	16	0
l flags - -	2	15	0
. *Soc.* vol. ix. p. 280.)	10	6	6

ld be a tank sufficiently capaarm of 150 to 200 acres.

resence of a large proportion of chest of liquid fertilisers, must ttributed the luxuriant effects y the liquid manure, as pree Continent, and from the use rage matters of large towns, as y proved in the case of the water-meadows, near Edine the drainage is employed in which it issues from the sewers, its use several crops of the nt grass are annually obtained. " said a late distinguished chesopher, "contains the essential vegetables in a state of solution." l analysis, human urine in its was found, by Berzelius, to following substances: —

	Parts.
- - - -	93·300
eculiar animal matter of - - - -	3·010
potassa - - -	0·371
oda - - -	0·316
f soda - - -	0·294
9	
Common salt - - -	0·445
Phosphate of ammonia - -	0·165
Muriate of ammonia - -	0·150
Lactate or acetate of ammonia Lactic or acetic acid - Animal matter, soluble in alcohol Inseparable urea - -	1·714
Earthy phosphate (earth of bones) with fluate of lime - -	0·100
Uric acid - - - -	0·100
Mucus of the bladder - -	0·032
Silica (earth of flint) - -	0·003
	100·

Thus it will be seen that there is hardly a single ingredient found in urine which is not either a direct food for vegetation, or furnishes by its decomposition a supply in another form; for in it are thus detected the ammoniacal salts of the dunghill, the phosphate of lime of bones, as well as of many cultivated vegetables, and abundance of easily decomposable animal matters.

The urine of the horse is nearly as rich in animo-vegetable matters; its composition, according to the experiments of Fourcroy and Vauquelin, are as follows: —

	Parts.
Water and mucus - -	94·0
Urea - - -	0·7
Carbonate of lime (chalk) -	1·1
Carbonate of soda - -	0·9
Benzoate of soda - -	2·4
Muriate of potassa - -	0·9
	100·

The following are the constituents in that of the cow, as found by Professor Brande: —

	Parts.
Water - - - -	65·0
Urea - - - -	4·0
Phosphate of lime - -	3·0
Muriates of potassa and ammonia -	15·0
Sulphate of potassa - -	6·0
Carbonates of potassa and ammonia -	4·0
Loss - - - -	3·0
	100·

It would appear, from some experiments of Dr. Belcher, that the ammoniacal salts of urine have a forcing or stimulating power which considerably hastens the vegetation of plants. His experiments were made with the common garden cress; and, in his trials, some plants nourished with a solution of phosphate of ammonia were fifteen days forwarder than plants growing under similar circumstances, but watered with plain water. In some experiments of Mr. Gregory, who watered half a grass field at Leyton with urine, the portion thus treated yielded nearly double the quantity of hay produced by the other unmanured portion;

5

which is not nearly so well understood as is desirable. Thus, by carefully conducted experiments, and very accurate gaugings, it has been found that the chief London sewers convey daily into the Thames about 115,000 tons of mixed drainage, consisting, on an average computation, of 1 part of solid and 25 parts absolutely fluid matters; but if we only allow 1 part in 30 of this immense mass to be composed of solid substances, then we have the large quantity of more than 3800 tons of solid manure daily poured into the river from London alone, consisting principally of excrements, soot, and the débris of the London streets, which is chiefly carbonate of lime: thus, allowing 20 tons of this manure as a dressing for an acre of ground, there is evidently a quantity of solid manure, annually poured into the river, equal to fertilising more than 50,000 acres of the poorest cultivated land! The quantity of food thus lost to the country by this heedless waste of manure is enormous; for, only allowing one crop of wheat to be raised on these 50,000 acres, that would be equal to the maintenance (calculating upon an average produce of 3 quarters of wheat per acre) of 150,000 persons. London, too, is only one huge instance of this thoughtless waste of the agricultural riches of the soil of England; from every other English city, every town, every hamlet, is hourly passing into the sea a proportionate waste of liquid manure; and I have only spoken of the solid or mechanically suspended matters of the sewerage; the absolutely fluid portion is still rich in urine, ammoniacal salts, soda, &c., when all the mechanically suspended matters have been separated from the other portion. According to very careful ex-

Irrigator.)

I have often employed
effect, in my own garden,
and standard apple trees,
prepared either by mixin
weight of cow dung with fo
or the collected drainage o
cow-house. Of these the v
most benefited by the app
whatever fruit tree the gar
sion to apply manure, the
manageable and so gratefu
the liquid. It has been fou
to plants cultivated in stov
a liquid manure, composed
soot to a hogshead of wate
this is a very unchemical
has been found by Mr.
peculiarly grateful and nou
causing them to assume an
healthy green; and for s
vine, peach, and other plan
Knight, of Downton, em
manure, composed of one
of domestic poultry, and
of water, with the most ex
the trees maintaining, at the
"the most healthy and luxu
imaginable." (*Trans. H*
p. 127.)

In whatever way we view
liquid manure, an abundant
presents itself on every side:
investigation likely to ampl
vator for the labour he may
stow upon it. By such manu
for vegetation is more
through the soil, and becom
serviceable to the crop, tha
mode of cultivation. I ha

ment carry with it its own reward, but
an unsuccessful one is not without its
ntages — it serves, at least, as a beacon
her cultivators, and affords that satis-
on which ever accompanies the acqui-
of knowledge. (*Journ. Roy. Ag. Soc.*
p. 147.)

IQUORICE. (*Glycyrrhiza*, from
, sweet, and *rhiza*, a root; the sweet-
of the root of liquorice is well known.)
ep light sandy loam suits all the species
genus, and they are readily increased
ips from the roots with eyes, and plant-
hem in spring.

mmon liquorice (*G. glabra*) is a na-
of the south of Europe; but it is cul-
ed in this country for medicinal use.
a leguminous plant, with unequally
ated leaves, composed of ovate, retuse
ts; the flowers are in racemose spikes,
er than the leaves. The legumes
mooth, and six-seeded. The root,
fit for use, is long, about the thickness
e finger, greyish without, and yellow
n. The sweet, subacrid, mucilaginous
contained in the root, is much es-
ed as a pectoral demulcent. Liquorice
res three years to perfect its growth,
the roots are taken up about the end
vember with the spade; they are then
, the fibres trimmed off, and the
er roots, which are termed "offal,"
parated from the larger. The small
are dried and ground into powder; but
arger, which form the principal ar-
of profit, are packed up and sold to
ruggists. A fair crop will yield from
20 cwt., at an average price of about
er cwt.; but the expense of digging
d preparing it for market, is not short
. per acre; which, great as it may ap-
is by no means extravagant, if we con-
the depth to which the roots run, and
re which is necessary to avoid breaking
ving any of them in the ground. (*Pax-
Bot. Dict.*; *Brit. Husb.* vol. ii. p. 330.)

QUORICE, WILD. See Milk-vetch.

TTER. The straw, fern, or other dry
ances which are placed under horses and
in the stables, cow-houses, farm-yards,
or the purpose of keeping the animals
and warm, and providing a supply of
re. In this last view, all sorts of dry
ials should be carefully collected, and
ed up for winter use.

VER-WORT. See Lichens and Moss.

STOCK. See Horses, Cattle,
Swine, &c. In our islands, the
forms the chief wealth of a farm.
implies cattle; but poultry, too, is
live stock; and in some countries,
e, bees, &c. are of that importance
are considered to be live stock. In several districts of England, rabbits are so, and that to a very essential extent. In some parts of southern Europe, even the silk-worm is live stock.

Having entered fully into the highly important subjects of the various live stock in which the farmer is commonly interested, I have now only to refer those who are anxious for more extended general observations as to live stock, to various other authorities. There is a paper by Mr. Cathery, of Alresford, "On the Reduction of the Number of Horses, and the Increasing the Number of Cows," *Com. Board of Agr.* vol. iv. p. 211. There are valuable Essays "upon the Breeding of Live Stock," and on the "Comparative Influence of the Male and Female Parents in impressing the Offspring" (*Trans. High. Soc.* vol. i. p. 17.), by Mr. Boswell, and the Rev. Henry Berry; "On the Comparative Advantages of feeding Stock with Mangel-wurzel, Turnips, and Potatoes," by Mr. Howden, *Ibid.* vol. iii. p. 268.); five reports "On the Comparative Advantages of feeding Live Stock on Raw or on Prepared Food," *Ibid.* vol. iv. p. 253., and vol. v. p. 52.; experiments "On feeding Cattle on different Descriptions of Food," by Mr. Robert Stephenson, *Ibid.* vol. vi. p. 61.; "On Live Stock, particularly as regards Crossing," by Mr. Ferguson, *Quart. Journ. of Agr.* vol. i. p. 33.; "On a Method of obtaining a greater Number of one Sex, at the Option of the Proprietor, in the Breeding of Live Stock, *Ibid.* p. 63.; "On the Value of Live Stock with relation to the Weight of Offal," by Mr. Ferguson, *Ibid.* vol. ii. p. 207.; "On the Points by which Live Stock are judged," by Mr. Dickson, *Ibid.* vol. v. p. 159.; vol. vi. p. 266—433.; and, for general reference, there are numerous excellent works, such as those upon "Cattle," "Horses," and "Sheep," published by the Society for the Diffusion of Useful Knowledge; "Illustrations of the Breeds of our Domestic Animals," by Professor Low, &c. That by the combined exertions of these, and the practical knowledge of modern breeders, a very material alteration for the better in the breeds of our live stock, has taken place, and is still progressing, no one will dispute, who has been a regular attendant upon the exhibitions of the Smithfield Club; and there is little reason to doubt but that still greater improvements are yet to be effected. To such researches too much attention can hardly be paid, for on the well or ill stocking of the land will mainly depend the cultivator's success. To this end, however, much must rest on the circumstances in which he is placed; all the general rules for his and a rudimental nictitating, or third eyelid; body elongated; feet, with five toes each; digits separate and unequal, particularly the hind ones, all armed with nails; scales on the belly round; the tail arranged in transverse and parallel bands. Cuvier subdivides the *Lacertidæ* into the two great genera, *Monitor* and *Lacerta*, each of which have been again subdivided.

The common green lizard (*L. agilis*) is a native of Britain. During the heat of summer, this animal delights to bask on the sides of dry banks, or beneath aged trees; but as soon as it is noticed, it immediately retires to its hole. The food of lizards consists of insects; and they are themselves devoured by birds of prey. These animals are of real service, especially in gardens, and should not be destroyed merely to gratify an unnatural and cruel aversion.

LIZENED CORN. A term provincially used for shrunk or lank corn.

LOAM. By this term is generally understood dark-coloured, rich mould, principally composed of dissimilar particles of earth, and decomposed vegetable matter, moderately cohesive, and therefore neither retentive of moisture, like clay, nor too ready to part with it like sandy soil. According as the different ingredients predominate, loamy soils are of different qualities — friable and mellow, middling, or heavy loams. (*Pract. Husb.* p. 284.) Loam is supposed to consist chiefly of woody fibre in a state of decay, which, as it progresses, acquires a black-brown colour, and is then mould or loam. It is a continued source of carbonic acid, as almost every particle of it is enveloped by an atmosphere of that gas, which is absorbed by the roots of plants,

baceous kinds do well in
or peat soil; but in wint
require the protection o
green-house annuals and
sown in pots, and treate
house annuals and bienni
the hardy kinds have only
open border. *L. longifl*
most venomous of plants.
Spanish Americans call it
because it proves fatal to
swelling them till they
ternally, it acts as a vio
effects of which no remed
which terminate in death
rican species, namely, *L.*
ful antispasmodic and em
employed to allay the p
modic asthma. There ar
species: 1. The water
manna), which grows in t
Scotland, Ireland, and t
land. The root consist
simple, whitish fibres.
mersed in water like the
numerous, two inches lo
with two longitudinal c
nearly naked, terminating
of light blue, drooping,
raised several inches abov
appear in July and Augu

2. Acrid lobelia. (*L.*
wild on bushy heaths in
root is fibrous; stem a
height, nearly upright; l
slightly toothed; upper
rated; the flowers are
terminal, of a purplish blue
in August and September
is milky, fetid, and very

His dissertation on "The Human
nd "On Education" will render
us throughout time. The publica-
hich he here requires mention is
"Observations upon the Growth
ure of Vines and Olives, the Pro-
of Silk, and the Preservation of
printed from the original MSS. in
ssion of the Earl of Shaftesbury.
1766. 8vo." (*G. W. Johnson's Hist.*
)

LAR. A term in botany: a fruit
unilocular if it contains but one
ular if it contains two cells, and so
nany instances, one or more of the
abortive, and become obliterated as
ripens.

STS. The common name of a
insects forming a group or sub-
the *gryllus* of Linnæus. They have
elytra, and large wings, disposed,
est, in straight, fan-like folds, as in
hoptera, and frequently exhibiting
e, green, or red colours. The thorax
us, to afford room for the powerful
f the wings, and is marked in many
ith one or more crests, or wart-like
ces. The locusts fly by starts, but
y rise to a considerable height.
pecies, called "migratory locusts,"
ncalculable numbers, and emigrate,
ng, in their passage through the air,
cloud: wherever they alight all
vegetation quickly disappear, and
d grounds are left a desert. One
(*Acridium migratorium*, Latr.) oc-
y commits devastations in the south
e and Poland; and stragglers have
es reached our shores, a circum-
hich happened in 1748: but they

of hares and rabbits, which are very destructive to them.

LODE. A local term for a *ford* in some districts. Lode is also a miner's term, synonymous with vein, for metals or minerals in the earth.

LOE. A provincial phrase signifying a little round hillock, or a heap of stones.

LOG. A large shapeless junk of wood.

LOKE. A provincial word used in Norfolk for a close narrow lane.

LOLIUM. See Rye-Grass.

LONDON, GEORGE. Died about Christmas, 1717. Switzer glosses over his birth and education. That industry and strong talent, which afterwards obtained for him the patronage of the nobility, and others in after life, were early discerned by his master Mr. Rose, who took particular pains in instructing him and bringing him into notice. After being with Mr. Rose four or five years, Switzer was informed, that that gentleman sent him into France for improvement. Soon after his return he entered the service of Bishop Compton. A few years afterwards he entered into the speculation of Brompton Park nursery. This was in 1681, and his partners were Messrs. Cook, Lucre, and Field. In 1694, the two last-named partners having died, and the first retired, Mr. London remained sole proprietor. He took Mr. Henry Wise into the concern. At that time the garden covered more than 100 acres of ground. Bowack, who wrote an account of Kensington in 1705, says that some affirmed that if the stock of these grounds was valued at one penny per plant, the amount would exceed 40,000*l.* (*Loudon's Encyc. of Gard.* p. 1063.) London, at the time of entering into this

Mustard.

LONG-HORNED CATTLE. A breed of neat cattle now nearly extinct, chiefly distinguished by the length of the horn, the thickness and firm texture of the hide, the length and closeness of the hair, the large size of the hoof, and the coarse leathery thickness of the neck. See Cattle.

LOOSENESS. See Diarrhœa, and Diseases of Cattle and Sheep.

LOOSETRIFE. (*Lysimachia*, from *lysis*, dissolution, and *mache*, strife.) A very pretty genus of plants, with mostly yellow flowers. All the species are of the easiest culture, and may be propagated by divisions, except *L. dubia* and *L. Linum-stellatum*, which must be increased by seeds. The following are the indigenous species which are all perennials.

1. Great yellow loosetrife (*L. vulgaris*), growing in watery shady places, particularly the reedy margins of rivers. The root is creeping; stems three or four feet high, erect, leafy, with four or more angles, according as the leaves are two or more together; simple, except at the top, where each terminates in a copious panicle of yellow flowers, whose corymbose clusters are partly axillary, partly terminal. Leaves on short stalks, two, three, or four together, two or three inches long, varying in breadth, single-ribbed, veiny, often downy beneath.

2. Tufted loosetrife (*L. thyrsiflora*). This species is very rare in England: the stem rises one or two feet in height. The flowers are smaller than the last, in dense, lateral, axillary stalked clusters about the middle part of the stem.

3. Wood loosetrife, or yellow pimpernel (*L. nemorum*). This species, which is one

species ; stamens glandula
June to August, and affo
food for cattle, especiall
count of its sub-acid and
properties, it is consider
most efficacious vulnerary
asserts that the leaves an
plant, steeped in oil, fur
remedy for destroying th
sects infesting the floors o
ton's Bot. Dict.; *Smith's*
p. 277.)

LOPPED MILK.
that has stood till it has
curdled.

LOPPING. The ope
off the lateral or other
See Pruning and Planta

LOTUS. See Birds'-

LOUSINESS. In far
of the skin, arising, in ca
mals, from the irritation
animalculæ, which may be
the naked eye. Most anin
sects, are subject to this a
ness in live stock is pro
and low keep. The best
attention to cleanliness,
The lice may be killed by
with a brush to the chi
composed of four ounces
mixed with a pint of tra
portion of weak mercurial

LOUSE-WORT. See

LOWER. A corrupte
in some districts.

LOWK. A provincial
of weeding corn, &c.

LOVAGE. (*Ligustic*
cause some of the species

le stem yields English opoponax.
are reputed to be carminative,
usion of the leaves affords a good
calves.
lovage. (*L. cornubiense.*) This
ommon species, found sometimes
fields in Cornwall. The root is
aped, contracted at the crown, de-
o a great depth; when wounded,
g a yellow resinous juice. The
wo or three feet high, solitary,
ched, striated, purple at the base.
leep green; the radicles once,
hrice pinnate, rough-edged, cut;
s, ternate, lanceolate, entire. Ribs
ls, bluntish. (*Smith's Eng. Flor.*
31. ; *Paxton's Bot. Dict.*)

APPLE. See TOMATO.

GRASS. (*Eragrostis;* from *eros*,
agrostis, grass; in allusion to the
lancing spikelets, whence also the
me.) It is a pretty species of
ass, growing in gardens about a
in any common soil. (*Paxton's*
)

LIES-BLEEDING. The com-
of a species of amaranth (*A.*

A very long narrow spade, pe-
the province of Connaught, and
s of Munster, and only suited
and, where a wider edge could
ly penetrate. (*M. Doyle's Pract.*

RN, or PURPLE MEDICK
(*Medicago sativa.*) An artificial
led by the French *grand trefle*,
rds perhaps a larger produce of fod-

island, since extreme cold destroys it. It is best sown alone in drills, at a distance of twelve to fifteen inches; the quantity of seed is from ten to sixteen pounds per acre. Any vacancies in the drills may in the autumn or following spring be made good by transplanting. By careful weeding and hoeing, and frequent top-dressings (for which purpose gypsum, calcareous matters, ashes, &c. are excellent) the profitable duration of this crop may be extended eight or ten years, giving during that period, on an average, three or four cuttings per annum: the first of which, in favourable seasons, will be as early as the middle of April. It should always be cut before the appearance of the blossom. It may be made into hay, although much better adapted for soiling. An acre will, upon an average, produce fodder for two horses, from the first cutting to October. It is admirably adapted for milch cows, and is, indeed, relished by all live stock.

"Lucern," as observed by Mr. Loudon, (*Encyclo. of Gard.*) is highly extolled by Roman writers; it is also of great antiquity in Spain, Italy, and the south of France; is much grown in Persia and Peru, and mown in both countries all the year round. It is mentioned by Hartlip, Blythe, and other early writers, and was tried by Lisle; but it excited little attention till after the publication of Harte's *Essays* in 1757 (? 1764). Mr. Towers, speaking of lucern, calls it "the plant of plants." "I have grown lucern (he adds) during four or five years, and previously I had witnessed its great success and extensive culture in the general fork-digging at that period of early spring, when the plants exhibit the first symptom of growth, so as to remove every weed, and loosen the surface of the soil, will be amply sufficient to secure the safety and full development of the herb. Upon the whole, lucern is a plant of the utmost value; for if the seed be good, the ground rich and in heart, and rendered deep in the first instance by a thorough trenching, the young plants start into lively growth, attain strength in the shortest possible time, and yield a bulk of luxuriant herbage that cannot be surpassed. If the plant require four years to attain its maximum of power, it is still a giant even from its infancy, advancing from strength to strength. A well prepared field, if kept clean by the forking, will remain productive for more than ten years; but as a change of crop always promotes abundance, it would be advisable to prepare a successional plot every six years.' (*Quart. Journ. of Agr.* vol. ix. p. 96.)

About eighty pounds' weight per day, of twenty-four hours, is sufficient for the largest cow, and half this, with corn, for a horse. No stock should at any time be permitted to graze upon it.

There are several varieties of lucern, with violet, yellow, and variegated flowers, which are supposed to be only a variation of the same plant, arising accidentally from the seed. However, neither the yellow nor the variegated is ever so strong as the purple flowered, and cannot, of course, be so profitable to the cultivator. Lucern may be estimated as the choicest of all fodder, because it lasts many years; will bear cutting down four, five, or six times a year; enriches the land on which it grows; will fatten cattle, and often proves a remedy

nifies a land measure of s
pole, or perch of six yards.
by which ditching and oth
tions are performed the
likewise applied to the st
work is measured. It is
log.

LUNGWORT. (*Pulm*
both its common and gene
supposed medical propert
the lungs.) The species
very pretty flowering pla
for ornamenting the fron
They thrive in any comn
readily increased by divis
two indigenous species:
spotted lungwort (*P. offi*
sometimes found wild in w
and flowering in April an
is fibrous; stems nine to t
hairy; leaves ovate, hairy
with white on the upper
have been thought to res
lungs, and were, therefor
for coughs; but they are
salad in early spring, and
poses than for pulmonary
flowers are in terminal, co
of a violet blue, reddish
species is eaten by sheep
not relished by cows, and
horses and hogs. It is
under the names of cowsl
and broad-leaved lungwo
the common lungwort aff
portion of ashes than almos
the produce in general
seventh part of its weight.

2. Narrow-leaved lung
folia). This is also a rar
lands. It is about twice as

species of this genus are among
eautiful of our border flowers.
ourish in almost any soil, but a
uits them best. They perfect
very freely, from which young
asily obtained. In agriculture,
cultivated principally for being
s a manure. (See Green Ma-
This plant requires but little
bour in its cultivation, as it will
soil, except the bad chalks, and
very wet. It will even grow well
gry, worn-out land, especially if
d sandy. When sown in Feb-
rch, after a single very shallow
nd slightly harrowed in, it will
or three times between May
, and prove an excellent en-
he ground when ploughed in
s second blooming. The best
wing this sort of crop is after a
in, as the seeds drop easily out
ls when they are gathered too
must, however, be laid up very
ns soon breed in them. They
to many other plants for the

ER. A sort of hunting dog, much
grel greyhound, with pricked
gy coat, and generally of a yel-
e colour. It is a very swift
that, if it gets between the
d the rabbits, it seldom misses
; and this is its common prac-
ing.

In botany, signifies a colour
urple, yellow, and grey.

RASS. See Elymus.

IS. (From *lychnos*, a lamp;
of the brilliancy of the flowers
e species.) This is an extremely
nus of plants, well meriting ex-
vation for the brilliancy of their
mong the most showy and es-
he border flowers is the scarlet
chalcedonica), the double va-
hich require some care, to pre-
rom returning to a single state.
nd *L. grandiflora* are truly ele-
atter will grow and flower well
ut in the open border in spring,
be taken up in autumn, or the
ill it. They all grow freely in
amy soil; but they must be fre-
ided, or they will dwindle away;
time to do this is early in spring.
the annual species has only to
the open border in spring. *L.*
handsome. (*Paxton's Bot. Dict.*)
re four indigenous species of
ampion.

w lychnis, or ragged robin (*L.*
which is found very common in moist meadows. The root is tapering, stem erect, from one to two feet high, quadrangular, rough, with deflexed bristles, often sending forth leafy branches from the bottom; the upper part viscid and brownish; leaves lanceolate; panicles terminal, of inodorous rose-coloured flowers, appearing in June; petals flaccid, quivering in the slightest breeze; deeply four-cleft, one-celled capsules, roundish. A double variety, of more humble stature, is sometimes seen in gardens, but seldom lasts long for want of its natural supply of moisture.

2. Red German catchfly, or rock lychnis (*L. viscaria*). This species is rare, being found only in dry fissures of rocks. The root is tufted, rather woody; stems a foot high, viscid; leaves, linear-lanceolate, dark green, with a slight woolly fringe at the base; flowers crowded in a spiked panicle, scentless, pink; capsule stalked, of five cells. A white-flowered variety has been sometimes found; and a double one is common in rustic gardens.

3. Red alpine campion (*L. alpina*). This species of lychnis is found growing on rocks in the Highlands of Scotland. It is about half the size of the last; the herbage of a paler hue, and quite destitute of viscidity; leaves linear-lanceolate, naked at the base; flowers bright rose-coloured, crowded into a dense roundish tuft; capsule stalked, of five cells.

4. Red or white campion (*L. dioica*). Some of the varieties of this species are found in most hedges and cultivated fields. The root is tapering, rather fleshy; herb, green, clothed with projecting soft hairs, a little viscid; stem upright, weak, round, leafy, eighteen to twenty-four inches high; in some varieties it rises to three feet. Leaves ovate, acute; panicle terminal, leafy, many flowered, partly forked; flowers diœcious, dark red or purplish, sometimes white; petals cloven, crowned with four teeth; capsule of one cell. The red variety is often cultivated in a double state, and called bachelor's buttons; a name, however, which is more frequently given to a species of ranunculus. (*Paxton's Bot. Dict.*; *Eng. Flor.* vol. ii. p. 326—329.)

LYNCHET. A country term applied to the stripes or grassy partitions in arable fields, but mostly to such as are in the state of commonage.

LYNCH-PIN, or LINCH PIN. The small pin, in carts or other carriages, that is put through the ends of the axle-trees, to confine the wheels on them.

LYRATE. In botany, leaves are called lyrate which are shaped in the form of a lyre.

chine. Compound machines are formed by combining two or more simple machines.

In husbandry, the term is applied to various implements, such as the **Drill**, **Thrashing** and **Winnowing Machines**, the **Steam Engine**, &c. See these respective terms.

MADDER. (*Rubia*, from *ruber*, red, in allusion to the colour of the roots.) This is a genus of interesting plants; any common garden soil suits them, and they are easily increased by seeds or divisions of the roots. The root of *R. tinctorum* is one of the most valuable dyes with which we are acquainted, and is a very important article of commerce. The plant is herbaceous, several stems rising from the same root; tetragonal, with hooked prickles at the angles. The leaves are four or six in a whorl, lanceolate, with the midrib on the under disk, and the margins aculeated. The flowers are small, yellow, supported on axillary trichotomous peduncles.

The dried root of the madder is long, cylindrical the thickness of a goose quill, branched and covered with a reddish cuticle, which, as well as the bark, is easily separated; the odour is feeble, and the taste bitter and astringent. It is imported entire from Smyrna and the Levant; but in coarse powder from Holland and France. The cultivation of madder has been attempted in England, and it is still carried on to a limited extent in some districts, but without any very great success or beneficial results, owing to the low price at which it can be procured from the Dutch growers and from Turkey. Rules have been laid down by Miller, *On the Culture and Manufacture of Madder*, for managing the land, separating and planting the shoots, gather-

Chem.; *Paxton's Bot. Di*
MADDER, THE FIE
RARDIA.

MADDER, WILD. (
This is an indigenous speci
growing in thickets and o
ground in the west of B
is creeping, fleshy, and te
red, useful in dyeing, but
to the cultivated madde
branched, spreading, sq
partly shrubby, its angles r
prickles, as are the edges
broad, shining, dark, eve
leaves, which are four or
The flowers, which appe
August, are yellowish gre
forked terminal panicles.
juicy, in pairs, black and s
Eng. Flor. vol. i. p. 211.)

MADWORT, THE MC
of the common names o
Germander Speedwell (*Ve*

MADWORT, GERM
procumbens.) An annual w
in rich waste grounds, b
Root small and tapering;
square, leafy, a foot or tw
angles beset with reflexed
two, three, or four toget
elliptic, lanceolate, borde
prickles, and rough with c
hairs, so that the plant stic
or clothes like *Galium apar*
which blow in June or Jul
illary, solitary, on short
fine deep blue; valves w
calyx of the fruit flat; seed
granulated. (*Smith's En*
p. 265.)

e kidneys.
IA. (Named by Plumier
Magnol, prefect of the botanic
ntpelier, and author of several
nts; he died in 1715.) This
very elegant and showy plants
er, and well worthy of exten-
on. The hardy kinds, being
handsome shrubs, should be
spicuous situations where they
rofusely when they attain a
M. glauca, and some others,
a peat soil in a moist situation.
erally increased by layers put
ing or autumn, or by seeds;
ers are first taken off, they
ted in a mixture of loam and
ed in a close frame till they
esh root. None of the leaves
en off or shortened, nor any
off, as they will not succeed
the more branches and leaves
ooner they will strike fresh
inese kinds are often inarched
M. obovata, one of the rea-
kinds, which takes readily.
the North American species
annually from that country.
be sown as soon as possible
rival, in pots of light rich earth,
n half an inch deep; these
d either in a hotbed or a warm
ation, or they may be sown in
nd, and when the plants are
ize, they should be planted out
ts, and sheltered till they have
oot; they should also be pro-
he frost by a frame for two or
ive winters, giving them the
e open air in mild weather.

the year round. They build in high trees, sometimes in a lofty hedge, and occasionally in a low but thick bush, returning to the same nest for several years in succession. The nest is constructed, with great art, of a framework of sharp thorny sticks, plastered with earth on the inside, and having a lining of fibrous roots and dry grass. There is a sort of dome over the top, and a small aperture on the side just large enough to admit the parent bird, who generally sits with her head to the hole, ready to quit the nest on the slightest alarm.

The magpie breeds early in spring, producing six or seven eggs of a pale bluish-white colour, spotted all over with ash colour, and two shades of greenish brown; the length one inch four lines and a half, the breadth one inch. When taken young the magpie is easily tamed, chatters to those who feed or notice him, imitates the sound of the human voice, and learns many amusing tricks; the desire to pilfer and hide any small shining article, observable in all the birds of this family, is particularly conspicuous in the magpie.

The beak, chin, throat, upper part of the breast, tail, legs, &c. are black, lower part of the breast, belly, &c. pure white, wing coverts of a fine shining blue, beautifully indescent, with purple green of various shades. The whole length of an adult male is full eighteen inches, of which the longest tail feathers measure nearly eleven inches. The female is smaller in size, the tail is shorter, and the plumage less brilliant. (*Yarrell's Brit. Birds*, vol. ii. p. 108.)

MAIDEN HAIR. (*Adiantum*, derived from *adiantos*, dry. Pliny says, it is in vain to plunge the *adiantum* in water, for it

Elm, near London, and published an elaborate treatise on its culture and the uses to which it could be applied. Notwithstanding his strenuous advocacy, its cultivation has never been much approved of, and in no part of the kingdom is it grown to any extent. This valuable plant produces a much larger number of ears, which abound with a greater proportion of wholesome mealy matter, than any European grain; and as Indian corn prospers in low, swampy situations, where it tends to dry up the superfluous moisture, and to render the soil firm, it might perhaps be advantageously cultivated in some of the southern countries of Britain; but unfortunately it requires a higher summer heat than we generally experience in these islands.

Maize is propagated by setting the seed in equi-distant rows, from two or three to five feet asunder. The proper season for planting it is from the middle of April to the beginning of May. For this purpose the earth is opened with a hoe to the depth of three or four inches, and in each hole are deposited four or five grains at a little distance from each other. As soon as the young plants appear, the weeds are carefully eradicated, and the earth gradually heaped around them, till the ears appear; after which they are left till the harvest arrives. The ears are then gathered and dried in an open situation; for if this corn be heaped together, it is apt to ferment and putrefy, or to sprout and grow. The best method of preserving it is to *hush*, or thrash it out, as soon as the harvest is completed, to dry it perfectly in the sun, and deposit it in cool, dry, and airy situations. Maize, in countries where it is extensively grown, is subservient

of which is given in the
Agr. vol. i. p. 484.

MAKINBOY. One
names of the Irish spurg
berna). See SPURGE.

MALE FERN. See

MALIC ACID. A
tained in the juice of th
other fruits; it may also
the berries of the mount
(*Sorbus aucuparia*), and
called *sorbic acid*. It is ve
crystallizes with difficul
acid taste, and forms mal
lies.

MALLOW. (*Malva*,
Greek *malache*, soft, whi
lacho, to soften, in allusi
qualities of the species.)
sive genus of plants, som
which are very ornam
most interesting of the
species, are *M. moschata*,
M. purpurata. They sh
the flower border, and in
of the roots, or by seeds.
should be sown in the
few of these are worth c

The indigenous specie
ber. 1. Common mallo
perennial weed which is
hedgerows, roadsides, an
well as waste ground. T
branching, whitish; st
branched, widely sprea
high, in a barren soil
deep green, soft, and d
acute lobes; foot stalks
hairy; the flowers, which
to August, are numerous

al in habit; has a tapering root.
e plant is smaller than the last,
e prostrate, with numerous stems
anched. Leaves roundish, heart-
h five, often seven, shallow lobes.
le lilac-coloured, several together
y hairy stalks; the stalks when
e bent downwards.
mallow (*M. moschata*). This is
mon perennial species, found in
borders of fields, &c., on a gra-
The root is tough and woody;
ge is bright green, more or less
th spreading, simple, not starry
companied with any short, dense,
bescence, and exhaling a musky
ecially in hot weather, or when
htly through the hand. Stems
feet high, leafy, round, but little
Radical leaves kidney-shaped,
withering away; the rest in five
natifid, jagged segments. The
hich appear in July and August,
ng axillary simple stalks, rose-
large and handsome; calyx hairy,
eaves linear-lanceolate. (*Smith's*
. vol. iii. p. 244.)

OW, THE MARSH. See Marsh-

OW, THE TREE. See Tree-

(Fr. *mal*; It. *malto*; Lat. *mal-*
term malt is applied to designate
h, being steeped in water, is made
te to a certain extent, after which
is checked by the application of
is evolves the saccharine principle
in, which is the essence of malt.
almost every species of grain, has
in malting; but in Europe, and
in England, malt is prepared al-
ly from barley. It is the principal
in the manufacture of beer, and of
rits.

cess of malting is performed by
ny quantity of good barley in cold
a period which (as regulated by
not be less than forty hours; but
hat period the steeping may be
as long as it is thought proper.
ortion of water imbibed depends
n the barley, and partly upon the
time that it is steeped; but the
good many trials proves that the
ncrease of weight from steeping
eckoned at 47 lbs. in every 100.
ge increase of bulk is about one
ter the grain has remained a suffi-
in steep, the water is drained off,
barley thrown out of the cistern
malt floor, where it is formed into
alled the *couch*, about 16 inches
this situation it is allowed to remain about 26 hours. It is then turned by means of wooden shovels, and diminished a little in depth. This turning is repeated twice a day or oftener, and the grain is spread thinner and thinner, till at last its depth does not exceed a few inches. The temperature which it is wished to preserve by these frequent turnings varies from 55° to 62°, according to the different modes of malting pursued. Soon after the rudiments of the future stem, called *acrospire* by the maltsters, has appeared, the process of germination is stopped by drying the malt upon a kiln. The temperature at first does not exceed 90°; but it is raised very slowly up to 140°, or higher according to circumstances.

Barley by being converted into malt generally increases two or three per cent. in bulk, and loses at an average about 20 per cent. in weight, of which 12 are ascribed to kiln drying, and consist of water which the barley would have lost had it been exposed to the same temperature; so that the real loss does not exceed 8 per cent.

The following is Dr. Thomson's analysis of barley, and the pale malt made from it:

	Barley.	Malt.
Gluten - -	3	1
Sugar - -	4	16
Gum - - -	5	14
Starch - -	88	69
	100	100

The gluten in this case is a most important component, as by its transformation, when the malt is converted into wort, ferment is generated; whilst the saccharine matter, which is increased fourfold, is the origin of the alcohol of the beer. Oxygen is appropriated by the gluten at the same time that the transformation of the sugar is going on; and thus carbonic acid and yeast are disengaged simultaneously.

In brewing ale, porter, and table beer, three different kinds of malt are employed: 1. pale or amber malt, which yields the saccharine or fermentable extract; 2. brown or blown malt, which is not fermentable, but is used to impart flavour; 3. roasted, black, or, as it is sometimes called, patent malt, which is employed instead of burnt sugar, merely as a colouring matter for porter.

The manufacture of malt has been carried on in England to a great extent from a very early period; but it is singular that notwithstanding the products obtained from it have always formed the principal beverage of the great bulk of the people, instead of increasing with the progressive wealth of the population of the country, it remained nearly stationary for more than a century, and it is only within the last eight or ten years that there has been any increase in the manufacture. This extraordinary result is most probably to be attributed to the introduction and universal use of tea, coffee, &c., and to the heavy duties which were formerly levied on beer and malt. The present duty on malt from barley is 2*s.* 7*d.* per bushel, and from bere or bigg, 2*s.* The quantity of malt charged with duty in the United Kingdom during the three years ending 1838 was 41,814,811 bushels; and the revenue derived from it averaged in the same period, 5,282,975*l.*

The following is the quantity of malt consumed by the brewers of London and its vicinity, from the 10th of October, 1830, to the 10th of October, 1840.

		Qrs.			Qrs.
1831	-	622,549	1836	-	754,313
1832	-	604,477	1837	-	714,488
1833	-	578,588	1838	-	742,597
1834	-	662,713	1839	-	750,176
1835	-	702,533	1840	-	776,219

The 6 Geo. 4. c. 107. s. 52. enacts that "malt may not be imported into the United Kingdom for home use under pain of forfeiture; but it may be warehoused for exportation." The importation of malt is, however, now allowed under very high duties, fluctuating with the price of home produce: but under no state of the market can any addition be thus made to the quantity of malt in this country, because barley which has undergone a voyage of much length is unsuited to the process of malting. The reader will find an elaborate article "On the Malt and Beer Duties," in the *Quart. Journ. of Agric.* vol. ii. p. 272., and another in the *Edin. Review*, No. 98. The works quoted at the foot of this article may also be consulted by those who wish to obtain more ample details on the subject. As no one would think of undertaking the business of a maltster without having a copy of the acts 7 & 8 and 11 Geo. 4. in his possession, it is quite unnecessary for me, even if my limits permitted, to give an abstract of these acts. (*Dr. Thomson's Veg. Chem.*; *Penny Cyclo.* vol. xiv. p. 341.; *M'Culloch's Com. Dict.*; *Brande's Dict. of Science.*) See Barley, Beer, and Brewing.

MALT-DUST. The dust or substance that separates from the malt in the act of drying, or during its preparation. It is sometimes called malt-combs, and has been found useful as a manure as a top-dressing when sown over the cereal grasses in the early spring season.

The proper quantity of this dust is, if top-dressed, for wheat, 36 to 40 bushels; if
drilled with the crop, for barley and
30 to 34 bushels. It is also emine
culated for grass lands; and if a
the latter proportion, it will produ
considerable increase of the best fe
common price at most malt-kilns i
to 6*s.* per quarter. Malt-dust i
some places employed in the f
milch cows and pigs. (*Brit. H*
p. 413.)

MALUS. (Lat. *malum*, an app
wild crab (*Pyrus malus*, see Cra
the only apple indigenous to this
and it is on this stock that most
luable apples have been grafted
by the ingenuity of the gardeners,
by sowing the seeds and studyin
so improved and multiplied the
this most excellent fruit, that it
become of great national impor
fording an agreeable and wholeso
a thousand shapes, to all classes.
Mascal was the first who intro
common or cultivated apple into
about the year 1525. The varieti
apple are now so numerous, that
cultural Society's catalogue inclu
than 1400. The apple, like m
hardy trees, may be propagated
cuttings, suckers, layers, or engra
seeds for obtaining new varieti
the other modes for extending th
of such as are in esteem.

In every garden and private
apples for ten different purpose
sirable:

1. For summer culinary use, th
while not fully grown or imperf
are fit for using in June, July, an

2. For summer eating or tabl
jenneting, pomroy, &c., which rip
end of June or in July. Margare
pearmain, &c. (July). Kentish f
Hawthorn dean, &c. (August).

3. For autumn baking, the cod
Burknotts, red streaks, Eve apple,
der, nonsuch, &c., which ripen in S
Piles's russet, Carlisle codling, cat
broidered, &c. (October). Worm
golden Harvey, queening, gold
(November).

4. For autumn table use, the K
Dalmahoy pippins, Loan's pearm
ville, Kent, Godolphin, &c., which
September; orange and ribstone
grey rennet, fameuse, violet, &c. (
Franklin's golden, and Borsdorf
Dredge's russet, margil, &c. (Nov

5. For winter culinary use, the
dumpling, Burknott, John apple,
tart, &c., which are fit to use in D
Halldoor, royal pearmain, Dutch
Aclam's russet (January). Bri

in, cockagee, tankerton, box-apple
ruary).
For winter table use, the golden and
ish pippins, golden and Canadian ren-
brandy, &c., which are fit to eat in
mber. The Norfolk storing, Hub-
, Sykehouse, white court pender, &c.
uary.) Dredge's Queen Charlotte,
s, Skenn's kernel, and Dalmahoy pip-
royal pearmain, &c. (February).
For spring culinary use, the quince,
Colville, Lord Camden's rennet, winter
main, which keep till the end of March.
er pippin, Trevoider rennet, Macdon-
Scotch nonpareil, Spaniard, &c. (April).
lk paradise, Loan's pearmain, English
t, &c. (May).
For spring table use, the hollow-eyed,
wall rennet, Hughes's new golden pip-
&c., which will keep till the end of
h. Cockle and Whitmore pippins,
n and Piles's russet, Wheeler's extreme,
April). Stone and Spencer pippins,
George, Ward, &c. (May).
For summer culinary use, till the
season returns, the Lord Cheney's
, Baxter's pearmain, stoup codling, &c.
will keep till the end of June. Nor-
eaufin, Norfolk storing, French crab
).
For summer table use, till the apple
returns, the Dredge's fame, oaken
carnation, &c., which keep till the end
ne. Nonpareil, Yorkshire greening,
lk Colman, which keep till the end of

other source of choice under each of
above heads, may respect the soil,
ion, and climate of the garden or or-
in which they are to be planted, or
aracter, whether of dwarfs, espaliers,
all trees, which they are to assume
Young trees are more likely to
ed in exposed sites and poor soils;
he apple will bear transplanting at
ater age than any other fruit tree.
common soil, neither extremely sandy,
lly, or clayey, on a dry subsoil and
a free exposure, will suit this tree.
lips's *Hist. of Fruits; Loudon's Encyc.
rd.; Treat. on Apples and Pears.*) See
and ORCHARD.

ANDRAKE. (*Mandragora;* the name
rived from *mandra*, an ox-stall, some-
relating to cattle, and *agauros*, cruel;
count of its poisonous effects on cattle,
accidentally gathered with their fodder
countries where the plants abound.)
plants, which are natives of the south
urope, thrive well in a light soil, in a
d situation. They can only be in-
ed by seeds. The roots are very apt
during winter. The root has an uncouth form, which is supposed to resemble the human shape; on which account it was imagined to be capable of preventing barrenness. It is, however, an acro-narcotic poison, and when taken proves fatal by the extreme purging which it causes. The common people still believe in its properties; but the root of a species of Bryony (Tamus *communis*) is usually sold for it in the herb shops. (*Paxton's Bot. Dict.*)

MANG. A provincial word signifying a mash of bran, malt, or other similar substance.

MANGE. A cutaneous disease, which attacks several domestic animals, especially the dog, and which is attended with an eruption and loss of hair.

In the horse it is known to exist by the animal's constantly rubbing or biting himself, so as to remove the hair, and sometimes produces ulceration; the hair of the mane and tail frequently falls of, and small scabs may generally be observed about the roots of those which remain. This disease is seldom met with, except in common stables where scarcely any attention is paid to the horses, and where their food is of the worst quality; horses highly kept, if not properly attended to, are also subject to this disease, which is very contagious.

The causes of mange are, sudden changes of temperature, hot stables, bad diet, joined to want of cleanliness. The perspirable matter being never properly removed by friction, and being frequently mixed with dust, &c., completely plugs up the external exhalents, whereby they become obstructed, and a diseased action takes place. It may also be caused by infectious matter coming in contact with the skin; as when a sound horse rubs himself against the stall in which a mangy horse has been kept. The principal symptoms are, the horse growing very thin, without any apparent cause, attended with a staring of his coat. This is soon followed by eruptions, which discharge a thick yellowish matter, forming a kind of scurf, which peels off, and is succeeded by fresh eruptions, and the hair falls off. This, though partial at first, soon spreads all over the body, is attended with an itching, and causing the horse to rub against every thing he comes near. In this disease great attention to cleanliness is necessary.

In the horse the following will be found the best remedy. Bleed to the extent of two or three quarts, according to the constitution of the animal, and after first preparing the horse by bran mashes, give the following dose of physic: —

Barbadoes aloes	-	6 drachms
Powdered ginger	-	2 —
Castile soap	-	2 —
Oil of carraways	-	20 drops.

Honey or treacle sufficient to form a ball. After which give the following alterative balls: — 2 ozs. each of powdered black antimony, powdered nitre, flour of sulphur, Castile soap, and aniseed powder, 1 oz. of rosin, added to a sufficient quantity of honey to make eight balls, one to be given every night.

The following ointment may be applied externally: —

Black sulphur	- - -	8 ozs.
Strong mercurial ointment	-	2 —
Soft soap	- - -	4 —
Train oil	- - -	1 pint.

These ingredients to be well mixed, and one third part carefully rubbed in daily. If the above ointment should be found ineffectual, 4 ozs. of spirit of tar may be added.

Dogs and swine are frequently subject to mange. For the common scabby variety in the dog, the following ointment is recommended: —

Powdered sulphur	- -	4 ozs.
Muriate of ammonia, powdered		½ —
Venice turpentine	- -	½ —
Lard, or other fatty matter	-	6 —

Well mixed.

MANGEL WURZEL. Field Beet, or Root of Scarcity. (Germ. *Mangold Wurzel.*) The root of the Beta *hybrida*, or *B. altissima*, Linn. This is a kind of red beet, which, according to Von Thaer, is a mongrel between the red and white beet. It has been long cultivated in France, Germany, and Switzerland, partly as food for cattle, and partly to be used in distillation, and in the extraction of sugar. Its culture in Great Britain is more recent; but its value is now becoming very generally appreciated, and the cultivation likely to become more extensive. So far back as the year 1811, General Beatson, then Governor of St. Helena, writing to the English Board of Agriculture, and describing the extraordinary produce of some plants, the leaves of which had been repeatedly cut to serve as a substitute for spinach, says: — "It certainly possesses advantages over every other plant hitherto introduced in field culture. Its produce is immense; and I have found it to grow, with considerable luxuriance, upon land where no other vegetation was ever seen. It has also the singular property of being unmolested by the dolphin fly, which is here extremely destructive to cabbages, turnips, and radishes. I have very often observed, where alternate plants of cabbage and mangel wurzel were growing in the same rows, and touching each other, that whilst the former were absolutely annihilated by the destructive insect, not one was to be seen on the mangel wurzel
(*Com. to Board of Agr.* vol. vii. p.

Lord Spencer, in the *Journ. of*
Eng. Agr. Soc., vol. ii. p. 296,
the result of a trial on the co
feeding properties of mangel wu
Swedish turnips. "Believing,"
lordship, "that mangold wurzel
more saccharine matter than Sw
nips, and ought, consequently,
more nourishing root of the two,
mined to try, practically, wheth
fed upon mangold wurzel increased
more than one fed upon Swedis
in proportion to the quantity of
sumed. In order to have render
periment perfectly accurate, I oug
ascertained the weight of hay co
each beast during the progress of
but I did not do this, although I
confident that the quantity con
each was nearly the same. I sel
steers, tolerably, and at least eq
bred. No. 1. calved March 29th,
No. 2. calved May 6th of the
and on the 24th of December, 18
No. 1. to Swedish turnips, and
mangold wurzel. I ascertained th
by measurement, and both of
sured the same, viz. 4 ft. 10 in. in
6 ft. 5 in. in girth, making them
668 lbs. each. On the 23d of
No. 1. had consumed 1624 lbs.
turnips, and measured 4 ft. 10 in.
by 6 ft. 7 in. in girth, making him
703 lbs., and to have increased
35 lbs., or at the rate of 48¼ lbs.
ton of Swedish turnips consume
had consumed 1848 lbs. of mang
and measured 4 ft. 10 in. in len
8 in. in girth, making him to wei
and to have increased in weight
at the rate of 65½ lbs. for every
gold wurzel consumed.

"This difference, however,
arisen from No. 2. having a g
pensity to feed than No 1. I th
put No. 1. to mangold wurzel,
to Swedish turnips. On the 20
ruary, No. 1. had consumed
mangold wurzel, and measured
in length by 6 ft. 8 in. in gir
him to weigh 734 lbs., and to hav
in weight this month 31 lbs., or
of 36¾ lbs. for every ton of mang
consumed. No. 2. had consume
of Swedish turnips, and mea
11 in. in length by 6 ft. 8 in. in gir
him to weigh also 734 lbs., and
creased in weight during this mont
at the rate of 15½ lbs. for every to
ish turnips consumed. I then
mangold wurzel, and divided the

een them. On the 19th of March, they each consumed 1792 lbs. of mangold el; No. 1. measured 5 ft. in length by 10 in. in girth, making him to weigh lbs., and to have increased in weight ; No. 2. measured 5 ft. in length by 9 in. in girth, making him to weigh lbs., and to have increased in weight

It would appear, therefore, as if the ensity to feed of No. 1. was greater that of No. 2. in the proportion of 50 ; but, notwithstanding this, in the first h, when No. 1. was upon Swedish tur- and No. 2. upon mangold wurzel, No. 2. No. 1. in the proportion above stated to 48¼. It appears as if there could o great inaccuracy in estimating the ve weight of the animals, as, soon after periment was concluded, I sold No. 1. utcher in the country for 24*l.* 3*s.*, and at Smithfield for 24*l.*

t will be for practical men to decide the value of this trial; what appears to be most conclusive part of it is, No. 2, who had during the first month, he was feeding upon mangold wurzel, ed in girth three inches, in the next h, when his food was changed to Swedish did not increase in girth at all; and the third month, he was feeding mangold wurzel, he again began ase in girth; because it is very well that, if an animal is changed from to less nutritious food, the probable quence will be that his growth will be d. The result appeared to me so de- that I have not tried the experiment the same accuracy since; but I did he following year, the feeding a cow ately on Swedish turnips and man- wurzel, and though I have not by me tails of the trial, I remember that the confirmed the experiment of the pre- year."

Miles of Kingsweston, in the same e of the *Journal*, p. 298., commenting he communication of Lord Spencer, bes so fully and explicitly the best of culture, &c. of this root, that I t do better than adopt his paper en-

Notwithstanding the favourable result rd Spencer's experiment with mangold el, the consideration will naturally t itself to the mind of the farmer, ly to his adopting the cultivation of whether, although the mangold ay bring on his cattle faster and n the Swede turnip, it is not more f culture, more tender in its ha- less productive in bulk per acre Swedish turnip; and I think, therefore, it may not be unprofitable to lay before the readers of the journal, first, the chemical analysis of the highest and lowest order of turnip and of mangold wurzel as given by Sir H. Davy, and of the sugar-beet and orange-globe mangold wurzel as lately obtained on the same plan by the celebrated Bristol chemist, Mr. Herepath; and then to point out the system adopted by myself in the West of England in the cultivation of mangold wurzel, which has been attended with complete success.

Roots.	Quantity of Nutritive Matter in 1000 parts.				
Species.	Mucilage or Starch.	Saccharine Matter or Sugar.	Gluten or Albumen.	Extract.	Total soluble or nutritive Matter.
Swedish turnip	9	51	2	2	64
White turnip	7	34	1	- -	42
Mangold wurzel	13	119	4	- -	136
Orange-globe	25¾	106¾	1·20	less than 1	135¼
Sugar-beet	17¾	126⅜	1¼	1	146⅜

"By this table, it is apparent that equal quantities of Swede turnip and orange-globe mangold wurzel contain very different proportions of nutritive matter, the latter more than doubling the former in quantity; and should the mangold wurzel be of equally easy culture with the Swedish turnip, it seems almost unaccountable that it should not yet have come into more general cultivation. I have grown the common red sort for six, the sugar-beet for four, and the orange-globe for three years; these kinds have regularly come into course with Swedes upon light land; the product has always been equal, in most cases far heavier. The Swede turnip has enemies innumerable; I have never observed the mangold wurzel attacked either by fly, slug, or wireworm. Equally a cleansing crop with the Swede, it stores better, and lasts good for a longer period. In the summer of this year I was using sugar-beet with stall-fed cattle, which cut perfectly good and crisp in August. The mode of culture I adopt, up to depositing the seed in the ground, is the same as that adopted in Northumberland for ridging the Swede; great care, however, must be taken that the seed of the mangold wurzel is not buried too deep, or it will not vegetate. Dibbling, as you never can ensure an equal depth, does not answer; nor does the seed drill well, if properly prepared by steeping, which I should recommend, for at least twenty-four hours before planting. To ensure, therefore, a proper depth, I have been in the habit of using an iron wheel, round the outer circumference of which, 18 inches apart, iron points project, broad at the base and tapering towards the point, about 2½ inches long; this is wheeled upon the top

Mr. Webb Hall, and since I have adopted it my crop has never failed.

"The after culture and the storing is similar to that of the Swede; great care, however, should be taken in never permitting two plants to grow in the same spot, which will be the case frequently, should only one capsule even be deposited in each hole, as every capsule contains many seeds. Should the tops remain uncut, the plant will stand a considerable degree of frost; it should, however, be stored early in November; the best and cheapest method is to build it up against some high wall contiguous to your beast-sheds, not more than 7 or 8 feet deep, carried up square to a certain height, and then tapering in a roof to the top of the wall; protect the sides with thatched hurdles, leaving an interval between the roots and the hurdles, which fill up with dry stubble; cover the roof with about a foot of the same, and then thatch it, so as to conduct all moisture well over the hurdles placed as a protection to the sides. In pulling the plants care should be taken that as little injury be inflicted upon them as possible; cleansing with a knife should on no account be permitted, and it is safer to leave some of the leaf on than by cutting it too close to impair the crown of the root. The drier the season is for storing the better, although I have never found the roots decayed in the heap by the earth, which in wet weather has been brought from the field, adhering to them. As to the productiveness of the different sorts, in one year I have grown a larger quantity of sugar-beet per acre, in another of mangold wurzel; both these, however, I consider exhaust the land in a greater degree than

equally with Lord Spen
do to return from any s
zel to Swede turnips, as
straw-yard have for tw
fused such a change.
earlier in April your man
the better, the deeper t
probability of a heavy
though both the mangold
beet require a deeper
than the Swede turnip, y
globe will flourish wher
succeed."

Mangel wurzel may b
soils than those adapted
it is better food for mil
not, like turnips, give
It cannot bear the cold,
the Swedish turnip, and
tivated in the souther
island than in Scotland.

Mr. W. Lester (*Qua*
vol. iii. p. 365.) descr
making ale from this ro
portion of about ten po
a gallon would make
with fifteen pounds' we
an excellent ale will be
dition of two pounds' w
firkin will be a great i
third malt and two thi
liquor, will make capita
in this way, an import
effected. One method i
clean the roots well, tak
pletely, scrape (rather
rind, slice and boil th
pulpy; squeeze the liqu
much as possible, and
with about six ounces o

roots boiled and mashed in the liquor, h either milk or a small quantity of meal ed, will feed the pig at a trifling ex- se.

MANGER. A trough or crib in the ble in which corn or cut provender for horse is placed. The usual method is have them the whole breadth of the l; but this is unnecessary, as if 18 or inches in length and 14 or 16 in breadth, will be sufficient for every useful pur- e. In the fixing of them, they should so contrived as to admit of being re- ed for the purpose of being cleaned. s could, however, never be done in the method of fixing them; but by a little rivance may be easily effected. It is, many cases, a convenient plan to have m in the corners or angles at the heads he stalls. See STABLE and STALL.

MANNA. (Fr. *manne; It. manna.*) The crete juice of the *Fraxinus ornus*, a es of ash growing in the south of Eu- . The juice exudes spontaneously in n dry weather, and concretes into whitish s; but the greater part of the manna of merce is obtained by making incisions the tree, and gathering the juice in ts, where it forms irregular masses of h or brownish colour, often full of im- ities. Manna consists of two parts; one charine crystallizable principle, named closely resembling sugar; the other uncrystallizable principle, which is purgative agent in the manna. This tance is now seldom used except as a ative for infants. (*Thomson's Dispens.*)

MAN-ORCHIS. (*Aceras.*) Very cu- species of orchis, which are rather lesome to cultivate. A light loamy mixed with chalk is most favourable to growth, and they can only be increased seeds. The green man-orchis (*A. an- pophora*) is perennial and indigenous, wing in chalk-pits, grassy pastures, and banks by the road side, on a chalky soil. root consists of soft or woolly radicles, ched to ovate knobs. The herb is light en, smooth and shining; the stem twelve fifteen inches high, bearing four or five ding leaves near the bottom, and one or small, sheathing, upright ones towards the dle; the flowering spike is long and cylin- al, formed of numerous, rather crowded, tless flowers, whose green hue, tinged re or less with brown, renders them not nspicuous. The lip of the flower, r, is usually of a pale yellow, without ts, though occasionally tipped with or dark red. (*Eng. Flor.* vol. iv.

TLE, THE LADIES'. See LA- ANTLE.

MANURES. The word manure, according to Todd, is derived from the French, *manouvrer*. Lemon gives the derivation as follows: — "Manure, 'omnia a manu operando.' Skinner — all improvements in agriculture brought in by the hand. Webster, *Eng. Dict.*, says, 'Manure (Fr. *manœuvrer*, but in a different sense. Norm. *mainoverer*, to manure; Main, Lat. *manus*, hand, and *ouvrer*, to work; Lat. *operor*.) A manure may be defined to be any fertilising compound or simple ingredient added to a soil, of which it is naturally deficient; and as all cultivated lands should contain the earths, silica, carbonate of lime, alumina, decomposing organic matter, and certain saline substances, it is evident that in cases where any one of these is contained in the land in insufficient quantities for the supply of cultivated vegetables, that then the addition of that substance, either in its simple or in a compound form, constitutes the great art of manuring.

Fertilisers therefore naturally divide themselves into three classes: 1. the earthy, which are by far the most permanent portions of a soil, and are usually applied in the largest proportions; 2. the organic (vegetable and animal), which are the least permanent, and are used in much smaller quantities than the earthy; and 3d, the saline, which are the most sparingly applied of all fertilisers, are the most readily absorbed by plants, and whose period of duration in the soil is longer than the organic, but less than the earthy. A manure is either useful to vegetation, by affording in its simple or decomposed state, direct food or constituents, or else it is a fertiliser, by adding to the soil additional power to absorb and retain atmospheric gases and moisture. We shall see, hereafter, that most manures which are commonly applied to the land assist the growth of plants in both ways. Looking at the question abstractedly, it must be evident, that as animals receive almost the whole of their nutriment either directly or indirectly from the vegetable kingdom, their excrement, or their decomposed bodies, returning these to the soil, must form the best manure.

With regard to inorganic substances, clay of the earthy manures, and some of the saline fertilisers, act principally by their absorption and retention of moisture. Gypsum, it is true, enters into the composition of some of the grasses; and, in minute proportions, other salts do the same; but, if we except phosphate of lime (the earthy salt of bones), none of the salts can be considered to be a very *general* direct food of plants. Davy very clearly explains the desirable objects in the fertilisation of soils: he says, "The plants growing in a soil incapable of are properly associated, and in which the decomposable vegetable or animal matter does not exceed one fourth of the weight of the earthy constituents. (*Elements of Ag. Chem.* p. 264.)

Of the organic manures, those which the most readily putrefy are the most rapid in their effects; but then they are the most speedily exhausted: thus oil and fish, the most rapid of fertilisers, are exhausted by the first crop; while bones, which decay more slowly, will last for two or three. The effect of chopped woollen rags is excellent for two years in the rich clay hop-gardens of Kent, and for three or four in the light chalky arable soils of the valley of the Kennett. Farm-yard dung, when applied in different states of freshness, illustrates the same position. M. Hassenfratz manured two pieces of the same kind of soil, the one with a mixture of dung and straw highly putrefied, the other with the same mixture newly made, and the straw almost fresh; he observed, that during the first year the plants which grew on the land manured with the putrefied dung, produced a much better crop than the other; but the second year, the ground which had been manured with the unputrefied dung produced the best crop; the same result appeared the third year; after which both seemed to be equally exhausted. "Another experiment of the same chemist," adds Dr. Thomson, "renders this truth still more evident. He allowed wood shavings to remain in a moist place for about ten months, till they began to putrefy, and then spread them over a piece of ground as a manure. The first two years this piece of ground produced nothing more than others which had not been manured at all; the

from either the atmosph
composition of organic m
more create than they ca
the silica, which are as
in most vegetables as sug
fibre. Davy proved this
plant of the oat grow in
lime, and watered it w
water. It grew but langu
it had a free supply of th
yet the access of all dust
vented. Upon analysing
found to have much incr
of lime, but its silica o
diminished, a grain of o
yield more: this Davy
loss of its husk during
tures, p. 312.) Whateve
matters, therefore, are fo
must have been either
natural soil or furnished
added to it — whether i
lime (chalk), or silica
flint), alumina (clay), sulp
sum), or phosphate of li
bone). It should also be
with the farmer, that th
any decomposing animal
nure, but what is either
solid state the natural foo
the gases emitted by the
dunghill are so much los
matters of the soil, and such
submitted to by the inte
but from an unavoidable
the value of green man
cases every portion of the
menting fertiliser is grad
the roots and leaves of the

When the cultivator is

sses, and even to turnips, is very useful;
others it produces no effect. Strange
nions were in consequence long enter-
ned with regard to this manure, until it
s found that the soils on which it was
seless naturally contained it in abun-
nce, and that those soils in which it did so
ch good were nearly or entirely defi-
nt in this essential ingredient of clover,
rn, &c.; for it was now evident, that to
gypsum to a soil which already con-
ed it in sufficient quantities, was as need-
as to add sand to a sandy, or clay to a
ey soil.

here is little doubt but that plants de-
all their constituents from the soil or
air, in either the gaseous or liquid state;
in the light they absorb carbonic acid
and emit oxygen is well known; by this
ns, therefore, they readily obtain the
ssary supply of carbon. The hydrogen
vegetable substances is most probably
ished by the decomposition of either
er or the carburetted hydrogen emitted
ing the putrefaction of animal and vege-
e substances. This latter seems pecu-
y grateful to plants in those situations
re it is copiously emitted, as near to
nant pools, over drains, &c., where vege-
n is always rank; and when present in
osphere, as in coal mines, the green
of plants growing in it is preserved
when they are deprived of light. The
y or saline matters of vegetables, such
ca, carbonate, phosphate and sulphate
e, &c., are all in minute proportions
ble in water; they are found more or
in all cultivated soils, and when they
deficient, their addition, as I have be-
observed, constitutes the great art of
uring: but there are such endless va-
s of soils, that there is hardly a ma-
e that will suit every description—each
must be separately examined—practice
e only substitute for chemical investi-
ons.

hus, wood ashes of the beech or bone
der form excellent manures for soils
cient in the phosphates; lime where
lk is altogether absent, and so on; and
lst we attend to the nature of the soil,
must also ever recollect, as one of the
t important principles of agriculture,
whatever is completely removed from a
by crops, must be in some way or other
tored by artificial means.

various earthy, animal, and vegetable
ces, when applied to the roots of
accelerate their growth, has been
from a very early period; but in
nner these fertilisers serve as the
vegetables has not been certainly
ned. That they must all be in a fluid state, is supposed to be absolutely necessary: thus all the attempts of Sir Humphry Davy to make plants absorb the fine impalpable powder of charcoal obtained by washing gunpowder entirely failed.

The soluble matters consumed by plants are probably, in general, absorbed by their roots unaltered, although, in other cases, decomposed during their absorption. In the experiments of Davy, he caused the roots of some plants of mint to be analysed, which had grown both in pure water and in sugar and water. 120 grains of the roots of the mint which had grown in common water yielded 3½ grains of deep olive extract, of a sweetish and astringent taste; 120 grains of the roots which had grown in sugar and water afforded 5 grains of pale greenish, sweetish extract, not so astringent as the other. (*Lectures*, p. 270.) These experiments, therefore, are evidently in favour of the opinion that plants absorb many of the constituents of manures in an unaltered state, and the experiments of the late Mr. G. Sinclair with saline substances are still more decisive. See SALTS.

The roots are the chief organs for absorbing the food of plants; and of the roots it is nearly established that the extremities, or spongioles, are the only parts which have the power of absorption, and hence one reason why they increase in length as the soil at their extremities is exhausted of nourishment. It is from this cause that *liquid* manure is so valuable a fertiliser; for in the dissolution of the excrements of animals in water, as practised so advantageously in foreign countries, and long ably recommended by Mr. Knight, the late president of the Horticultural Society, for the adoption of the English farmers, the dung is merely rendered more easily soluble by the plant, and better diffused in the land. No new compound is formed by the mixture; the action of the dung, mixed with four or five times its weight of water, is apparently much less energetic; and yet this plan is decidedly advantageous, successfully produces the most luxuriant crops, is an old practice on the Continent, is gaining ground in England, and the more it is known the oftener it will be adopted. Yet hitherto in this country much too little general attention has been paid to liquid manures; by many farmers the drainage of the farm-yard and the house is generally disregarded, and allowed to escape in the best way it can, into the nearest ditch or river, being supposed to contain nothing that is the food of plants; and this, too, by the very same persons who are particularly careful in the preservation, as food for their hogs, of every portion of a miserable dish of cabbage-water. See Liquid Manure.

There are certain properties in which all fertilisers, to a certain extent, agree:—thus they all contain one or more vegetable constituents, and they have all a strong attraction for atmospheric moisture (the insensible vapour always contained in the atmosphere). This property is of very considerable advantage to vegetation. The comparative powers, in this respect, of various manures may be judged of from the results of my experiments, which will be found in the following table. In these the animal matters were employed without any admixture of straw. (*Essay on Salt*, p. 8—19.)

	Parts.
1000 parts of horse-dung, dried in a temperature of 100°, absorbed by exposure for three hours to air saturated with moisture of the temperature 62° - - - -	145
1000 parts of cow-dung, under the same circumstances, absorbed - -	130
1000 parts of pig-dung - -	120
1000 parts of sheep-dung - -	81
1000 parts of pigeons' dung - -	50
1000 parts of a rich alluvial soil, worth two guineas per acre - -	14

The following were dried at 212°.

1000 parts of fresh tanners' bark -	115
1000 parts of putrefied tanners' bark -	145
1000 parts of refuse marine salt, sold as manure - - - -	49½
1000 parts of soot - - -	36
1000 parts of burnt clay - -	29
1000 parts of coal ashes - -	14
1000 parts of lime - - -	11
1000 parts of sediment from salt pans	10
1000 parts of crushed rock-salt -	10
1000 parts of gypsum - -	9
1000 parts of chalk - - -	4

There is reason to conclude that some manures act as stimulants to plants, and excite them to a more vigorous growth: it is probable that the saline matters of farm-yard compost operate in this way, and that saltpetre and other saline fertilisers do the same. I have often had occasion to notice the increased luxuriance and productiveness of fruit trees, such as cherries and pears, by the application of common salt. (*Essay on Salt*, p. 4.) Priestley made similar observations. "It seems pretty plain," to give the words of Dr. Thomson, "that the vessels of plants are made to contract by various *stimuli*: the experiments of Coulomb and Saussure render this probable; and an observation of Dr. Smith Barton makes it next to certain. He found that plants growing in water vegetated with much greater vigour, provided a little camphor was thrown into the water. (*Chemistry*, vol. iv. p. 338.)

Of the organic manures, the
abound in azote, or nitrogen; and,
there are, as Dr. Liebig observes (
Chem. p. 70.), "numerous facts
that the formation in plants of su
containing nitrogen, such as glute
place in proportion to the quantity
element, which is conveyed to the
in the state of ammonia, derived f
putrefaction of animal matter. A
which is composed of 14·15 of nitr
1 of hydrogen, is capable of un
such a multitude of transformatio
in contact with other bodies, tha
respect it is not inferior to wate
possesses the same property in an
degree." "The employment of an
nure," he adds (p. 86.), "in the cu
of grain, and the vegetables whi
for fodder to cattle, is the most co
proof that the nitrogen of veget
derived from ammonia. The qu
gluten in wheat, rye, and barley
different: these kinds of grain a
when ripe, contain this compoun
trogen in very different proportions
found French wheat to contain
cent. of gluten: Vogel found that
varian contained 24 per cent.:
tained 19 per cent. from winter,
cent. from summer wheat; from
wheat 21, and from Barbary whe
cent. The meal of Alsace wheat,
to Boussingault, contains 17·8 per
gluten; that of wheat growing in
din des Plantes 26·7; and that
wheat 3·38 per cent. Such gre
ences must be owing to some c
this we find in the different me
cultivation. An increase of ani
nure gives rise not only to an in
the number of seeds, but also to
remarkable difference in the prop
the gluten which they contain."
adds (p. 175.), when speaking of t
of manures, "according to the
view, the action of solid anima
ments depends on the decaying
matters, which replace the humus
the presence of certain compound
trogen, which are supposed to be as
by plants, and employed in the p
of gluten and other azotised su
But this view requires further con
with respect to the solid excre
animals; for they contain so smal
portion of nitrogen, that they ca
sibly, by means of it, exercise any
upon vegetation."

The following table of manur
structed from the experiments
Payen and Boussingault, showing
ber of loads required in both the

y) and dried (or prepared) states to
00 loads of farm-yard dung, so far
uantity of the nitrogen they con-
concerned, will be interesting, I
o the farmer. (*Gard. Chron.*)

	Moist.	Dry.
w	22	100
n straw	83	361
traw	39	174
traw	166	650
- -	81	367
er joints	97	453
er joints, with the after thrashing	30	137
w	235	975
1841	95	390
w	142	541
traw	173	750
haff	47	207
m artichoke straw	108	453
- -	32	142
eet leaves	80	43
eaves	72	84
eaves	47	66
aves	22	102
ck	46	138
- -	42	123
- -	28	85
h from the sea	74	
st	8	39
lover roots	24	110
e	7	32
ke	8	35
e	74	322
ake	11	49
t pulp	35	154
- -	105	154
ulp	76	100
ater	—	573
- -	—	645
efuse	111	107
- -	24	—
l drainings	67	126
of acacia	137	513
- -	173	629
ood	250	886
- -	173	629
- -	74	256
-dung	125	84
ne	90	51
ow-dung	97	75
rse-dung	72	88
rine	15	15
orse-dung	54	64
dung	63	57
p-dung	36	65
-dung	18	49
dung	4	21
Flemish manure	210	—
- -	181	—
poudrette	10	44
hells	125	487
- -	78	—
scular flesh	3	13
ed	5	17
ssed and salted	2	10

	Moist.	Dry.
Blood, soluble	3	12
Do., liquid	13	—
Do.	14	—
Do., coagulated and pressed	8	11
Do., dry insoluble	2	11
Feathers	2	10
Cow's hair	2	12
Woollen rags	2	9
Horn raspings	2	12
Cockchafers	12	14
Bones, boiled	5	25
Do., moist	7	—
Do., fat	6	—
Glue refuse	75	213
Glue dross	10	34
Graves	3	15
Animal blacking of the maker	37	95
Animalised black	36	98
Noir de champs	32	65

It is a very common error to suppose that manures of a vegetable or animal nature impart any sensible warmth to a soil; the analogy sometimes attempted to be drawn between the action of a fermenting dung-heap and some fifteen or twenty loads of fermented dung, or half a ton of chopped woollen rags, spread thinly over an acre of ground, is too absurd to be admitted. Yet, although the dung cannot increase the warmth of the land, the temperature of the earth, and the free access of the gases of the atmosphere, have a very material influence upon the duration of the manure in the soil. Thus, in the heavy clay and deep alluvial soils it remains much longer than in the sandy, chalky, or gravelly. In the first its good effects may be traced for three or four years; in the last it is usually consumed in one, two, or at the utmost three years. To the last description of land, therefore, the judicious cultivator usually applies his compost in a half-putrefied state, in order that it may remain longer in the soil: this is now the practice of some of the most enlightened agriculturists.

Too little attention is paid, in general, to the *mixture* of manures by the farmer. This remark not only applies to those of the farm-yard,—little care being usually taken to spread evenly those of the horse, the cow, and the pig, although it is notorious to the best cultivators, what was stated by the late Mr. Blakie, in his *Essay on the Management of Farm-yard Manure*, that this chief of fertilisers is very considerably improved by an even mixture,—but the remark applies to almost all other manures. Thus, old heaps of weeds, pond-mud, scourings of ditches, and all the earths in which there is any organic matter, are best applied to the soil after being mingled with lime or common salt. Peat, sawdust, wood chips, and tanners' bark, nearly inert substances in themselves, become excellent manure when mixed with stable dung. Sprats, and all other fish, are successfully and economically added to three or four times their bulk of mould: and even bone dust is successfully applied with a third of its weight of the dung of the sheep, and may be then drilled as advantageously with the turnip-seed as the bones in their simple state. Then, again, mixing together some kinds of manures, produces, by their chemical action, a third or fourth, which is more valuable than either. Thus, when salt and lime are united together, in the proportion of one part of the former to two parts of the latter, a chemical action takes place: the mass swells, and the salt is gradually decomposed: and in the course of three months, if the heap is suffered to remain undisturbed, both the salt and the lime nearly disappear, and two new substances are formed by the combinations into which their constituents have entered, viz. soda and chloride of lime: both excellent manures. In other cases, the mere mixture of two well-known fertilisers, without any chemical action between the two, produces much greater effects than that of both when used separately. Thus, a compound of salt and soot possesses the most extraordinary fertilising effects. The late Mr. G Sinclair, in his *Prize Essay on Salt* describes it "as remarkable," when applied to carrots: a fact which I have often witnessed myself. (*My Essay on Salt for Agriculture*, p. 145.) The Rev. Edmund Cartwright was the first to notice the same result with potatoes (*Com. to Board of Agr.* vol. iv. p. 376.): and the same benefit is evident when the mixture is used as a top-dressing for wheat; in which observation my experience is confirmed by that of others. (*My Essay on Salt*, p. 41.) There are a few instances, however, in which substances used as manures are best employed in their simple state. Thus, sea-weed, which many of the farmers on the sea-coast throw on their dung-heaps, is much better employed by itself, turned into the earth in the freshest and greenest condition: and to all green manures, and to those which contain salts of ammonia, such as urine, or the liquor from gas works, the same remarks are applicable. See MIXTURE OF SOILS.

The proportion in which fertilisers are applied is generally unnecessarily large, even of organic manures; and although this bad practice has been regularly diminishing as agriculture has become better understood, yet much remains to be done, in preventing that wasteful expenditure of dung which is continually taking place.

It is more than probable, that t
the improved manure-drills, by
distribution of the fertiliser, and
it more closely into contact with
will effect much towards this ver
saving; for it must be evident t
careless, that in the manner in w
post is commonly spread over a f
fered to be dissipated by long e
heaps to the sun and wind, and
spread over spaces in which th
any plants to absorb, during it
ation, the disengaging gases, a
siderable portion of it is lost to t
crops. See MANURES APPLICA
DRILL.

It is almost needless to remar
importance of such investigation
both to the cultivator and to
owner, or of the caution necessar
ing conclusions from experiment
vegetation is concerned. "Life,"
"gives a peculiar character to
ductions; the power of attracti
pulsion, combination and decomp
subservient to it; a few elemen
diversity of their arrangements,
to form the most different subst
similar substances are produced
pounds which, when superficially
appear entirely different." And,
remarks in another place, when
the subject of this article—"Th
of the proper application of man
an illustration of an important
economy of nature, and of the b
in which it is arranged. The fe
and putrefaction of organised
in the free atmosphere, are no
cesses; beneath the surface of t
they are salutary operations. I
the food of plants is prepared wh
be used, and that which would
senses and injure the health, if e
converted by gradual processes i
of beauty and of usefulness." (
pp. 54—309.) All researches
carry with them their own rewar
only does a successful experime
but even an unsuccessful one i
attended with advantages: it at le
as a beacon to other cultivators, a
to afford to the farmer that ple
increased power, which ever ac
the acquisition of knowledge. (J
the Fertilisers, p. 32.)

Several papers on manures will
as follows:—*Com. to Board of A*
p. 116.; and by the Rev. E. Cartwri
cipally on common salt). *Ibid.* p. 3
Green Vitriol," by Dr. Pearson. *Ib*
"On Manures," by Lord Meadowb
p. 384.; "On Soap-makers' wast

vol. vi. p. 317.; "On Bone Manure,"
Mr. Watson, *Quar. Journ. Agr.* vol. i.
0.; "On Manures in general," *Ibid.*
3—119.; "On Saltpetre," *Ibid.* p. 302
8.; "On Bones," *Ibid.* vol. ii. p. 106.;
Coventry on the Manure required
a Course of Crops," *Ibid.* p. 331.;
Bone Manure," *Ibid.* vol. iii. p. 715
59.; "On Owen's Animalised Car-
Ibid. vol. v. p. 619.; "On the usual
of preparing Manure on Farms,"
vol. vi. p. 104.; "On applying it,"
r. Baker, *Ibid.* vol. vii. p. 584.; "On
anagement and Application, so as to
the Production of Weeds," by Mr.
rk, *Ibid.* vol. viii. p. 483.; and by
earson, *Ibid.* vol. ix. p. 299.; by Mr.
, "On Green Manure," *Ibid.* p. 506.;
the Philosophy of Manure," by Dr.
en, *Ibid.* p. 546.; "On Mineral Ma-
," by the same, *Ibid.* vol. x. p. 86.;
Poudrette," *Ibid.* p. 285.; "On Soot
Bone Dust as a Top-dressing for
," *Ibid.* p. 481.; "On ploughing in
wheat as a Manure," by Mr Bal-
l, *Trans. High. Soc.* vol. ii. p. 124.;
Liquid Manure," *Journ. Roy. Agr.*
vol. i. p. 147.; "On various Ma-
," by Mr. Sim, *Ibid.* p. 418.

re are also many valuable observations
theory of manures, dispersed through
rks of Sir H. Davy on Agricultural
istry, and of Liebig on Organic Che-
y. There is an excellent paper by
Sprengel, "On Animal Manures,"
. *Roy. Soc. Agr.* vol. i. p. 455., and
ture "On the scientific Principles by
the Application of Manures ought to
egulated," by Dr. Daubeny, *Ibid.*
p. 232. See GASES, EARTHS, SALTS,
ER, FARM-YARD MANURE, BONES,
K, LIME, LIQUID MANURE, &c.

eight of a Cubic Yard of various Manures.

	Cwts.	qrs.	lbs.
n mould - - -	19	3	25
dung - - -	9	3	18
s and sea weed - -	9	0	3
r - - - -	15	0	3
ost of dung, with weeds l lime, which had been once ned over in nine months -	14	0	5

. W. Johnson "*On Fertilisers*," p. 90.)

ANURES, *on rendering them more portable*
pplicable by the Drill. The application
nures in a more concentrated form than
in which they naturally present them-
for the cultivator's service, was an effort
ved for modern agriculturists; an im-
ement chiefly induced by the increase
pulation, which almost compelled the
r to force into cultivation the poor in-
soils of England and the Continent: lands which could only be enriched by fertilisers brought from other districts, and from places where men congregated together in large masses. This necessity was, some years since, first felt and acted upon by many of the large continental cities, such as Paris, Berlin, Frankfort, and some of the other chief German towns. The contents of the cesspools were, in consequence, collected; their fertilising matters were mixed with drying, disinfecting substances, and when thus reduced to powder, or into cakes, sold at a considerable profit. The enlightened constituted authorities of these places felt that they were, by so doing, conferring great and important benefits not only on their fellow-citizens, but upon the *distant* cultivator. They did not confine their attention to the farmers in their own direct vicinity; because they well knew that those, in common with the immediate agricultural neighbours of all large cities, have a ready access to an abundance of organic manures, since the cultivators so favourably situated carry their produce with facility into such populous places, and return with their carriages loaded with manure. And yet, when the German and French authorities thus husbanded, — thus rendered more portable, the manure of their large towns, they made no discovery: they merely practised what the Chinese had preceded them in from time immemorial, and what, in Flanders, is an old and long cherished custom. The only improvement which the citizens of Paris and Frankfort have made is, that they form with their night-soil an enriching powder; while those of China and of Belgium still make theirs into cakes, with a portion of either clay or marl; so that the powder of Paris can be either applied with the drill or dibble, but the Chinese and Flemings are obliged to dissolve theirs in water, before it can be used as a liquid manure with advantage. In England, however, notwithstanding the example of our neighbours, little or nothing has yet been done to render the commonest manures, such, for instance, as night-soil more portable. The nightmen and scavengers are still compelled to hurry away their collections only at stated hours and in the dead of the night; are fined for any neglect, and harassed in all possible ways, rather than that this, the most powerful of all the animal fertilisers, should be preserved for the use of the farmer in any way that might endanger the olfactory nerves of the citizens. But an endangerment upon sensitive noses is not essential; the night-soil might be preserved without any offence to the most sensitive. But this manure has been hitherto little known or employed in this country;

are other manures, now well known to, and extensively employed by, the cultivator, whose powerful action, when judiciously used in very small proportions, well illustrates the truth of what I have so often ventured to urge upon the farmer's attention, viz. that a much smaller quantity of manure, composed of any description of organic decomposing matters, is sufficient, when applied in a skilful manner, to produce more luxuriant effects than is commonly believed. The very great importance of applying fertilisers in immediate juxtaposition with the young plant, even in very small proportions, as by the drill, is only now beginning to be considered with even patient attention; and yet there are many circumstances, with which the farmer is well acquainted, which ought to convince the most inattentive that such is the fact. The small quantity of oil-cake drilled with the seed; the few bushels of bones successfully applied in the same way per acre; the woollen rags of the Berkshire farmers (half a ton per acre only); the 2 cwt. of gypsum applied to sainfoin and clover; the 1 cwt. of saltpetre, or of nitrate of soda, used on the same extent of land, all indicate the truth of the case, that it is not absolutely necessary to apply fertilisers of any kind in such great masses as are commonly deemed essential by the cultivator. I was told not long since by an excellent farmer of Middlesex, Mr. George Sherbourn, that he had succeeded in producing the finest crops of turnips by merely mixing about 30 bushels of coal-ashes per acre with 3 gallons of train-oil, and drilling these oiled ashes with the seed. It is a folly, therefore, to contend that the careless way in which

quantity of earthy manur
commonly supposes.

There are several ad
from placing the seed in
the manure, to which the
attends. For instance,
seed in the immediate nei
fertiliser, is by this mean
the very period of its gr
needs assistance to enabl
fibres, and to extend its
plant, so situated, is not
extension; it avoids the
crops which tenant poor
are obliged to penetrat
search of the requisite
ment. On the contrary,
plant is thrown into t
leaves, and the crop flou
for the leaves and roots
and healthy plant are ena
gases and aqueous vap
sphere, by which the pla
the most complete mann
chanical effect, too, of p
posing organic manure
with the roots of vegetab
free access to them of the
and vapour, would be
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system, even if we say no
certain advantages of th
the case of decomposing
sentation of the gases of
roots of the plant, at th
extrication, and the econ
effects of this mode of dis
nure. The farmer, in fa
plan is probably a good
explanation of the

tted by the most naked fallow, he would onger be content with such an *explana-* as this.

r. Hales ascertained that a cabbage emits into the atmosphere by insensible ur, about half its weight of vapour ; and that a sunflower, three feet in ht, transpired, in the same period, ly two pounds weight. Dr. Woodward d that a sprig of mint, weighing 27 s, in 77 days emitted 2543 grains of r; a sprig of spearmint, weighing 27 s, emitted, in the same time, 2558 s; a sprig of common nightshade, hing 49 grains, evolved 3708 grains; a lathyrus, of 98 grains, emitted 2501. l. *Trans.* 1699, p. 193.)

I were asked to produce any evidence e extreme difficulty with which agri- ral improvements, even of the most ubted value, are introduced, I should e instance the manure drill, the pro- of which has been slow — for it has d the fate of very many other scientific s — it has been zealously opposed by gnorant, neglected by the indolent, and led by the bigoted farmer, as an in- tion upon the good old system of the of the patriarchs of agriculture, when arth brought forth its fruits in abund- nd the very seeds were not sown by But even here this solitary argument e adherent to old customs fails; for the se (the most expert of farmers) and ultivators of Japan and of Arabia have d and dibbled in their seed from time emorial. The natives of the Carnatic e same; and after they have thus de- d their seed, the Hindoos use a kind bsoil-plough, which passes under, and ns, to the depth of about eight inches, oil under about three drills' breadth at ne. And so prejudiced are the natives se empires, too, in favour of the cus- of their ancestors — so rarely do they duce new modes of cultivation, that it been very reasonably concluded that drill system, so far from being entitled e appellation of "the new husbandry," t rather to be classed with those ches of the sciences which degenerated, ere lost in the dark ages.

r George Staunton, in his *Account of d Macartney's Embassy to China*, says, . ii. p. 375.) — "Near Sanchoo, wheat perceived growing for the first time in a. It was, though on a dry sandy soil, re no rain had fallen for the three pre- months, looking remarkably well. ery neatly sown in drills, or dib- cording to the method used of late parts of England. A gentleman of embassy calculated that the saving of the seed alone in China by this drill husbandry, which would be lost by that of broadcast, would be sufficient to maintain all the European subjects of Great Britain."

In a communication to the Board of Agriculture, dated at Junacondah, December 31. 1795, Captain Halcott says, — "The drill-plough, I find, is in general use here, and has been so time immemorial, in the culture of all grain (except horse grain), and also of tobacco, cotton, rice, and the castor-oil plant." (*Com. Board. of Ag.* vol. i. p. 355.)

The first drill introduced into Europe seems to have been the invention of a German, who made it known to the Spanish court in 1647. (*Harte's Essays on Husbandry.*) The Roman farmers endeavoured to attain the advantages of row-culture by ploughing in the seeds.

It is useless to search in the works of Jethro Tull for any recommendation of the drill as a means of applying manure; for all Tull's arguments and experiments are directed to proving that the application of manure of any kind is utterly needless. And yet he had the discernment, when thus suffering his enthusiasm to carry him much too far, to make the observation, that "almost the only use of all manure is the same as of tillage, viz. the pulveration it makes by fermentation, as tillage doth by attrition or contusion; and with these differences, that dung, which is the most common manure, is apt to increase weeds, as much as tillage (of which hoeing is chief) destroys them." (*New Husbandry*, p. 166. 1st edit. 1731.) The advantage, thus glanced at by Tull, of the manure keeping the ground light and porous, is much greater than the cultivator commonly suspects, and this benefit is mainly owing to the free access which is thus secured of the watery vapour and gases of the atmosphere to the roots of the plants. Now, for the vapour of the atmosphere, all well pulverised fertile earth has a strong attraction — the richer and the better divided the soil, the more copiously does it absorb vapour; but the power of the richest cultivated soils in this respect is very much inferior to that of even the most ordinary manure. In my own experiments, I have never found, in a given space, say three hours, that 1000 parts of the richest soil, previously dried, absorbed more than from 14 to 20 parts of moisture; but in the same time, under similar circumstances, 1000 parts of horse-dung absorbed 145 parts; cow-dung, 130; pig-dung, 120; sheep-dung, 81; pigeons' dung, 50. (*My Work "On Fertilisers,"* p. 41.) It is evident, therefore, that for the mere purpose of withstanding long continued dry weather, edition of his *Horse-Hoe Husbandry*, published in 1731, and even whence he derived the hint for his drill; he says, — "When I was young, my diversion was music; I had also the curiosity to acquaint myself thoroughly with the fabric of every part of my organ; but as little thinking that I should ever take from thence the first rudiments of a drill, as that I should ever have occasion for such a machine, or practise agriculture; for 'twas accident, not choice, that made me a farmer." But he was certainly not the originator of the idea of thus applying the seed; for, nearly a century before his time, John Worlidge ineffectually, in 1669, laboured hard to draw the English farmers' attention not only to the drill, but to *the manure-drill* also. And little can be now added to what, 175 years since, honest John Wolridge urged in its favour, when he said, after describing the seed-drill, — "By the use of this instrument, also, you may cover your grain or pulse with any rich compost you shall prepare for that purpose, either with pigeons' dung, dry or granulated, or any other saline or lixivial substance, made dispersable, which may drop after the corn, and prove an excellent improvement; for we find, experimentally, that pigeons' dung, sown by the hand on wheat or barley, mightily advantageth it in the common way of husbandry: much more, then, might we expect this way, where the dung, or such like substance, is all in the same furrow with the corn; whereas, in the other vulgar way, a great part thereof comes not near it. It may either be done by having another hopper on the same frame behind that for the corn, wherein the compost may be put and made to drop successively after the corn;

in some places too
thin."

It was between the y
that Jethro Tull labour
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introduce the drill sys
however, was reserved f
Leicester, in the early
century, of inducing i
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It then naturally foll
manures were found e
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oil-cake was one of the f
was used as a manure, a
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for turnips, opened ano
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received an impetus whi
never lose, for with its
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poor light lands in the
such as on the Wolds
and the sands of Nott
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manure-drill is that o
Louth, for which the E
Society awarded him, in
medal. It is an attemp
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proceed with great car
single experiments with
has been yet experience
certainly of a nature to

ce, ashes to be applied in a wet state,
ecially in a dry turnip seed season, for
the seeds vegetate much sooner. An-
er equally excellent drop, and common
, is that made by Mr. Hornsby of
ntham." See Drill.

dmitting the truth of these experiments,
one half the quantity of organic ma-
es usually spread on the land is suf-
nt, when applied by the drill, in imme-
e contact with the seed, what a field is
opened for the manuring of much
er breadths of land than has hitherto
deemed possible. The complaints of
deficiency of manures, which are now
revalent with farmers, need then no
er be heard. Their crops will be pro-
y nourished, and the manure applied
them will be not only bestowed in the
scientific manner, but it will lead to
r improvements — it will enable the
er to mix his manures, according to
nature of his soil and his crop, with
h more facility than at present: he
then study, not merely the economy to
egarded in its distribution, but also its
ity, or chemical composition, and to
t soils the manure is best adapted.

here is one class of fertilisers, however,
e application by the drill requires
caution; I allude to the saline ma-
for they are often much too power-
their operation to be safely applicable
eir pure state or in large proportions.
on salt has, in this way, carried great
truction by being drilled in with the
, and I have witnessed equally disas-
effects from applying the lime of the
works (sulphuret of lime) in the same
. Yet when the seed-wheat is wetted
a nearly saturated solution of salt,
then rolled in lime, or the salt and
are not used until they have been
ed together for three months, and then
on the land broadcast, — or when the
lime is previously mixed with four or
times its bulk of sifted mould or ashes,
I have seen the most excellent effects
duced by its being drilled with the
ip-seed: the same remarks apply to the
ride of lime of the calico-bleachers.
er salts, whose action is less energetic,
which are applied in very small propor-
s, are perhaps best applied by the drill;
instance, saltpetre, which is rarely ap-
d in larger proportion than 1¼cwt. per
, may very likely be still further reduced
quantity, especially if mixed with other
stances, such as three or four times its
k of mould. Mr. Beadel of Witham, in
ex, a very excellent farmer, has found,
where saltpetre was applied to his
ips broadcast as a top-dressing, it did not succeed, but it did so very decidedly when it was drilled with the seed.

In those situations where nightsoil, or sprats, or bones cannot be obtained at a sufficiently reasonable rate, very great effects may be produced by the careful collection of the excrements of domestic animals, and mixing them with merely a sufficient quantity of dry ashes, mould, sawdust, or, what is best of all, recently prepared finely powdered charcoal, to render them sufficiently friable to pass the drill: this is very easily accomplished, by making the preparation under cover some months before it is used, and, if necessary, by causing it to be spread in the sun. By the adoption of these means, a very recent mixture will be found available by the farmer; the excrements of the horse, cow, and especially the sheep (still more so if fed with oil-cake), will be found excellent for this purpose. And in very small proportions the Peruvian farmers, according to Humboldt, employ the guano, or excrements of seafowl, (which abound in phosphate of lime, or earthy salt of bones), which is brought in sailing vessels, from the rocky islands of the Pacific, expressly for the use of the cultivators of that republic. See Guano.

And that bones might be very profitably mixed with other fertilisers, so as to materially reduce the expense of the manure, is indicated by more than one successful experiment. To give another instance, which has recently been communicated to me, in the trials made by Daniel Dixon, Esq. of West Clandon, in Surrey. "On a poor chalk soil," observed an excellent and scientific friend of mine, "he has used a compost for a manure-drill for turnips with great advantage. He puts 8 bushels of ground bones with 24 bushels of any ashes he can get together in a dry place, and from to time (as often as possible) he empties the liquid sewerage of the house upon it. In two or three months it is fit for use, working well out of the drill. The above is the quantity for an acre. The effect of drilling this mixture with the seed was very remarkable, and as bone manure was drilled by the side of it, the contrast was at once visible; the difference was more than double. In fact, the bones by themselves seemed comparatively useless. The soil on which the mixture has been applied is poor, chalky, and flinty, abutting upon the sheep-walks and Guildford race-course. Whenever the mixture is too wet for the drill, it is spread to dry for a day or two." (*Letters of Henry Dixon, Esq. to the Author, November* 1839, *and March* 1840.)

"A friend of ours, a farmer in Northumberland," says the excellent editor of the dung, collected for the express purpose, at an expense of 2½d. per bushel paid to the collectors: this he prepared in the winter, by laying the bone-dust in alternate layers with sheep-dung, and suffering them to remain fermenting some months until the turnip sowing. By this plan, by the fermentation of the mass, the two manures are thoroughly incorporated; and he considers that 35 bushels of the mixture are fully equal in effect to 25 bushels of the bones. So that, allowing 3s. 6d. per acre for the expense of collecting the sheep-dung, there will be a clear saving of 12s. 6d. per acre in bones, valuing these at 2s. per bushel. The mixed bones and sheep-dung are invariably drilled in with the turnip-seed.

The application of rape-cake powder by the drill has never been so common as it ought to be, for it is not only a very powerful, but a very easily manageable fertiliser; it has moreover the advantage of being moderate in price, and easily attainable at all seasons of the year. There is no doubt of the advantage of feeding stock with this food, the manure they produce when thus fed being exceedingly rich. Many farmers, however, owing to the want of cattle, or an unwillingness to lay out the requisite money, in a long course of stall-feeding, are deterred from using oil-cake to the extent they would otherwise do. The use of the oil-cake powder conveys to the land all the enriching ingredients of this fertiliser at once, and to the exact extent the farmer requires; there is neither the waste, the risk, or the trouble of stall-feeding to be dreaded. The oil remaining in the cake certainly constitutes its most enriching portion; the oil abounding in sprats is an instance familiar to the farmer, and when this

successfully practised
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of night-soil, and the
been adopted to reduce
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notice that such a pro
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to whale blubber, and
farmers find, that whe
with earth, finely divid
these very oily fish are
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when thus kept mixed
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Even earthy manur
tageously reduced in
to the air, or by the ap
heat. Chalk, I have fo
loses from 15 to 25 per
by being thus deprived
a cubic foot of calc
thoroughly wet, contain
Schubler, more than 31
same measure of sandy
clay, 41 lbs.; stiff clay or
pure grey clay, 48 lbs.; g
and fine slaty marl, 35 l
Ag. Soc. vol. i. p. 184.)
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still further reduced b

sphere. Even the difference of
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hem after continued dry weather
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tributed. Its disagreeable odour,
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and the erroneous modes of apply-
ither in excessive quantities, or
ith other composts in such propor-
t its powers could not be dis-
d in the mass; its semifluid nature
for its removal carriages of a
construction; the extent and com-
of the sewerage of our large cities,
ral other minor obstacles, have
its use not nearly so extensive as,
national point of view, is desirable.
HT SOIL.) And yet the necessity
asing the supplies of manures, in
promote the fertility of the soil,
elf-evident to every one who re-
not only the increasing popu-
the country, but the immense
on its organic fertilising matters
e hourly pouring their contents
sea. Thus, as I have elsewhere
, by carefully-conducted experi-
has been clearly ascertained, that
ipal London drains convey *daily*
Thames 115,000 tons of mixed
consisting, on an average compo-
one part solid or mechanically
d matter, and 25 parts absolutely
t if we allow only 1 part in 30
mmense mass to be composed of
stances, then we have the large
of more than 3800 tons of solid
daily wasted in the river from Lon-
. What might not the farmers of
effect if this mass of fertilising
as preserved, at a reasonable rate,
use? 15 tons of this solid ma-
ay, 10 tons, would render fertile
of the poorest cultivated, or even
or heath land. But allow, for the
argument, that 20 tons were re-
ven then 3800 would give a daily
of manure sufficient for 180 acres
orest land in England; and if we
days on which this manure was
that would afford an annual supply for *fifty-four thousand of such acres*, which land would not again need manuring for four years;—and in this calculation nothing is allowed for the *fluid* portion of the drainage. It is the reckless waste of the drainage of our large cities and towns, which has alone prevented the cultivated lands of England from becoming increasingly fertile; because yearly more abounding in organic decomposing matters. For such is the enormous yearly import of foreign products into this country, that it must tend to rapidly increase the natural fertility of the soil of England, since all their ingredients ought, and do in some measure, eventually find their way as a manure upon the land; thus, in 1834, were imported into the United Kingdom, according to a parliamentary report, now before me, of

	Cwts.	qrs.	lbs.
Barilla - - -	215,750	1	22
Bark for tanners -	854,869	3	16
Butter - - -	136,674	0	23
Cheese - - -	134,085	3	5
Coffee, about - -	250,000	0	0
Currants - -	141,540	3	1
Figs - - -	15,416	3	14
Raisins - - -	158,290	2	1
Molasses - -	717,666	2	4
Rice - - -	218,867	1	20
Seeds, clover - -	53,263	1	30
Sugar - - -	4,732,749	3	22
Tea, about - -	250,000	0	0
Wool and cotton, about	3,000,000	0	0

So that, including corn, oil-cake, timber, &c., &c., at least 1,000,000 tons of vegetable matters alone are yearly imported from foreign countries into the United Kingdom, and added to the riches of the soil: thus our merchants are annually fertilising, while the Commissioners of Sewers are in an equal ratio impoverishing, the island. But against this great fertilising import, we have at present to set off the large and ever-flowing drainage of the cities and towns of the United Kingdom; not only London, but Liverpool, Manchester, and a hundred others, are incessantly pouring the riches of the land into the sea, and to such an extent is this done at Bristol, that the Court of King's Bench was obliged, not long since, to interfere to protect the inhabitants from the nuisance created by the non-removal of the city drainage from the bed of the Avon. (*Rex* v. *Bristol Dock Comp.*, 6 *B. & C.* 181.; 9 *D. & R.* 309.)

On the Continent, the use of various manure powders made from night-soil is equally extensive and successful. An elaborate report upon these was made a short time since to the Directors of the Thames Improvement Company by Dr. Granville, who and convenient transport, to dry the stercoral substances to powder, which, bearing the name of *poudrette*, is sent into the country from the neighbourhood of the capital, and is sold at a high price. The success of the establishment for the manufacture of *poudrette*, first formed near Paris about forty years since, by a person named Bridet, has been such, that, in almost every part of the kingdom, similar manufactories have been erected, and nothing now is wasted. The Parisians have at present several such large works. M. Bridet obtained a patent for his process of manufacturing the *poudre vegetatif*. He proved, by experiments, that the *poudrette* is many times more valuable than the best sort of ordinary manure. It was found, after repeated trials, that 240 lbs. of the *poudrette* would manure an acre of ground with greater effect than eight cart-loads of the best stable manure. (*Brevet*, tome i. p. 371.)

Under the name of "Alkalino-vegetative Powder," another preparation of night-soil was ushered into notice in France, and generally adopted, under the auspices of an agricultural lady, Madame Vivert Duboul, to whom, in consequence, the Royal Society of Agriculture, in 1814, awarded their gold medal. This lady obtained a patent of fifteen years for her process, which consisted in promoting fermentation in the most liquid portion of the excrementitious substances, and treating them with slaked lime afterwards, so as to form a powder, which has been found to be very superior to the first-named *poudrette* upon cold, light, or moist soils. Its action is very powerful, and it extends its influence over the soil for several years, without requiring

chemists and agricultur
included the names of
&c. The report made by
men is full of interest t
Urine is the active ingre
Paris (gypsum), so commo
hood of that capital, the
This mixture is reported
mittee to be so powerful
the dullest soil, that the
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the government. A po
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by the "London Manure
New Bridge Street. It
salts of ammonia, phosp
the animal matters of
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which the "urate" is d
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per acre is about five cw
most entirely composed
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of ammonia, it is evident
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for the grass and grain
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tensively employed by th

In some recent reports
manure upon turnips, I
Anderson, of Oakley, Bed
it as proving "itself quit
perior to the farm-yard m

e turnips on the urate were fit to hoe en days before the manured part; from ir first appearance, a stranger could point the spot where it commenced and ended; difference is still evident and in its ur. Both the manured and urate pieces re sown the same day, about the 14th of ne. I certainly consider it a good arti- al dressing, and its fertilising properties at."

In 1820, another patent was granted to M. Loques, by the French government, a manure called "stercorat," consisting a mixture of both the solid and liquid ts of the excrementitious matters, and e earthy substance. It is said to be ticularly efficacious, and sells at a very h price.

M. Parmentier, a celebrated French agri- tural writer, some years since expressed surprise at the tardiness of his country- n in adopting the practice of their Flemish ghbours, and in continuing so long to money for getting rid of that which r nations first, and the French thems afterwards, found to be so productive wealth. He quotes the case of an indi- al who in former times had amassed wealth by the sale of a manuring der, which he manufactured from the soil he was annually paid by govern- to remove out of the extensive mili- barracks of Lisle.

There existed at one time much public judice against this mode of rendering land more productive, on the wild sup- tion that the obnoxious principles of a manure would form part of the ts raised by means of it; but the most urate experiments have proved, that not least vestige of such animal substances to be detected either in the ascending or in the more solid parts of the plants ultivated. A great extent of the rich ins of Normandy are fertilised every r by the manure powder manufactured present out of the cess-pools of Paris.

The poudrette sells for eight francs the ier on the premises, and the whole is ched away at that price as soon as ready, principally distributed within twelve gues of Paris. Now, as there are 7½ tiers in a ton, it is evident that the value the latter is 60 francs, or 2*l.* 10*s.*; and the comparative agricultural value of compost is not so great as that of the sh manure." Messrs. Payen and y, the patentees of the "engrais zé," or disinfected night-soil, sell poudrette" at 2½ francs per ton he market price of that of Mont- and they have rarely any left on nises.

The engrais animalizé, or disinfected night-soil, has recently been introduced into this country by M. Poittevin, and a manufactory of it established in Whitechapel, near London. It is there produced by mixing the night-soil of the metropolis with a considerable quantity of recently prepared charcoal powder, and drying the mass in a very gentle heat. As thus prepared, its appearance somewhat resembles that of the friable rich vegetable mould of an old hot-bed; it is of a very dark colour, and totally devoid of smell. Its introduction into this country has been too recent for any very extensive trials to have been yet made with it; my own are only now carrying on; these, however, promise well. In some comparative experiments made last year with bones, they were found to answer very completely. These results have been confirmed by several communications with which I have been recently favoured, stating that, to use the words of Col. Challoner, "this manure, in its effects upon the turnip crop, was fully equal to bones." And Mr. Beach, of Oakley Hall, near Basingstoke, who had applied it by the drill with the seed, at the rate of fourteen bushels per acre to a portion of a field of turnips; and, on another portion, drilled three sacks per acre of crushed bones, mixed with turf ashes; and, on a third portion, with ordinary stable manure, says, in February last, "It is impossible to distinguish any difference between the three, some persons fancying one part, and some another, to be superior. In their early growth, the night-soil had a decided advantage. The seed came up as thick as rows of mustard-seed in a hot-bed, and the turnips were hoed out within a month." Mr. Beach adds a suggestion, which I think highly worthy of the attention of the turnip cultivators, — "I am so well satisfied with it for turnips, that I shall use a large quantity of the night-soil powder this season. I shall also mix ten or twelve bushels with a quarter of crushed bones, which I am inclined to think will answer well." I have recently been shown a letter from Mr. Robert M'Crea, of Grange House, near Londonderry, in which he speaks of this manure in the highest terms, as a dressing for turnips; those thus treated having carried off last year the first prize offered by the Londonderry Farming Society.

A preparation of night-soil has been lately imported into Scotland and the north of England from Copenhagen, under the name of Owen's Animalised Carbon, which has answered, when applied by the manure drill, very well for turnips. Mr. James Waldie, in his recent prize communication to

the Ayrshire Agricultural Society, describes it as an useful auxiliary manure, and as likely, in a great measure, to supersede the use of bones, now that the latter have risen to the enormous rate of at least 3*s.* per bushel. He says, "One ton of carbon, the cost of which is 3*l.*, is sufficient for an acre of land; and from experiments which I have made this year, conjoined with what I have observed of two successive crops on a farm in this neighbourhood, where comparative trials were made with different manures, on a very extensive scale, it may be inferred, that one ton of carbon is equal to 25 bushels of crushed bones." These experiments are supported by the observations of Mr. M. Milburn, of Thorpefield, near Thirsk, when describing, in his report to the Yorkshire Agricultural Society, the various fertilisers advantageously employed on light lands in the cultivation of turnips; for, he observes, "Animalised carbon has been used advantageously; 16 bushels per acre, when drilled, is the quantity generally employed. Pigeons' dung is most valuable; rape-dust has been used successfully; malt-dust is useful as a top-dressing." (*Brit. Farm. Mag.* vol. iv. *N. S.* p. 85.) There is a chemical "seed manure" prepared by Messrs. Hodgson and Simpson, near Wakefield, which is applied, mixed with water, as a liquid manure, or steep to the seed-corn, and seems, from a communication, with which they favoured me in March, 1840, to be a kind of secret preparation, composed principally of saccharine matter, ammonia, common salt, and nitre. This seed manure is applied according to the following directions, — instructions which might be advantageously followed in the use of other fertilisers: "Dissolve 28 lbs. of this manure in a pail, by adding water in small quantities, stirring it at the same time, until the mixture is of the consistence of thick cream; it is then to be poured over the quantity of seed intended to be sown on an acre of land, and the whole repeatedly turned over, so that it appears one uniform mixture; it is then to be spread out thin on the floor to dry for ten or twelve hours, and mixed with a sufficient quantity of soot, or any kind of dry ashes, to render it sufficiently friable to be sown by the hand or by the drill." The quantity thus directed to be applied per acre, is certainly very small, and yet, according to the testimonials which I have seen, the effect it produces is considerable. Mr. Milburn, of Thorpefield, in one of these, tells us: "A new principle in the application of manure has been developed in the use of the chemical seed manure, which, by applying a chemical composition to the seed itself, not only secur
diate effect in the precise situ
quired, but highly economises the
necessary. I have great pleasure
ing a very successful experiment
a barley crop. The field had
corn crop the preceding year —
field was dressed with a coatin
mented farm-yard dung — the
part with the chemical seed man
rate of 28 lbs. per acre. The
that the barley sown with the
manure exhibited a decided
over the rest of the field, in colou
ness, and general appearance,
tained that superiority to the ti
ting, so much so, that it lodged c
more than the rest of the field."

Various modes besides those
have alluded, have, at different t
suggested, by which night-soil
rendered more concentrated
portable. Simply drying it ha
tempted with some success; but
this means about 70 per cent.
driven off, yet, at the same ti
siderable portion of ammoniacal
gaseous matters are vaporised:
manure is impoverished, while
of the operation is intolerabl
again, it has been mixed with li
way recommended by Davy; b
by my own experiments, and th
neighbours, I am fully persuaded
not the most economical way of u
soil. The lime certainly dissolve
tially decomposes it, but the fertil
of a given weight of night-soil
lime is clearly not so great as whe
weight of it is used either by itsel
with some merely drying odour
substance. There are several p
of this kind made in large qu
London, such as those of Mr. C
of Mr. Lance, the author of t
Farmer, all of which, I believe, ar
manures; but I have not had
tunity of examining any of thei
tories except those of the Londo
Company, and of the Messrs. Poit
preparation of these gentlemen i
as that so successfully carried int
M. Payen at Paris: it combines
cessfully too, the great object
off the water of urine and nigh
gentle heat, after all its gaseo
have been absorbed, by mixing
portion of newly prepared carb
finest possible state of division,
no known substance has such gr
of absorption of all gaseous m
those which abound in and imp
agreeable odour to night-soil. T

g powers of charcoal have been long
wn: the medical man applies it in pu-
ent cases, the housewife rubs it pow-
d over her tainted meat, and the sailor
the inside of his water-casks for a si-
r purpose. The presence of the carbon
the manure thus prepared is valuable in
ways; it gradually combines with the
gen of the atmosphere, forming in the
te of carbonic acid gas the food of plants;
l, at the same time, all the gaseous mat-
of putrefaction with which it is satu-
ed are thus preserved, stored up, as it
re, for the service of the roots of the
tivator's crops; nothing is lost, the emis-
n of the gases from the slowly dissolving
arcoal being so gradual, as to be almost,
ot entirely, imperceptible to the senses.
Such, then, are the principal facts already
rtained with regard to the fertilising
of night-soil, and other decomposing
ures, in their ordinary form, and when
uced by various processes to such a
te of dryness, so as to be easily applied
the state of powder to the soil by the
ll. In thus investigating the advantages
rendering manures more concentrated, I
been induced chiefly to confine my
ation to one only of the organic ma-
s, night-soil, because, from its nature,
ess, and powerful effect, it affords,
aps, greater facilities for accomplishing
important object, than any other ex-
ent, and is, besides, more commonly
ted than any other fertiliser. I hardly
it necessary to make any remarks
the importance of all researches which
to the better understanding of the
ers and best mode of employing ma-
es, for with such investigations is in-
rably connected the gradual and steady
ease of the productiveness of our coun-
. Such improvements, too, are full of
erest, not only to the cultivator, but to
ry one to whom the vegetable kingdom
an object of importance. And, as I have
where had occasion to remark, it is
rdly possible, in reflecting upon the es-
ntial use of organic fertilisers in the
oduction of our food, to avoid being im-
ssed with the wisdom and beneficence of
e Creator, in thus making decomposing
xious organic substances the nutriment
vegetation, rendering the very animal
stances which the grass once formed, its
d when dead. This interchange of their
ts, so essential to each, is equally in-
t and remarkable, the death and de-
ition of the one ever imparting
od and life to the other. Thus the
es, which are at one moment con-
the noxious products of putrefac-
in the next existing in the exquisite aroma of the flower. These facts are, indeed, too apparent to escape our observation, and the marvellous rapidity and advantage to us of these magic vegetable combinations cannot but excite both our curiosity and our gratitude. (*Quar. Journ. of Agr.* vol. x. p. 142.)

MANURES, *History of.* See the heads ASHES; FARM YARD MANURE; BONES; CHALK; LIME, &c. The application of manures became one of the sustaining arts of life as soon as man was ordained to earn his bread by the sweat of his brow. From that time to the present, the art of manuring the soil has been steadily improving; and there is no doubt but that it will go on advancing, as long as mankind continue to increase.

The first manure used by man, as soon as he began to dwell in fixed habitations and till the land around him, would, of course, be that of his domesticated animals; but he is naturally averse to labour, and consequently this operation would be postponed until the rich alluvial soils, which would be certainly the first selected, were exhausted by over-cropping, and by the increase of population the poorer descriptions forced into cultivation; the occupier of the land would naturally avoid, if possible, the trouble of spreading the dung of his farm-yards over his fields. Instances of this kind have not been wanting in recent periods in the newly settled rich prairies of America, in which many cases have occurred where, in consequence of the enormous accumulation of dung around the farmer's sheds, he has been induced to remove his buildings to a new spot, rather than undertake the greater labour of removing the masses of fermenting manure, which so deeply incumbered his old farm-yard. The first rude mode in which this was conveyed to the land, was naturally by hand baskets, or by sledges or barrows; the use of beasts of burden was necessarily a later agricultural improvement; and, at first, there is no doubt but that manure was carried on their backs to the fields, as is even now practised in the mountainous districts of the Continent, and in some parts of the north of England, and in Devonshire. Dung-carts were a much later improvement, and the preparation of compost heaps, and exciting and regulating their fermentation by the use of the fork, has been a much more modern discovery than is usually believed.

Irrigation, which is a mode of applying the weakest of liquid manure, by the use of the waters of rivers, is of a very ancient date. It has been used from a very early period in Italy and the East; in fact, in many warm sandy countries, as in China, a copious supply of water is an essential requisite for the successful cultivation of the earth. Water meadows were first constructed in England, on a tolerably regular system, about the termination of the seventeenth century; some of the most excellent of those in Wiltshire, such as those in the Wyley Bourne, were made between the years 1700 and 1705 (*Davis's Agr. of Wiltshire*, p. 116.); and about half a century afterwards, the celebrated Craigintinny meadows were formed near Edinburgh, by which the town drainage is rendered available in the production of the most luxuriant crops of grass. These meadows were considerably enlarged towards the end of the eighteenth century, and again in 1821. (*Stephen's Practical Irrigator*, p. 75.) These might be very advantageously imitated in the neighbourhood of other large towns.

Amongst the Egyptians and Israelites, whose climates were hot, a plentiful supply of moisture was necessary for a healthful vegetation; and the simile of desolation, employed by Isaiah (chap. i. 30.), is, "a garden that hath no water." In Egypt they irrigated their lands, and the water thus supplied was by an hydraulic machine, worked by men, in the same manner as the modern tread-wheel. To this practice Moses alludes, when he reminds the Israelites of their sowing their seed in Egypt, and watering it with their feet, a practice still pursued in Arabia. (*Deut.* xi. 10.; *Niebuhr's Voyage en Arabie*, i. p. 121.)

Of their knowledge of manures we know little. Wood was so scarce that they consumed the dung of their animals for fuel. (*Parkhurst*, p. 764.) Perhaps it was this deficiency of carbonaceous matters for their lands, that makes an attention to fallowing so strictly enjoined. (*Levit.* xix. 23.; xxv. 3.; *Hosea*, x. 12.)

Agriculture was too important and beneficial an art not to demand, and the Greeks and Romans were nations too polished and discerning not to afford to it, a very plentiful series of presiding deities. They attributed to Ceres, as the Egyptians did to Isis, the invention of the art of tilling the soil. Superstition is a prolific weakness; and consequently, by degrees, every operation of agriculture, and every period of the growth of crops, obtained its presiding tutelary deity. The goddess *Terra* was the guardian of the soil; *Sterculius* presided over manures, &c.

Xenophon recommends green crops to be ploughed in, and leguminous plants to be raised for the purpose; "for such," he says, "enrich the soil as much as dung." He also recommends earth that has been long under water to be put upon land to enrich it. Theophrastus, who flourished in the fourth
century B. C., is still more partic
the subject of manures. He state
viction, that a proper mixture of
clay with sand, and the contra
produce crops as luxuriant as co
fected by the agency of manures.
scribes the properties that rend
beneficial to vegetation, and d
composts. (*Hist. Plant.* ii. c. 8.)
recommends the stubble at reapi
be left long, if the straw is abund
this, if burned, will enrich the
much, or it may be cut and m
dung."

From the outline which we can
ancient authorities of the agricul
Romans, we shall be surprised to
little they differed from the metho
employ. We are superior to th
implements, and consequently in
of performing the operations of ti
of the fundamental practices of th
were as fully aware as ourselves.
dern writer could lay down mo
and comprehensive axioms than
in the following words, and whoe
obeys them will never be ranked
ignorant of the art. "What is
lage?" says this oldest of the Rom
of agriculture. "To plough. W
second? To plough. The third
nure." (*Cato*, 61.) In his four
he thus expresses his convicti
utility of manure: "Study to ha
dunghill, keep your compost caref
you carry it out, scatter it and pu
carry it out in the autumn.
round the roots of your olives in
And in his twenty-ninth chapter
your manure, carry half of it t
when you sow your provender, a
are olive-trees, put some dung to th
In his thirty-seventh chapter he
use of pigeons' dung for gardens,
and corn lands, as well as *amerca*
of oil; and recommends the farm
serve carefully the dung of all d
of animals. This was advice
years before the Christian era;
after the lapse of 2000 years, the
must be still the same. We learn
lumella (i. 6.), and Pliny (xvii.
19.), that they collected their ma
stored it in covered pits, so as to
escape of the drainage; and so
verised pigeons' dung, and the l
their crops, and mixed it with th
soil, by means of the sarcle or hoe.
i. 16.; *Cato*, 36.) They were aw
benefit of mixing together earths o
qualities, and sowing lupines, a
ing them in while green. (*Varr*

Virgil is very particular in

With common manure he men-
es (*Georg.* lib. i. 80.), pumice-
l shells. (Lib. ii. v. 346. 50., and
8.) He advises the seeds of corn
ed with saltpetre and the dregs of
to make the grain swell. (Lib. i.
rigation was employed in his days.
96. 9.) The Italian farmers also
over-luxuriant crops (lib. i. 3.),
the stubble. (Lib. i. v. 84. 8.)
(lib. i. c. 38.) mentions many
nimal manure, and is particularly
his enumeration of the dung of
l includes even that of blackbirds
hes kept in aviaries.

lla (lib. ii. c. 5.) advises the culti-
to carry out to the field more
the labourers can cover with the
ame day, as the exposure to the
it considerable injury; and he
es (lib. ii. c. 15.) as well-known
night-soil, the excrements of
sheep, urine (especially for apple-
vines), dregs of oil, the excre-
cattle, the ass, the goat, of pigs;
pped stalks of the lupine (or hop),
trees, brambles, &c., and mud
ers or ditches. Pliny also men-
lime was employed as a fertiliser
nd marl in the same country and
but we can only surmise thence,
were also probably employed by
ns. (*Pliny*, xvii. 5.)

manure is not a mode of fertilising
ltogether of modern origin. For
ed mixture of water and night-
om a very early period been em-
the Chinese farmers. Those of
ainly practised irrigation in the
Virgil (*Georgic.* lib. i. v. 106. 9.);
adds, they employed a mixture of
nes and water to fertilise their
s. (Lib. xxxvii.) Columella praises
ly the use of stale putrid urine
and apple-trees (lib. ii. c. xv.);
ing also the lees of oil for the
pose. More modern agricultural
ave united in praising various
eparations; thus Evelyn (whose
s most of these authors recom-
his *Treatise on Earth* (p. 123—
es several recipes, some of which
ed as the basis for recent modes
ing liquid manure; such as the
attle, urine, *salt*, and *lime*, nitre.

nployment of *crushed bones* as a
but a very modern improvement;
one of the fertilisers even men-
the early agricultural writers;
s neglect of bones several causes
ed. The necessary machinery for
them was, in the early ages of
al efforts, totally unknown; and bones when unbroken dissolve in the soil much too slowly to be of any apparent value as a fertiliser. The use of bones is an improvement, for which agriculture is entirely indebted to the enterprise of the English farmers. The refuse matters produced by the ivory and bone turners and cutlers of Sheffield, which speedily accumulated in very considerable heaps around their manufactories, first drew the Yorkshire farmers' attention to bone manure. The cultivators of the poor soils in the neighbourhood of that town, towards the conclusion of the last century, began to carry away these refuse matters with some readiness, and the turners were at first too glad to be relieved from this bone-rubbish, to think of charging them anything for the valuable manure they had been the first to employ. As, however, the Yorkshire farmers soon began to scramble for these bone-turnings, the manufacturers of Sheffield speedily made a small charge for them, which has since gradually increased in amount. It required, however, some time to bring about this great and successful improvement. Mr. T. Ellin, late master cutler of Sheffield, well remembers, some fifty years since, the bone refuse carted into Sheffield Moor, and buried in pits as worthless rubbish; these old deposits, often found in digging foundations, are now carried off with much alacrity to the bone-crushing mills. The farmers at first gave sixpence a bushel for these parings and turnings; of these about 600 tons are annually sold in Sheffield. By the sole use of this fertiliser, great breadths of very poor land have been successfully brought into cultivation, and maintained in a state of the greatest fertility in the north and east of England and Scotland. Their effects upon the wolds of Lincolnshire has been magical. The first person, perhaps, who successfully used the roughly broken bones from the dog kennel as a manure was General St. Leger, in 1775. (*Evelyn's Sylva, by Dr. Hunter.*)

Manuring with *fish* was necessarily an improvement of an advanced state of agriculture; we have no mention of them as thus used in the early agricultural authors; the immense shoals of sticklebacks, and other small fresh-water fish, which once tenanted the fen counties of England, first gave the farmers of Lincolnshire an opportunity of using this rich oily manure; they were towards the latter end of the eighteenth century sold by the fen fishermen at about sixpence a bushel; and Arthur Young tells us, that at one village on the borders of Cambridgeshire, 2000*l.* have been taken for these fish in one season. It is not often that a glut of herrings, pilchards, or other valuable fish, manure.

Manuring with *calcareous sand* was practised very early in the middle ages by the English farmers. This they obtained not only from inland pits, but from the sea-shore, especially in Norfolk and Cornwall. The privilege of freely taking it from the sea-shore, the West of England farmers enjoyed under a grant from Richard Duke of Cornwall, confirmed by another of 45th of Henry III., A. D. 1261. (*Camden*, *Britt.*) This is expressed in the preamble of the act of the 6th James II. c. 18., A. D. 1609, which says, " Whereas the sea-sand by *long trial and experience* hath been found to be very profitable for the bettering of land, and especially for the increase of corn and tillage within the counties of Cornwall and Devon, where the most part of the inhabitants have not commonly used any other *worth* for the bettering of their arable grounds and pastures." This act, which empowers the farmers to take this sand free from any toll, was, after being several times renewed, made perpetual by the 16th Charles I. c. 4. This wise encouragement of the use of manures by the legislature of England has not been confined to the sea-land of Padstow harbour: thus, uncrushed bones passing through a turnpike to be crushed for manure are exempt from toll under the 3 G. 4. c. 126. s. 32., and 5 & 6 W. 4. c. 18. s. 1. (*Pratt* v. *Brown*, 8 C. & P. 244.); and carts loaded with common manure are equally free (*Rex* v. *Adams*, 6 M. & S. 52.); or even when going empty to fetch it (*Harrison* v. *James*, 2 Chitty, 547.); but this exception does not extend to lime. (*King* v. *Gough*, 2 Chitty, 655.) And in authorising the construction of railways,

improvement. It is comm
as a steep with olive oil, t
grain swell. To this know
tilising powers of saltpetr
tivators of the earth were
from noticing that those
rally produce saltpetre are
of the most fertile descrip
those rich eastern fields
lebrated in Palestine fo
abound in this salt. Thre
according to Googe, it was
German farmers. " Som
prospereth best in salt gro
fore they use to cast upon
petre or ashes." In 167
Discourse on Earth, tells
dews, cold and dry winte
snow, which I reckon equ
manures, impregnated as
lestial nitre;" which, altho
displays his opinion of the
of nitre. " I firmly believe
were saltpetre, I mean ficti
obtained in plenty, we sho
tle other composts to melior
Evelyn recommends saltpe
solution, three pounds of
gallons of water mixed wit
this way Sir Kenelm Digby
ley grow very luxuriantl
with a very weak solution.

It would be, perhaps,
any other substance in the
dern fertilisers whose pow
often disputed as *commo*
controversy many reasons
It has been generally emp
scientific accuracy, has bee
ner far too careless for an

th year of the reign of William the ird, and was not removed until after an nous debate at the end of that of George Third. The price of salt, thus raised to re than 20*s*. a bushel, was in consequence expensive a fertiliser to be employed by English farmers. During that long iod it was known only in their traditions. ough these they were told that it was nerly used to kill worms and to destroy ds, that it cleansed fallows, increased produce of light arable soils, and sweet- l grass. These reported advantages e rendered more probable by certain s that had been forced as it were upon r attention. Every gardener was aware the brine of the pickling tubs, when red over his heaps of weeds, not only d those weeds and their attendant seeds grubs, but that these heaps were then verted into so many parcels of the most lising manure, whose good effects, espe- ly upon potatoes and carrots, were very iled. It was well known, too, that a sin- grain of salt, placed upon an earth-worm, dily destroyed it; that if brine was red upon a lawn, from that spot all earth-worms were immediately ejected; that if it was sprinkled over a portion the grass, on this salted portion all the , or sheep, or horses of the park con- ly repaired, in preference to any other of the field. Salt evidently therefore troyed weeds and worms, and rendered more palatable to live stock; and upon ulting the old agricultural writers, it found that the notices of salt as a ma- were many and important, and that had been employed in various agricul- l operations from a very early period. s, it is referred to by St. Luke, chap. xiv. ; Virgil reprobates a salt soil; Cato re- mends it for cattle, hay, straw, &c.; does Virgil. (Lib. iii. v. 394.) The early man farmers knew of its value for sheep; for the same purpose, in Spain, it has employed from the earliest ages. In 0, Conrad Herebasch commends it as rtain prevention of the "murrain or le." In 1653 Sir Hugh Platt speaks of as a fertiliser, in his usual visionary man- , and details the result of a very success- experiment on a "*patch of ground*" at pham, from which some late writers upon uses of salt have led their readers into at blunders, by stating this experiment have been performed upon an *acre* of

use of salt by the cultivator, since repeal of the duties in 1823, has been able, however, in many districts of l, in spite of these blundering in- ns, ill-contrived experiments, and ignorant conclusions. If to this be added the natural difficulty of obtaining correct results in any experiments in which vegetable life is concerned, we need no longer be surprised that many contradictory statements have been made with regard not only to salt, but to all other fertilisers.

A mixture of *salt* and *lime* was recommended as a manure by the celebrated German chemist Glauber, in his "Hints for the Prosperity of Agriculture," more than two centuries since. He at some length described the mode of preparing it, and characterised the compound of soda and chloride of calcium produced as "most fit for dunging lands, and to be used instead of the common beasts' dung." (*Prosperity of Germany*, vol. i. p. 417.) Christopher Packe, who, in 1688, published a huge folio translation of Glauber's works, enforces the value of this fertilising compound with much earnestness, in his preface, describing it "as the cheapest of all mixtures for the enriching of poor and barren land." The want of scientific knowledge amongst farmers, and the hindrance to the use of salt through the duties which were so long imposed upon it, naturally prevented any extensive use of this fertiliser; yet there have been many accidental or occasional notices of its value. Thus, for a great many years, it has been the practice of the farmers of Essex, and other English maritime counties, to steep their seed-wheat in sea-water, strengthened with salt, until it is of a sufficient gravity to float an egg, and then roll the brined seed in lime. This, they consider, not only prevents smut in the corn, but promotes the general health and vigour of the plant. The Essex farmers have a tradition that this plan was discovered by the accident of a farmer's labourer dropping a sack of seed-wheat from the boat in which he was crossing the mouth of the River Crouch. It was long, however, the superstitious belief of the district, that the salt-water wetting must be the result of *accident*, to produce a good effect. The Cornish farmers have for centuries used the saline calcareous sand of the coasts of Devon, which contains 64 per cent. of lime, fetching it for some miles from the shore, in preference, says Dr. Paris, to the unsalted sand, which they can procure at their own doors. The very mixture of salt and lime was successfully employed in Ayrshire many years since. (*Aiton's Ayrshire* (1811), p. 385.) And George Sinclair (*Sinclair's Scotland*, vol. i. p. 211.), in 1818, very nearly demonstrated at Woburn the value of this application. He unfortunately, however, applied the salt and the lime separately; yet still with considerable benefit. (My

Manley, of Anderton, in Cheshire, when giving his evidence before a Committee of the House of Commons on the salt duties, mentioned, that in getting marl (which is a mixture of carbonate of lime, alumina, and silica), he had found that, by mixing it with brine instead of water, the portion of the field on which the brined marl was used yielded five bushels of wheat per acre more than that portion on which the watered marl was employed.

The use of *ashes* as manure may be traced to a very early age. The Roman farmers were well acquainted with paring and burning. Cato recommends the burning of the twigs and branches of trees, and spreading them on the land. Palladius says, that soils thus treated would not require any other manure for five years. They also burnt their stubbles; a practice common amongst the Jews in Palestine. The ancient Britons, according to Pliny, were used to burn their wheat straw and stubble, and spread the ashes over the soil; and Conrad Herebasch, a German counsellor, in his *Treatise on Husbandry*, published in 1575, which was translated by Googe, tells us (p. 20.), "In Lombardie, they like so well the use of ashes, as they esteem it far above doung, thinking doung not meete to be used for the unwholsomness thereof."

Gypsum, or sulphate of lime, when employed as it exists in an impure state in ashes, which owe all their virtues to the gypsum they contain, was used by the early Italian farmers. Virgil (*Georg*. i. l. 80.) gives the following injunction: —

> ——— " Neve
> Effœtus cinerem immundum jactare per agros."

"Nor hesitate to scatter the dirty ashes over

what he very ludicrously
and gravely tells us, th
proportion of earthy sub
tained many particles of li
ter." This was most pro

The use of the mineral
nure was discovered in 1
Kirwan, by M. Meyer,
man of great talents; bu
the chemical compositio
totally unknown, he nat
it with other calcareous e
sembled in appearance.
sisted in discovering the
mineral substance exist
neighbourhood, which wa
shown to be sulphate of
fact Meyer was entirely i
early as 1792, gypsum w
cessfully by Mr. H. Smi
near Sittingbourne, who
has since been confirmed
servations, that clover m
sum is always preferre
cattle to all other clover.

Sir Joseph Banks recon
stance as a fertiliser to L
at his suggestion, it was
many years since; but, ow
ment in its application, i
pear to answer the intend
years afterwards, owing
commendation of Mr. Gri
again employed pretty e
same nobleman, and wit
and so satisfied was thi
agriculture with the res
sented Mr. Grisenthwaite
plate for his exertions in
In a letter with which I

gland. Mills have been erected for nding it, and considerable quantities been brought from the northern coun- ; but still not one thousandth part of quantity is employed in agriculture would be used if its correct mode of plication were more generally known; ce, from the small quantity used per , and the low price of the article, it con- utes one of the cheapest of the artificial nures.

From this sketch of the history of the manures, and of the steady improve- nt in the mode of applying them, we safely conclude, that, as regards the tivation of even the most barren soils, drifting lands of Norfolk, the heath s of the north of England and Scotland, even the shingle of its sea-coast, much yet be effected by improved modes of lying manures. Let such improvements ceed; let science go hand in hand with ctice; let the naturalist discover new cul- able vegetables, or new varieties of e already known; let the chemist yield agic aid to demonstrate the best mode promoting their growth, and increasing fertility of the soil; and then I fear- y assert that many more than the pre- inhabitants of Britain may be amply rted by the produce of the land of rth. "Nature," said Davy, "amidst r changes, is continually directing her rses towards the production and mul- ation of life, and in the wise and d economy of the whole system, even agents that appear injurious to the s and destructive to the comforts of , are, in fact, ultimately connected with re exalted state of his powers and his ition. His industry is awakened, his ity kept alive, even by the defects of ies and seasons. By the accidents h interfere with his efforts, he is made xert his talents to look farther into fu- ity, and to consider the vegetable king- , not as a secure and unalterable inhe- nce, spontaneously providing for his nts, but as a doubtful and insecure pos- on, to be preserved only by labour, extended and perfected by ingenuity." *ctures*, p. 267.)

anure, Law with regard to. — In most leases there are covenants introduced h regard to manure, which are often than useless; encumbering the efforts skilful cultivator, and rarely im- the practice of the ignorant, lazy, principled. Thus, by some leases, er is allowed, on certain conditions, his straw and hay, and bring on farm in its stead a given weight of (commonly two tons of stable dung for a load of straw, and three tons for a load of hay); in others, he is restrained from selling either; in others, from liming or chalking his land. In most leases he covenants to spread the manure on the farm, and to leave it, in the concluding year of his term, properly laid up in heaps, if it is not already employed on the land.

The mere relation of landlord and tenant is a sufficient consideration for the tenant's promise to manage a farm in a husbandlike manner, and not to carry away any straw, dung, compost, &c. (*Bowley* v. *Walker* (1793), 5 T. R. 373.); but to promise to spend 60*l.* worth of manure every year, is not in law an obligation arising out of the bare relation of landlord and tenant. (*Brown* v. *Crump* (1815), 1 Marsh, 567.) A tenant from year to year, under a notice to quit, cannot remove manure, except according to the custom of the country, and if necessary he may be restrained by an injunction. (*Onslow* v. —— (1800), 11 Ves. jun. 173.) The custom of the country is usually followed with regard to the management and sale of manure; but in case there is a written agreement, no inquiry can be made as to the custom of the country (*Liebenrood* v. *Vines* (1815), 1 Mer. 15.); and when an express stipulation is made, the custom of the country is excluded entirely. (*Roberts* v. *Barker* (1833), 1 C. & M. 808.) In this case Lord Lyndhurst said, "The off-going tenant was bound by the custom of the country to leave the manure on the premises, and was entitled to be paid for it by the landlord, or the succeeding tenant; but in this case they did not rely on the custom. The lease contained a covenant that the tenant, on quitting the farm, should not sell or take away the manure which should be in the fold, but should leave it to be expended on the land by the landlord or his succeeding tenant. It is to be left for their use, and there is no provision as to any payment in respect of it. We are of opinion, therefore, that the plaintiff is not entitled to be paid for the manure." But where an agreement is silent as to the question of manures, then the custom of the country is valid in law. (*Senior* v. *Armytage* (1816), Holt, 197.) If the out-going tenant has covenanted with his landlord to sell the manure to the in-coming tenant at a valuation, and to leave it on the farm, the out-going tenant has a right of on-stand on the farm; and if the in-coming tenant remove the manure before such valuation, he is answerable to the out-going tenant in an action of trespass. (*Beaty* v. *Gibbons* (1812), 16 East, 116.) A tenant may sell or assign over manure to an assignee, although he thereby and manure the land, with two sufficient sets of muck, within the last six years of his tenancy, the last mucking to be within the last three yeers, this covenant is satisfied by the tenant laying on two sets of muck within the last three years of his term, if he shall think fit to do so. (*Pownall* v. *Moores* (1822), 5 B. & A. 416.)

In valuing manure to an in-coming tenant, much depends upon the custom of the country, which is usually followed in these cases. Land which has been rendered perfectly clean by a year's fallowing, is denominated a full tillage, and by tillages the valuation is commonly made.

In estimating the value of manure in arable land, it is done by allowing a full tillage after a fallow or crop of turnips fed off; after a white crop, half a tillage; but after two white crops no allowance is made.

For bones one tillage more is valued than for dung, on arable soils; two thirds of the value of the bones, and labour of procuring and spreading them, being allowed after one white crop, and one third of the value after two white crops. Soot, rape-cake, oil, sprats, &c., which are quickly exhausted in the soil, are allowed for as one full tillage before a crop grown, or after turnips, &c. eaten off; but if the turnips, &c. have been carried off, then only one third of the cost of procuring, carrying, and spreading is allowed.

For earthy manures more is allowed in a valuation than for those of a perishable nature. Thus, on pasture land, lime, chalk or marl are commonly valued for six years after they have been spread on the land. This includes prime cost, carriage, and

counties the dung is us
charge to the in-coming
Scotland, is called holding
CUSTOMS OF COUNTIES.

MAPLE. (*Acer*, from
point, the wood having fo
sought after for manufac
of pikes and lances.) T
the most part beautiful t
able size, generally emp
avenues or the back of
soil they delight most to
sandy loam, in which
strike freely in the open
be increased by layers
autumn: but all the be
tained from seed, which
soon after gathering. Fr
sugar maple (*A. sacchar*
Americans make a very g
in considerable quantities;
sess, more or less, in the s
property. There are a g
of maple; but two only, w
are common to Britain.

1. The greater maple
pseudo-platanus), which
and about houses, comm
wild. It is a large hands
growth, with a smooth a
and round spreading bra
long footstalks four or
palmate, with five acute
lobes; the middle one la
most very small; veiny,
little hairy tuft at the ba
cous beneath. Clusters pe
many-flowered, downy.
size of a currant blossom
two or three broad sprea

gated sycamore, or Costorphine
p. *flavo-variegata*, Loudon), the
iegated leaved sycamore (*A. p.*
Loudon), and the purple leaved

common or field maple (*A. cam-*
This is a common tree in hedges
ts, but is rather rare in Scotland
orth of England. It is of much
ble growth than the preceding,
spreading branches; the bark
full of fissures; that of the
smooth. Leaves about 1½ inch
ny while young, like their foot-
e-lobed, obtuse, somewhat cut.
orymbose, erect, the wings of the
divaricated. The wood is com-
fine grain, sometimes beautifully
lebrated among the ancient Ro-
ables, though now superseded by
, and even by our native oak.
rway maple (*A. platanöides*) has
een classed among our British
s. It is a tree of the first rank,
ll in our climate, and attains a
al to that of the sycamore within
od of years; it is a decided ac-
o our park and woodland scenery,
od promises to be of more value,
ed for a greater variety of pur-
n that of the sycamore, being
se-grained, firm, susceptible of a
, and frequently exhibiting the
appearance in the direction and
of the fibre, for which the bird's-
of America is so highly prized
t after. The foliage, though not
and massive as that of the syca-
mbrageous; the leaves, which in
a striking resemblance to those
tanus occidentalis, are large with
tioles, and, when fully expanded,
shining light green; in an early
panded state, they are of a deli-
wish green, and in autumn, before
become of a rich warm yellow.
Bot. Dict.; *Smith's Eng. Flor.*
229.; *Phillips's Shrub.* vol. ii.
lby's Brit. Forest Trees, vol. i.
)

A provincial term signifying a
nall lake.

. The matter which remains after
ure of fruit; or any substance
ds oil; or, in fact, any fluid mat-
separation of which the action of
is required. What remains in the
e *marc.*

ESCENT. In botany, a term ap-
eaves, &c. which are permanent,
withered do not fall off.

H. The third month of the year.
Calendar. Spring is now breaking on the farmer. If any beans, peas, or winter vetches remain unsown, this is the latest period when the work can be successfully accomplished. Now it is that, for sowing spring corn, fine weather is so valuable to the cultivator: the value of March dust is known to a proverb. Oats, barley, flax, and hemp-seed should be sown this month, and clover and other grass seeds with the spring corn, or amongst wheat. In all cases, we should advise the farmer to use a steep of some kind for the seed,—a weak solution of saltpetre (or nitrate of soda for barley) or common salt; and these may be rolled in lime to dry them sufficiently for the drill. For the smaller grass seeds the solution should be weaker, and be dried with gypsum powder. On all those soils which are said to be *tired* of clover, or *clover sick*, we would earnestly recommend the application of gypsum, at the rate of 1½ to 2 cwt. per acre with the seed; it answers admirably on moist soils, especially on those where the sulphate of lime does not exist naturally, Many simple observations will indicate to the farmer the probable success of gypsum. If common coal or peat ashes, when spread on his clover, sainfoin, or lucern, promotes their growth, then he may securely apply gypsum, for the ashes owe all their enriching properties to the presence of gypsum. Nitrate of soda may also be applied either as a steep for barley (for this grain usually contains a small proportion of that salt), or it may be sown at the rate of 1½ cwt. per acre, as soon as the spring corn makes its appearance above the ground. If saltpetre is used, 1 cwt. per acre is sufficient. Both these salts do best on light dry soils, such as sands, gravels, chalks, or light loams; and upon such poor grass lands, these are perhaps the only manures which can be profitably employed. During this month carrots and parsnips are generally sown on the light lands of Norfolk. These valuable crops would be much more extensively cultivated if only some labour were previously bestowed in deepening the soil, by either the spade or the subsoil plough. This is a good time to top-dress wheat with either soot, ashes, lime, or salt and lime. The farmer will find, in using soot, that its powerful effect is materially increased by adding to it from 8 to 10 bushels of salt. The mixture of these enrichers, at the rate of from 10 to 15 bushels of each per acre, *trenched*, or deeply ploughed in, is one of the most powerful of all manures for carrots. The nutritive matters of the carrot are very considerable, 1000 parts containing 98 of nutritive matter; the same proportion of parsnips contain 99 parts, the Swedish turnip 64, the

[illegible] only 42 parts. The Flemish farmers sow carrots with their spring corn. It is a good practice to facilitate the vegetation of the carrot-seed by steeping it in water, and still better to add to the steep 1 lb. of saltpetre to every 6 quarts of water. Sow lucern towards the end of the month.

Prepare your potato ground, and plant towards the end of this month. This root delights in fresh soils, such as old pastures or stack-yards. If you need any manure, use sea-weed, ploughed in as green and wet with the salt-water as possible. In Cheshire they carry, in the autumn, for a mile or two, and spread on their potato fields, the salt mud of the shores of the Mersey, at the rate of 20 or 30 cubic yards per acre. If you cannot get these, use ditch-scrapings, pond-mud, or weed-heaps, with which, a month previous to using it, mix a bushel of common salt (the refuse of bacon is excellent) with each cubic yard. I have found on the gravelly soils of Essex no manure superior to this for potatoes. Plant hops. Alders are now cut. Water meadows may be fed for the first time. This is a good period to destroy moles. Top-dress young wheats. Soot, malt-combs, lime, and salt and lime, are all powerful manures for this purpose.

Look steadily to your ewes: provide them warm, dry, sheltering places: give them your best turnips or carrots, mangel wurzel, and hay: regard also their cleanliness. The same remarks apply to all breeding animals: to cows and to mares.

Attend to your poultry: cleanse and lime-wash their houses: let their boxes be often replenished with hay or straw. If you would be successful with them, never set them with their own eggs for stock birds; procure these from a distance. The advantages of an incessant change of stock is a secret little understood by housewives.

Gardener's Calendar. *Kitchen Garden.* — *Alexanders*, sow, earth up those sown in autumn. *Angelica*, sow or plant. *Artichokes*, spring, dress *e.*, plant, force in hot-bed, dress established beds. *Balm*, plant. *Basil*, sow. *Beans*, plant, earth up advancing. *Beet* (red, white, and green), sow. *Borage*, sow. *Borecole*, sow *e.* *Broccoli*, sow *e.*, of that now in production mark some for seed. *Burnet*, plant and sow. *Cabbages*, plant, earth up, &c. former plantations, sow. *Carraway*, sow. *Carrots*, sow. *Cauliflowers*, plant out from frames, attend to those under glasses, prick out spring raised, sow *b.* *Capsicum*, sow *e.* *Celery*, sow, dress and earth up autumn planted. *Chamomile*, plant. *Chives*, plant. *Celeriac*, sow. *Clary*, sow. *Cress, American*, sow. *Chervil*, sow. *Composts*, prepare and turn

over. *Coriander*, sow *e.* *Corn*
Cucumbers, sow, prick out, rid
tend to the impregnation, &c.
forcing. *Dill*, sow. *Dung*, prep
beds. *Earthing up*, attend to.
or plant. *Garlic*, plant. *Hot-*
attend to linings, &c. *Hyssop*, s
radish, plant. *Hoeing*, attend
weather. *Herbray*, clean and
weather. *Jerusalem artichokes*,
ney beans, sow *e.*, attend to
Kale (*sea*), plant or sow, force.
Lettuces, plant from frames *e.*,
out early sown. *Lavender*, plant
plant, *b.* *Marjorams*, sow and pl
sow, prick out, ridge out, atten
forcing. *Mint*, plant, clean old
golds, sow. *Mushroom* beds,
to those in production. *Musta*
sow. *Nasturtium*, sow. *Onion*
crop, those raised in autumn tr
bulbing, plant for seed *b.* *Oni*
plant. *Orach*, sow. *Parsnips*,
sow, earth up and stick, atte
in hot-beds. *Pompions*, sow *e.*
sow *e.* *Parsley*, sow. *Hamb*
sow. *Potatoes*, plant, attend
forcing and on borders. *Penny*
Radishes, sow thin, &c. those
Rochambole, plant. *Rosemary*,
plant. *Rampion*, sow. *Rape*,
sow, edible rooted, sow *e.* *Rh*
Spinach, sow, attend advancin
plant. *Small salading*, sow.
Savoys, lay in old stocks to prod
Salsafy, sow. *Scorzonera*, sow
sow. *Sorrels*, plant and sow. S
and sow. *Succory*, sow. *Tree-*
Tetragonia, sow *e.* *Tansey*, p
ragon, plant. *Thyme*, sow. *To*
Turnips, sow *b.*, *e.* Vacant g
manure. Weeding in general
Wormwoods, sow.

Flower Garden. — Now
Evergreens cannot be moved
period. Deciduous flowering
also be still planted, such as Al
Syringas, roses, honeysuckles,
sumach, laburnums, lilacs, jasmi
berry myrtles, guelder-roses, &
the borders require filling up,
ing plants may still be moved
early in the month. Lychnis,
Canterbury bells, tree-primros
sweet-williams, wallflowers,
monk's hood, rose campions,
asters, sunflowers, foxgloves,
perennial and biennial flower-s
the last week in this month. S
hyacinths, when the flower-stem
Plant out layered carnations of
into the places where they ought
Give fresh earth to any plants in

arnations, pinks, auriculas, double sweet- lliams, double stock gillyflowers, rockets, Sow annuals of all hardy kinds; nsplant any hardy roses which you may h should blow late in the year; plant for edging still; and roll the lawn and e walks. Transplant any tender kinds annuals, which you may have been at pains of raising in or procuring from a -bed. Keep the garden quite free from ds and dead leaves.

ENERAL MONTHLY NOTICES. — March, first month of the Roman year only ing the reign of Rome's first monarch, ived its name in honour of Mars, the ary deity of that city. In this they rted from the custom of their credited fathers, the Greeks, who named it in ur of Diana. Romulus assigned to it y-one days, which it has ever since re- d. Our Saxon forefathers called it -*monath*, because the rites of the god- Rheda were celebrated in it, and *Lent-* *th*, which is literally the *spring month.* is synonymous with length in our lan- e, and was probably applied to the g season, because in its days the hours ght begin perceptibly to exceed those rkness. The later Israelites called this h *Nisan*, most probably from the He- word signifying to flee away at a given d, in commemoration of their escape Egypt. By their forefathers this month named *Abib*, or the month of green because, in the climate of Palestine Egypt, the corn, especially barley, had letely developed its ears in their green It is worthy of remark, that most s in their early stages of society de- te their months and seasons after some ral phenomena usual to it in their cli- . The Hurons and other tribes of th America distinguish the year into ve lunar months. March is their *Worm* , because worms with them begin then pear on the earth's surface; April is *Moon of Plants*; May, their *Moon of* *owers*. The Flemings call February *moand*, the pruning month; April call *Grasmoand*, because in it they their meadows. This, with justice, be called the Proteus of the months, ut one of them exhibits such a variety spects — such versations of clouds and hine — of genial warmth and frosty ds.

walks have now many temptations e us to extend them. If, passing r garden-gate, we ramble into the rn upon which we are looking, we eaves of the woodbine to be almost ull size; the buds of the larch and s nearly expanded: in the marshy parts of their inclosures, the spurge-laurel, the daffodil, and the rush are now in bloom. If we wander rather in some of the warm lanes which stretch to the south of our village hill, the common whitlow grass on some dry rubbishy banks, the primrose, and the sweet violet, may already be met with. In more completely animated nature, we are amused with watching the habits of the rooks, who now are detained by the process of incubation; to watch for the first appearance of the wheat-ear, the brimstone-coloured butterfly, the black ant, and the bat; to listen for the first aspirations of the skylark, the first notes of the thrush, the woodlark, the linnet, the blackbird, and the golden-crested wren; for these are much surer indications of confirmed spring than any dictum of the almanac. Whilst some birds are thus as it were arriving to us, many are actually leaving us, and following the winterly temperature they delight in to its more northern haunts. The fieldfare, the redwing, the various palmipedes, the woodcock, and others, are now steering their aërial voyages to Siberia, Russia, Norway, the shores of the Baltic, and even to the Canadas. (*Farmer's Almanac.*)

MARCHES. The name given to the borders or frontiers of any district, but more especially applied to the boundaries between England and Wales, and England and Scotland.

MARE. The female of the horse. See HORSE.

MARE'S TAIL. (*Hippuris vulgaris.*) A curious indigenous aquatic, growing in marshy situations, and in ditches, pools, and the borders of slow streams. The root is creeping; stem a foot or more above the water; round, juicy, polished, reddish, with many whorls of spreading, linear, entire, smooth, single, spreading leaves; the lower ones, deep under water, are long, thick-set, pellucid, and pale; the herb in winter bearing no other. (*Smith's Eng. Flor.* vol. i. p. 4.)

MARIGOLD. (*Calendula*, named from *calendæ*, the first day of the month; there being flowers almost any month in the year.) A genus of showy plants, among which is the old and well-known common marigold (*C. officinalis.*) This species was formerly used in soups and broths, but is now little regarded. The green-house species thrive well in loam and peat mixed, and cuttings root freely in sand under a glass. The half-hardy annuals it is recommended to sow in a gentle heating hot-bed, from whence they must be transplanted into the open ground; the hardy kinds merely require to be sown in the flower borders of the garden. (*Paxton's Bot. Dict.*)

The marigold is raised from seed, which may be sown from the close of February until June; or it may be performed in autumn, during September. If left to themselves, they will never fail to multiply innumerously, from the self-sown seed. They are usually sown broadcast, and raked in, or in drills, ten inches apart; the plants are best left where raised, being thinned to ten or twelve inches asunder; but when the seedlings are two or three inches in height, they may be removed into rows at similar distances as above. Water must be given moderately every other day, until established. The flowers, which the spring-raised plants will produce in the June of the same year, but those of autumn not until that of the following one, will be fit to gather for keeping in July, when they are fully expanded, as well as for use when required. Before storing, they must be dried perfectly, otherwise they become mouldy and decay. For the production of seed, plants of each variety must be grown as far distant from each other as may be. The two Childing, and the largest double marigolds, are especially liable to degenerate, if the seed is not carefully taken from the largest and most double flowers. (*G. W. Johnson's Kitch. Gard.*)

MARIGOLD, CORN. See CORN MARIGOLD.

MARIGOLD, AFRICAN. See AFRICAN MARIGOLD.

MARIGOLD, The MARSH. See MARSH MARIGOLD.

MARJORAM. (*Origanum*, from *oros*, a mountain, and *ganos*, joy; the delight of the mountain, in allusion to the habitation of the plants.) A genus of well-known pungent and gratefully aromatic herbs. The

for them. If the soil is
are deficient in their esse
the perennials are unabl
vere weather. The situa
open. The sweet marjo
solely by seeds; the two
as well as by parting thei
slips of their branches. S
formed of all the species, f
of February, if open we
mencement of June; but
April is the usual time
Portions of the rooted pl
be planted from Februa
during September and O

The sowing is perform
six inches apart, or bro
case the seed being buri
half an inch deep. When
attained a height of tw
they must be thinned t
those removed may be pr
similar distance apart ea
the annual species are
the perennials, to be final
September, at the distanc
when raised from offsets,
given at every removal, a
are established. The
partings of the root are
ten or twelve inches apa
to remain; they must b
rately every evening, and
day, until they have take
soon do, and acquire a st

The only after cultiv
the species require is the
tion of the hoe. In Oct
parts of the perennials
some mould scattered o

plant or two are left ungathered from, nfailingly ripens in the course of the umn. But the exotic species seldom en the seed in this country; consequently is usually obtained from the south of nce or Italy. In favourable years, how- r, they sometimes perfect it late in umn. When the green tops are much equest, a small quantity of seed of the mer marjoram is sown in January or ruary, in a moderate hot-bed. (*G. W.* son's *Kitchen Garden; Paxton's Bot.* *t.; Engl. Flor.* vol. iii. p. 106.)

ARKHAM, GERVASE (GERVAS ARVISE), was born at Gotham in Not- hamshire, the younger and portionless of Robert Markham, Esq., about the dle of the sixteenth century, as we are red by the circumstance of his being, n in the prime of life, champion and ant of the Countess of Shrewsbury in l, and in whose cause he was danger- y wounded in a duel by Sir John Holles. lin's *Hist. Col. of the Fam. of Cavendish,* es, *&c.*) He served as a captain in the l army during the civil wars, and, ac- ing to Bromley, died in 1636. He was ry voluminous writer, and appears to been the first Englishman who, de- ing upon the produce of his pen for ence, became a hackney author. 's *Essays on Husb.* vol. ii. p. 32.) I not attempt to notice all his works, or to examine all in the following list, veral are mere copies from each other. es these, he wrote on horsemanship, iseases of cattle, vermin, &c.

The English Husbandman, in two parts. London. 13, and again enlarged in 1635. 2. Maison Rus- , or the Countrey Farmer, translated from the h; and the Husbandrie of France, Italie, and , reconciled and made to agree with ours here in land. London. 1616. folio. 3. Farewell to Hus- ry, or the Enrichment of all Sorts of Barren nds. London. 1620, 1621, 1625, 1631, 1649; all in . 4. Enrichment of the Weald of Kent, or a Di- n to the Husbandman for the true Ordering, Ma- g, and Enriching of all the Grounds within the ls of Kent and Sussex, and may generally serve for e Grounds in England of that Nature. London. 1649, 1675, 4to. 5. The Country Huswife's Garden. 1648, 4to. 6. The Way to get Wealth, in six parts. The editions of 1660 and 1664 are said in their pages to be the tenth and eleventh.

Its "*Farewell to Husbandry*, or the en- ing of all sorts of barren and sterile nds in our kingdome, to be as fruitful ll manner of graine, pulse, and grasse, the best grounds whatsoever, together h the annoyances and preservation of all ne and seede from one yeare to many is Gervase Markham's best work, one on which it is evident he had the greatest pains. His direc- wever, are generally rude, and o sweeping in their nature: thus s all barren lands to be first hackt ghed, and then dressed with sea-sand; then limed, and then manured with farm-yard comfort "in very plentiful manner, so farre forth as your provision will extend, for it is to be understood that barren and hard earths can never be overloded with good meanure or compasse, since it is only the want of warmthe and fatnesse which meanure breedeth that causeth all manner of fruitfulnesse." The rotation of crops in his day for such newly-enclosed lands was very ill understood; for he directs the first two years wheat or rye, then folding with sheep, then barley; "the next three yeares you may sowe it withe oates;" the seventh year "pease or beanes, according as you shall finde the strengthe and goodnesse of the grounde;" then he adds, "for three or four yeares following the seven, you may let it lye at rest for grasse, and doubtlesse it will yielde you either as good pasture, or as good medow as you can reasonably require," and he very sagely predicts that by following these directions "hee that is master of the most fruitfullest and richest soyle shall not boast of any greater increase than you shall."

Markham was aware of the fertilising powers of salt, but then he mistook the amount of the necessary quantity to be applied per "aker." He was more correct in his directions for steeping the seed-wheat in brine, made "so strong that it will beare an egge," of which recipe he very reasonably predicts, "that the use therof will never be layde downe in this kingdome." His directions to use all kinds of manures are frequent and fervent; he notices the burning of earth and weedes, which he calls "burning of baite," — the dung of live stock, rotten straw, "mudde of ponds and ditches," "the spyteling of house-floores," street sweepings, sea weeds, pigeons' dung; he even had the wisdom, in that early day for the progress of agricultural discoveries, to plead earnestly for the use of manure *drilled with the seed.* He says, "Take pigeons' dung, or pullens' dung (that is, any kind of lande fowle whatsoever, but by no means any water fowl), or pigeons' dung and pullens' dung mixt together, and allowing to every acre two or three bushells thereof, which is the true quantitie of seede proportioned for the same, and this dung being broken and masht into small pieces, you shall put into your sydlop or hopper, and in the same manner as you sowe your corne, you shall sowe this dung upon the ground, and then immediately after it you shall sowe your wheate, either steept in brine or salt sea water, or unsteeped, as you shall think good; but in case you can neither get salt sand nor sea rocke weedes, then you shall by no means omit the steepe-no doubt of the daily profit.

The following directions addressed to cottagers show the good feeling with which he was actuated. "If the former directions and instructions which I have shewed thee appear either too difficult or too costly (for now I speake to the plaine, simple, poore husbandman), and yet thou art master of none but barren earth, then thou shall by thyne own industry, or the industrie of thy children, servants, and such like, or by contracting with taylers, botchers, or any poore people that will deserve a pennie, gather up, get, or buy all the ragges, shreds, and base peices of woollen cloth whatsoever that are cast out, and fit for nothing but the dunghill, and of these if thou canst composse but a sackefull, or a sackefull and an halfe, it is sufficient for the dressing of an aker of arable land (all Markham's prescribed quantities of manure are too small in amount; it should be at least five times this quantity). These ragges and shreds, torn small, thou shalt thinly spread over the land before fallowing time; then coming to fallow, plough them into the land." Then he advises the poor cottager to steep his seed in liquid manure made with cow-dung, and advises him, "if he cannot get a sufficient supply of ragges, to manure his barren land with the horns and hoofes of cattle, soap, ashes;" he further recommends that the sewerage of the house should be mixed with the dunghill; and urges the employment of hair, fern, leaves, furze, malt-dust, pilchards, and garbage of fish; and lastly, "the blood, entrals, and offal of any beast, especially for the vine," as fertilisers. At p. 67. he has some excellent directions for the recovery of barren lands by the use of water;

seasons of the yeere.
rious "signes of rayne
sunne, fowle, beasts."
nothing very remarkable
server, every one of
"when flees and small
and sore," or "the cat
her eare," or "the tasel
up her pricks," "the
clineth to believe in the
The following may not
the corn-dealer and the
way our author prese
whether "corne shall be

"Take twelve prin
wheate out of the strengt
the first day of Janua
harth of your chimney
it cleane, then make a
the graynes on the hot
it well, and if it leape
be reasonably cheape, bu
then corne shall be exc
if it lye still and move
of corne shall stand an
that moneth; and thus
twelve graines, the first d
one after another, that
moneth one graine, and
rising and falling of cor
all the yeare following."
ter treats of "the choyce
kitchen garden;" the thi
sowing and ordering
"Pothearbs;" the fourt
Hearbs;" the fifth, of
the sixth, "of Flower
Home-bred;" the sevent
tion of "all manner of S

The second part into

ur author treats of the "fighting
l "of the choyce ordering, breed-
yeting of him for battell." Of
nearly exploded sport, Markham
tly an ardent admirer; he eu-
as "delightsome and voyde of
and tells us that many of "the
mes of our nation have been
participate with the delights
nd that he is induced to publish
"being worthy a general know-
any delight whatsoever." He
his description of these noble
an eloquence which shows his
; for, when describing the game
ys, "For his courage you shall
n his walke, by his treading, and
f his going." "He should be of
d upright shape, with a small
unto a sparrow-hawke, a quicke
and a strong beak, crookt and
e setting on. For the sharpness
, that cocke is sayd to be sharp
rrow heeld which every time he
th and draweth blood of his ad-
ilding (as they tearme it) his
blood, and threatening at every
d of the battell."

ute directions which he gives for
g, "dyetting," and matching of
animals, very clearly shows the
to which in all ages they have
ed, in what Markham is pleased
e concluding words of his book,
se in the pleasure of princes."

's "Cheape and good Husbandry
ll ordering of all Beastes and
l for the general Cure of their
s merely the matter contained in
orks, expressed in somewhat dif-
uage. This work is another in-
e closely-crowded title-pages of
f the age of Gervase Markham;
a complete table of contents—
treat of the breeding of live
et forth by name), of the art of
of poultry, the use of bees, and
in conclusion of the title, laud-
author's abilities. The volume
trange mixture of culinary re-
ultural directions, and remedies
e of diseases, most of which are
in other portions of his pub-
s.

of Markham for horses is shown
entitled "How to chuse, ride,
dyet both Hunting Horses and
orses; with all the secrets thereto
iscovered, an arte never heere-
ten by any authour; also a Dis-
orsemanship, wherein the breed-
ing of horses for service, in a
er, is more methodically sette downe then hathe beene heretofore, withe a more easie and direct course for the ignorant to attaine to the sayd arte or knowledge, together with a new addition for the cure of horses' diseases, of what kinde or nature soever. At London, printed by James Roberts, 1599." It is dedicated "to the right worshippful, and his singular good father, Mr. Robert Markham of Gotham, in the countie of Nottingham, Esquire," by his "obedient sonne Gervis Markham."

In this work the directions of Markham are plain and practical enough. In his first chapter he gives the breeder advice as to keeping good fences for his fields, and avoiding low-lying grounds for his brood mares, which he recommends "to be on the knole or height of a hill," lying "open on the east, that the morning sunne may rise thereon;" and he adds, "colts bredde in low grounds will alwaies be weake pasterned, and fat chauld, the one through his wette treading and uncertain foot-hold, and the other through his grosse foode in sommer, and the abundance of his sower fogge in winter; whereas the freshe ayre, which is alwayes pure on the height of hills, will adde much lyfe and spirit to your coltes," &c. He then gives a variety of directions as to the management of the stallions, mares, &c., which are totally opposed to the practice of modern breeders. Chap. II. is on the "Arte of ryding." He wisely advises the use of the most gentle treatment for the management of this noble, though too often abused, animal; he says, "lette all things be done with lenitie and discretion, and yet not so voyde of correction, but that if hee be a stubborn jade, which through will and churlishness will withstande hys ryder, you may with a sharpe rodde correct hym, making him as well understande when hee offendeth as when hee pleaseth." Chap. III. is entitled "How to choose a Horse for Hunting; how to traine him thereunto, and also how to dyet him, having made some great Match or Wager." Chap. IV. is on "The Secrets and Art of Trayning the Race-horse," of which the following paragraph is the odd conclusion of some rather lengthy and long since chiefly exploded directions. "When the howr is come in which you must leade him out, gyrd on his cloathes handsomely, bridle him up, and then take your mouth full of strong vinegar and spirt it into your horse's nosethrills, the strength whereof will search and open his pypes, making them apt for the receite of wind. This done, lead him to the race, and when you come to the ende therefore, where you must uncloathe him, having the vinegar carried after you ing of them, and of running, hunting, and ambling horses, with the manner how to use them in their travel. Likewise, in two newe treatises, the artes of hunting, hawking, courseing of greyhounds; with the lawes of the heath-shooting, bowling, tennis, baloone," &c. The second, entitled "The English Huswife, containing the inword and outword virtues which ought to be in a compleate woman, as her phisicke, cookery, banquetting stuffe, distillation, perfumes, wool, hemp, flaxe, dairies, breweing, bakeing, and all other things belonging to an householde; a work very profitable, and necessary for the general good of this kingdome. Printed at London for R. Jackson, at his shop, neere Fleet Street Conduit, 1615." Having defined what "hunting is, the colour, shape, diversity, and proportion of houndes, and composition of kennels," he next touches upon their "sweetnesse of cry;" and, to this end, he tell us, that "if you would have your kennel for sweetnesse of cry, then you must compound it of some large dogges that have deep solemne mouthes, and are swift in spending, which must, as it were, beare the base in the consort; then a double number of roaring and loud ringing mouthes, which must beare the meane or middle part; and so with these three parts of musique, you shall make your cry perfect: and heerin you shall observe, that these hounds, thus mixt, doe runne just and even together, and not hang off loose one from another, which is the vilest sight that may bee; and you shall understand that this composition is best to be made of the swiftest and largest deep-mouthed dog, the slowest middle-sized dog, and the shortest legged slender dog; and if amongst these you cast

of all the Groundes wit
Kent and Sussex," by
nothing except what he
at length stated in his
bandry," when speaking
and other manures to b
Jour. Ag. vol. xii. p. 209

MARK. A term a
which is said to *mark*
age by a black spot, lik
mon bean, which appear
a half years old, in the ca
teeth, and is gone whe
old. When he ceases t
has rased. See AGE OF

MARK OF LAND.

MARKET. In law,
chise, whereby a town i
and open shops, &c. at a
its limits for buying and
provision of such victu
wanteth. The establish
with the grant of the toll
ing, is one of the king's
can only be effected by
grant, or supported on lo
usage and prescription,
such grant. The general
all sales and contracts of
in fairs or markets, over
not only be good betwe
valid against all claim by
right or property in the s

MARL, *as a manure.*
a mixture of chalk, cl
much used by our for
nure; and no one can
given by Pliny of the
tions of the early Brit
struck with the minute

certainly used by the early Ita-
tors, as a valuable addition to
heir fields. It is thus spoken of
la:—"If, nevertheless, you are
ith no kind of dung, it will be
vantage to it to do, what I re-
arcus Columella, my uncle, a
d and diligent husbandman, was
wont to do; viz. to throw chalk
pon such places as abound in
to lay gravel upon such as are
too dense and stiff; and thus
raised great plenty of excellent
nade most beautiful vineyards;
t skilful husbandman denied that
to be applied to vines, because
poil the taste of the wine; and
at stuff gathered together out of
d from among briars and thorns,
word, any other sort of earth
m any other place, and carried
was much better for making a
ntage."

ture of soils, we find from Theo-
was a practice common in his
found, it seems, the advantage
the light with the heavy, the fat
an, and, in fact, any that were of
nature. This mixture, he tells
ly supplies what shallow soils
pth, but adds to the power of
at a worn-out soil, thus treated,
in to bear crops with renewed
us barren clays, when thus fer-
n become fruitful; in truth, this
ltivation he deemed a complete
for manure. The inhabitants of
sides practising this system, were
fifth or sixth year to trench
digging as deep as they imagined
o penetrate, and bringing the
to the top; for it was an axiom
Megarean cultivators, that the
rtions of earth proper for the
nt of plants are always washed
as far as the influence of the
ter extends; so that we see from
e advantages of deep ploughing,
ng, is not a very modern dis-
(*Col.* lib. xi. c. 16.; *Theop.* l. iii.

t of sinking marl pits is men-
the *Chartæ Forestæ*, A.D. 1285;
Statum Walliæ, 12 Edward I.,
re mentioned as being dug close
roads. "It is one of the duties
iff and coroner," says Daines Bar-
to inquire *de fossatis et* marleris
a iter publicum," which shows that
manure was very commonly used.
rl pit was sunk in ground that did
to the king, but which happened
e purlieus or neighbourhood of a forest, prosecutions were instituted in the forest, which imposed heavy fines for the offence, as the pit occasioned both inconvenience and danger to the hunter. (*Observations on Statutes*, p. 36.)

Marl is found in many parts of England; and any earthy substance in which the proportion of calcareous matter is apparent, mixed with sand or clay, is styled, in popular language, a marl. Of this there are three principal varieties: 1. Clay marl; 2. Sand marl; 3. Slate or stony marl; 4. Shell marl. Of these the last is commonly the richest in calcareous matter. In some shell marl examined by Sir George Mackenzie, he found (*Farmer's Mag.* vol. v. p. 271.)—

Lime - -	- 41·45
Carbonic acid -	- 32
Silex - -	- 14
Argil - -	- 14
Oxide of iron -	- 2·5
Inflammable matter	- 2
Loss - -	- 4·70
	100

Clay marl usually contains from 68 to 80 per cent. of clay, and from 32 to 20 per cent. of calcareous matter. Silicious sand often contains 75 per cent. of sand (*Kirwin on Manures*, p. 13.). But there are endless varieties of marl. Thus, M. Thaer found in that of Oldenburgh (*Prin. d'Agri.* vii. p. 423.)—

Fine sand -	- 36
Clay - -	- 44
Mould - -	- 5
Carbonate of lime	- 14
Gypsum - -	- 1
	100

The quantity of marl applied per acre necessarily varies with the kind of soil and the quality of the marl; it is usual to employ it in very considerable quantities, and it is often some years before it is sufficiently incorporated with the soil to produce an evident improvement; but then that advantage is almost always, sooner or later, not only decided, but permanent.

The clay marls render light sandy soils more tenacious; the sandy marls materially improve the friability of the heavy clays. In Cheshire, they often apply 128 cubic yards of clay marl per acre to light sandy soils, and about half that quantity to their heavy lands. (*Agr. Rep. of Cheshire*, p. 222.) In many parts of Scotland, it is spread on grass lands, and suffered to remain for two or three winters exposed to the frost, before it is ploughed in, in about the same proportions per acre. (*Survey of Morayshire*, p. 320.; *Ibid. Forfarshire*, p. 407.)

not unfrequently occur, are carried upon the fallows in winter, where these substances, when broken down by the frost, prove a valuable alterative to the texture of the soil, especially where the pulse, rape, and clover crops are gypsumed."

On the heathy sands of Norfolk, much improvement might be effected by the application of marl. Mr. Kiddle, of Marsham, in that county, made many experiments with marl; he preferred from long experience the variety denominated "clayey marl," which he thought the best for sandy lands, even if brought from a considerable distance. (*Com. Board of Agr.*, vol. iv. p. 124.) "A few years since," said General Vavasour, "I purchased, with other lands, a field of ten acres; it had been part of a common inclosed about fifteen years before, and was tithe free, the soil sandy, mixed with moory earth. I ploughed and sowed it in divisions with various crops, most of which failed. Having discovered a stratum of rich clay marl, within 400 yards of the field, I carted on 75 cubic yards per acre, at 10*d.* per yard, or 3*l.* per acre." The result was, that the value of the land increased from 6*s.* to 1*l.* 1*s.* per acre. (*Com. to Board of Agr.*, vol. iii. p. 520.; *Johnson on Fertilisers*, p. 268.) See MIXTURE OF SOILS, LIME, CHALK, EARTHS, &c.

MARRAM. One of the common names of the sea matweed or sea reed (*Arundo arenaria.*) See REED.

MARROWS. A provincial word used to signify fellows or equal pairs in speaking of cattle, as oxen, &c.

MARSH (Sax. meprc, a fen.) A flat surface, the soil of which is so far saturated with water throughout the year as to be unfit for culture by the spade or plough;

putrefactive process be
line matter. The fact
demonstrated by the f
prevalent on the banks
the Reculvers, althoug
twice every day by th
advantages in one point
things, are balanced by
BOG; WASTE LAND; F
LANDS; and IRRIGATION

MARSHALL, WIL
tive of Yorkshire. H
merchant, and was a pl
in the West Indies, bu
land about 1775, and t
rey. In 1780 he resi
Norfolk as agent of the
bord Harbord, which si
in 1784, and settled at
remained two years, o
some of his writings, an
terials for his "Œconomi
he pursued without devi
having formed a plan to
tural practices of each En
composition of two great
ed Property," and "A
ture;" the first of which h
latter he did not live t
1786 to about 1808, he r
Inn, London, during th
travelling in various pa
during the summers. H
a large estate in the V
his native county, in 18
ment he lived eleven ye
advanced age in 1819.
addition to the works
and many county surveys,

1. On Planting and Rural Or

free-flowering plants: the bien-
ual kinds should be sown in the
in spring, and transplanted when
trong, The herbaceous kinds
eased by dividing the roots or
1. *rosea*, the parent of the many
rieties of holly-hock, yields a
ing matter equal to indigo.
ot. *Dict.*)
mon marsh-mallow (*A. offici-*
indigenous perennial, growing
in marshes, especially towards
e root is perennial, tap-shaped,
ly. The herbage of a hoary
liarly soft and downy, with a
ibescence. Stems several, about
, simple, round, leafy, tough,
Leaves ovate or heart-shaped
various in breadth, soft and
tly five-lobed. Flowers (which
aly to September) in very short,
ry panicles, rarely solitary, of
uniform blush-colour, not in-
ees are very fond of its melli-
s. The whole plant, especially
ields in decoction a plentiful,
urless mucilage, besides a fatty
llizable sugar, starch, and phos-
. It is emollient, and salutary
ternal irritation. A syrup made
t, as well as the decoction, is
preparation of the Pharmaco-
used in the coughs of children.
g. *Flor.* vol. iii. p. 224.) See
I Holly-hock.

MARIGOLD. (*Caltha*, a sy-
alathos, a goblet; in allusion to
of the form of the corolla to a

scarcely half the size of our common *C palustris*. The recumbent stems send forth roots from several of the lower joints creeping to a considerable extent. Leaves from one to two inches broad, more triangular than heart-shaped, sharply crenate; the radical ones on very long slender footstalks. Petals the colour of the last-noticed species, about half as large, more obovate, or sometimes obliquely wedge-shaped. A double variety of this is cultivated near London. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 59.)

MARSH THISTLE, or RED THISTLE. (*Carduus palustris.*) See Thistle.

MARSH-TREFOIL. See Buck-bean.

MARTYN, THOMAS, F.R.S., &c., was elected Professor of Botany at Cambridge, as his father's successor, in 1761. He took his degree of Bachelor of Arts, while of Emanuel College, in 1756. He was afterwards elected a Fellow of Sidney Sussex College, subsequent to which he took his degree of Master of Arts in 1759; and that of Bachelor of Divinity in 1766. He died the 3d of June, 1825, in the ninetieth year of his age. The following are a portion of his literary works: —

1. An edition of Philip Miller's "Gardener's Dictionary," corrected and newly arranged. This appeared between the years 1803—1807, in four volumes folio.
2. Flora Rustica; a Description of Plants in common cultivation, pointing out such as are useful or injurious in Husbandry, &c. With coloured plates, from drawings by Nodder. London. 8vo. In 4 vols.; commenced publishing in 1792, completed in 1794.

MARTINS. (*Hirundo.*) Well-known birds of passage, which make their annual appearance in Britain from the beginning of April to the middle of May, according necessary for its purpose. The eggs are four to six in number: white like those of the house martin, but smaller. They feed on gnats, dragon-flies, and other small insects. The plumage of the head, back, wings, &c. is uniform hair-brown or mouse-brown: the throat, breast, belly, &c. are pure white: legs, toes, &c. dark brown. The whole length of the bird is four inches and three quarters. (*Yarrell's Brit. Birds*, vol. ii. pp. 222—232.) See SWALLOW and SWIFT.

MARUM. Bitter. In botany, the term is used to signify a herb with a strong smell.

MARVEL-OF-PERU. (*Mirabilis*, wonderful: alluding to the flowers.) Few plants make a more handsome appearance when in flower, either in the green-house or open border, than those of this genus. They grow well in any light rich soil, and are increased by seeds. They may be planted out in the open border in spring, where they will do as well as in the green-house. At the approach of winter the roots must be taken up, and kept dry and free from frost. (*Paxton's Bot. Dict.*)

MASCAL, or MASCHAL, LEONARD, an agricultural writer. His works are —

1. On the Government of Cattle, 4to., with his portrait, 1596, 1662. 2. (and this appears to have been a translation from the French) "A Booke of the Art and Manner how to graff and plant all sortes of Trees, how to set Stones and sow Pepins, to make wilde Trees to graffe on, as also Remedies and Medicines, with other new Practices, by one of the Abbey of St. Vincent, in France, with the addition of certain Dutch Practices, set forth and englished, by L. M. London. 1572, 4to, and 12mo; 1575, 4to; 1580, Black Letter; 1580, 1582, 1590, 1592, 1652, 1656, all in 4to. 3. The Countryman's Jewel, in three books, 1680, 8vo. (*Johnson's Hist. Gard.* p. 69.)

It is impossible, in reading the work of

prescribes, even for rea
monly either very harn
Thus, one could hardly
man could have been f
of Elizabeth, pretendin
medicine, who would d
"the bloody flux" in
of treatment as this:
a frog, and cut off his
him alive in the beast'
you must have ready
mixed with a pint of g
so soon as you can afte
beast to drink, and m
down together!" A
page 188., when speaki
ease in other cattle, "S
fish quick, and put i
throat," or certain herb
milk of a one-coloured

The other more pla
rections, however, of M
superior description to
he on all occasions se
wisely, an advocate for
tleness in the manage
and, in the three books
is divided, omits no occ
careful observances on
farmers of those days.
work explains pretty
for in those primitive d
they had little idea of
of modern title pages
sion is of the date of 16
and much enlarged b
It is entitled "*The Co*
the Government of Catte
books: the first discou

h," which he gives, both in prose
se, with great zeal. Even Mascal,
seems to prefer the dark side of
n, had a suspicion that horse-
ere in his time rather roguishly
for he tells us, by way of a pro-

trust all current horse-coursers,
'wise thee to beware,
truth amongst the most of them
s found to be full rare.

d faith in stranger things than
y of horse-dealers; for he tells
most true, in the high mountains
which lie towards the occident
jennets and young mares have
ut the covering of the horse."
s directions for the management
wine, and sheep, and the remedies
d for their care, are of the most
d often useless description; he
aphrases Fitzherbert in the fol-
ount of the origin of the rot in
"It is very good for all men to
d, but especially shephards, what
hurt or rot sheep. Whereby
avoid the danger the better, ye
rstand there is a grass or weed
arwort, the leaves are long and
e the point of a spear, hard and
stalk hollow, growing a foot and
, with a yellow flower, which is
in wet places, and there will it
t, or where water hath stood in
r. There is also another weed
niwort or pennigrass, and it will
grow in moist and marsh grounds,
weth low by the ground, and half
both sides of the stalk, like unto
thick, and round and without
et some do say it beareth a yel-
r, which will (as they say) kill
hey do eat it; also all manner of
land flouds do overrun before a
not good for sheep, because of
stinking filth lying thereon; and
r of marish grounds is evil for
d the grass that groweth amongst
not very good for sheep, for
it is much earth and the other ill
lso knot grass is not good for
(as some do say) it will cause
am at the mouth, and so will be a
ewise all mildew grass is not good,
shall know two manner of waies,
e is, by leaves upon trees in a
and chiefly on the oak tree; if ye
eaves, ye shall find a taste thereon
y. And whereby the mildewes and
the ground kill many sheep; then,
epherd do well, he should not let
abroad untill the sun have dried
e dews. In like manner, evil water is not good, and a hungar rot is the worst rot of all, for there is neither good flesh nor skin; and being hungar-starved, they do eat such as they can come by; but in pastures they seldom have the rot but when hurt with mildews; yet then they have much tallow, and likewise flesh, and also a good skin. They say little white snails be ill for sheep, either in pastures or fields. There is a rot called the pellet, which cometh of great wet, especially in wood-grounds or fallow-fields, where they cannot well dry them. These are the chief things that do rot sheep, as the shepherds have found, commonly by experience, from time to time."

A few, however, of Mascal's directions for the cure of diseased horses have remained till our time. Thus he advises the use of bay-salt for the bots, and attention to the food and water of broken-winded steeds, rather than medicine. But, then, he soon wanders again amidst the veterinary absurdities of that day. "If," he says, "he be bit by an adder or snake, ye shall take a live cock and cleave him in the midst, and clap it hot to the wound,—some take but a pigeon, and open her, and clap it to. Also, if the horse have eaten in his meat any hen's or chicken's dung, it will cause him to have the bloody flux; therefore, keep poultry from your stables if you love your horses. Salt was a favourite condiment for sheep in his days; for he says, "salt will keep them longer safe and sound without sickness;" and he adds, in another place, a very rough remedy or prevention for the rot, viz. of keeping the sheep for three days in a house without meat or drink; "then give to every hundred a bushel of bran mixed with as much salt laid in troughs, and hunger will make them to eat it; then drive them to the water, and let them drink their fill; then let them be chased with a cur a good space after, and then put them into what ground ye will for one quarter, and they shall take no hurt: then must you take them up the next quarter to serve them so again!" "Some shepherds," he adds, "use, when they fear the rot, to take them up and give each sheep he suspecteth a little milk mixed with salt, and so set water by them, and keep them so for certain days." His ideas of the fertilising effect produced by folding sheep were excellent; but then the mode he recommends of making the most of their services in this way, was hardly more enlarged than we should expect from a village blacksmith. He says very gravely, "In folding of sheep, to the opinion of some husbands hold, that the urine of sheep doth heat, help, and comfort the land as much, boiling water upon a small quantity of ground malt, bran, or other similar substance, in a pail, so as just to wet it well. After this has been done, it should be well stirred about, till it is thoroughly mixed and sweetish to the taste, when, after becoming lukewarm, it is in a proper state to be given to the animal. It is frequently used after purges to increase their operation as well as after hard labour, and in the time of disease. Mashes are very useful for restoring animals in these circumstances.

MASHELSON. A local term used to signify a mixture of wheat and rye, or what is sometimes called meslin. See MESLIN.

MASON, WILLIAM, was born on the 23d of February, 1725, at Hull, where his father resided as vicar of St. Trinity, one of its churches: he died on the 7th of April, 1797, at Aston.

In 1772 appeared the first book of his "English Garden," and the other three followed separately in 1777, 1779, and 1782. London. 4to. Another edition was published in 1785. London. 8vo.; with Notes and a Commentary by W. Burgh, LL.D. (*G.W. Johnson's Gard.*)

MAST. The nuts or seeds of the beech-tree which are the food of hogs, squirrels, &c. In some districts the term is applied to acorns; and it is occasionally pronounced *mess*. See ACORNS and BEECH.

MASTER AND SERVANT, LAW OF. A general hiring for a year, and so on, particularly of clerks and respectable servants, can only be put an end to at the end of the current year, where no misconduct is imputed. (*Beeston* v. *Collyer*, 4 Bingham, 309.) And where, as in this case, a clerk's salary was paid for some years quarterly, but afterwards monthly, it was held to be evidence of a hiring from year to year.

Duty of a Master to a Servant. — An

rant the refusal) to a mo
son v. *Hindman*, 3 Es
a person dismissed unde
stances — such as, for i
with intent to ravish
not entitled to wages
during which he has
Acton, 4 C. & P. 208.) N
if he is dismissed befo
for either moral miscon
the father of a bastard
ford, Caldicott, 57.), wi
habitual neglect. (*Ca*
C. & P. 518.)

Rights of Master. —
tain an action for deba
though he is no way rel
(*Fores* v. *Wilson*, Peake
ing his servant by which
(*Ditcham* v. *Bond*, 2 M.
seducing him away (*Ha*
per, 54.); and it makes
was merely hired by the
493.); or for continui
after notice. (*Blake*
221.)

Liability of Master
Servant. — A master is
any damage which his
dentally cause while in
his master's work; but
damage. (*M'Manus*
106.) *For Goods supplie*
been used to procure go
on credit by a servant,
goods that servant m
name. (*Busby* v. *Sc*
76.) And if he has bee
credit, he can only exon
his liability by giving t

ng the absence of the master
the magistrate may, on com-
r the labourer's wages to be
steward, agent, bailiff, foreman,
of the estate.

RWORT. (*Imperatoria*, named
s from its supposed powerful
ualities.) Plants of no great
l of the simplest culture, in-
livisions.

non or great masterwort (*I.*
is an indigenous perennial, grow-
meadows in Scotland, and flower-
. The root is fleshy, tuberous,
eeping, of an aromatic and acrid
g supposed a counter-poison,
ed as a powerful external as well
remedy in numerous disorders.
ny other remedies of the olden
outlived its celebrity, and is
edly neglected. The stem is
eet high, hollow, round, striated,
htly branched. Leaves twice
livided or three-lobed, rough-
ets two or three inches long.
ll, white or pale flesh-coloured;
alternate. (*Paxton's Bot. Dict.;*
. *Flor.* vol. ii. p. 78.)

ATION. The process of grind-
ing the solid parts of food be-
teeth, by the united motion of
ngue, and lips, in consequence
is broken into small pieces,
the saliva, and thus adapted for
as well as more easy digestion;
is, perhaps, not more essential
r purpose than water. Leuchs
n, two German physiologists,
proved that saliva has the

rooted grass as a safe support to the hands of the Alpine botanist, in precipitous situations, though it renders his path very slippery. The hard and wiry foliage of the mat-grass is eaten by horses and goats, but disliked by cattle and sheep. This species is often a troublesome weed on arable lands and pastures, where it affords but coarse food to cattle. As it, however, forms large and thick tufts, which resist the action of the scythe, it may be usefully transplanted to loose sandy lands, where its spreading horizontal roots will tend to consolidate the soil, and increase the stratum of vegetable mould, for the reception of more useful plants. (*Smith's Eng. Flor.* vol. i. p. 70.; *Sinclair's Hort. Gram.* p. 288.)

MATH. An old term for crop; hence *lattermath* is the last mown crop of grass.

MATRIX. The womb, or place where any thing is generated or formed. In Mineralogy, it implies the earth or stone in which the mineral is imbedded.

MATWEED, THE SEA. One of the names of the sea-reed (*Arundo arenaria*). See Reed.

MAUDLIN-WORT. See Ox-eye Daisy.

MAUKS. A local name in some places for maggots or larvæ.

MAUL. A provincial word, variously applied to a beetle, a mallet, and the mallow, in different localities.

MAUM. A country term signifying a dry mellow quality in land.

MAUND. A provincial name for a basket or hamper with handles.

MAW-SKIN. A word used in some places to signify the stomach of the calf

boiling water upon a small quantity
ground malt, bran, or other similar
stance, in a pail, so as just to wet
After this has been done, it should
stirred about, till it is thoroughly
sweetish to the taste, when, afte
lukewarm, it is in a proper stat
to the animal. It is frequer
purges to increase their op
as after hard labour, and
disease. Mashes are very
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MASHELSON. A
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is sometimes called

MASON, WILL
23d of February.
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In 1772 appea
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MAS
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at of your fatten-
n your straw-yard;
night-soil, urine, or
, it will much enrich the
y also mix turf, saw-dust,
; this adds to the quantity,
sly reducing the quality:
add chalk, or common salt, if
the presence of grub; but do
e with it, or sea-weed; the first
e quality of the manure, and the
grossly wasted by being mixed
ented in the heap. Sea-weeds
be ploughed in as green and fresh
ible; they contain no seeds or in-
that can prosper in inland soils. Buck-
eat may be sown towards the end of this
nth, or as soon as the late frosts are over.
Lucern may be sown; there is no grass
more useful than this to a farmer on deep
soils, or any that cattle prefer to it; the
chief things to be attended to with lucern
are, to deepen your soil as much as possible,
either by the spade, the common or the
subsoil ploughs; sow it in drills about nine
inches apart; do not believe those who
say it is as well sown broadcast. Ashes or
gypsum are the best dressings for it; hoe

r, is now
s kept set
, for the bark is
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rnips the beginning of
sown early produce the
heaviest crops; and the l
better for feed, both as
and consumption by th
roots have the most succ
early sowing, too, the you
insect enemies to enco
of failure, time is given
ing. This is the best m
foal, both on account o
grass and the mildnes
Rape and turnips for au
tory for wheat, are sow
of the month; at this t
ficial grasses, in some
early soils ready for th
generally left much too
in their prime when t
flower; after this the va
stem are lost.

GARDENER'S CALEND
den. *Angelica*, sow. A
clean beds of. *Asparag*
now into production.
top, &c. those advancing
&c. advancing crops;
Basil, plant out. *Bore*
b., prick out, attend t
and leave some for see
sow *b.*, plant, prick out,
Burnets, sow and pla
Balm, plant. *Cabbages*
&c. advancing crops. C

sow, leave
necessary.
ochio, sow,
ot-beds, at-
ow, and
b.;
ds.

d,
Po-
t, sow *b.*
Hamburgh,
Purslane, sow,
yroyal, plant. *Ra-*
r seed. *Rosemary*,
rooted, sow *e.* for.
plant. *Salsafy*, thin,
n, &c. *Spinach*, sow.
some for seed. *Sage*,
t, sow *b.*, prick out.
v. *Savory*, sow, and
, and plant. *Tomatos*,
, plant. *Turnips*, sow,
eave for seed. *Turnip*,
me, sow, and plant.
—Propagate perennial
by cuttings; increase
by slips of the young
Sow annuals for suc-
eet peas, nasturtiums,
s adonis, &c.; take up
s, &c. which have done
them in the shade to

kly now; hoe them up
em; support all flowers
em upright, clear away
from your carnations,
earth round with your
ok round the borders
egular shoots.
y Notices.—The He-
onth of their calendar
s with the fifth of our
Chaldaic word, signify-
the Romans called it
Rhea, the goddess of
ne of her epithets, ac-
ius; though Plutarch
after Maia, the mother
Ovid maintains it was
r of the patricians (à
of which appears so
derivation assigned by

Macrobius. The Anglo-Saxons knew it as *Tri-milchi*, because their cows, stimulated by the fresh herbage, were so productive of milk as to enable the proprietors to bring them with advantage to the pail three times a day. The name of May was introduced by the Normans. Romulus made it comprise thirty-one days, which have never been diminished.

Well might the Easterns consider this as oicing month of nature, and the Ro- licate it to the earth; for in our during its days, the earth is in , happiest appearance—it is her gh festival of beauty and delight, and been known as the "merry" month in every age to which our records reach. In days of more simple manners, the first of May was in every village the merriest day in "merry England;" for every hamlet had a May-pole on its green, around which the village population gathered,—the elderlies to share a cup of neighbourship, and to talk of by-gone Mayings, when they danced as joyously round "The May column" as their children were now tripping before them. The custom is almost extinct, and with it one incentive to rustic virtue and amiability; for that maiden was usually selected Queen of the May, who was most generally beloved among her village associates, and no esteem is general but such as is merited. For a particular account of all the pastimes which in those days were peculiar to this season, we must refer our readers to Bourne, Hutchinson, Strutt, and Brande. One gawd or shew had such an elegance in its allusion, that it tempts us to narrate it. "May-day," says Brande, "was considered the boundary-day between winter and summer, allusively to which there was instituted a sportful war between two parties; the one in defence of the continuance of winter, the other for bringing in the summer. The youths were divided into troops, the one in the livery of winter, the other in the gay habit of the spring. The spring was sure to obtain the victory, which they celebrated by carrying triumphantly green branches and May flowers. It was always a sham fight." (*Farmer's Almanac.*)

MAY-DAY. See May.

MAY-TREE. See Hawthorn.

MAY-WEED, THE SCENTLESS. See Corn Feverfew.

MAY-WEED, THE STINKING, or MATHER. See Camomile.

MEAD. (Dutch, *meede.*) An agreeable vinous liquor made from honey. The use of this substance as one of the ingredients in drink is of very ancient date. When fermented, honey-water obtains the name of mead, which is, in fact, honey-wine: indeed

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its original fertility. In most cases (says a writer in the *Penny Cyclopædia*) the shortest method and the best is to plough it up, clean and manure it during a course of tillage, without taking very exhausting crops from it, and then to lay it down again, in a clean and enriched state, by sowing the best sort of grass seeds; or,
hich is preferable, by inoculating or
ting in it small tufts of grass from
ich meadow, which will soon in-
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when the soil is a very stiff
small depth of good mould
some danger in breaking
, for it will take a long time
manure to re-produce a proper
ng of sward. In this case it is a pre-
able practice to scarify the meadow, by means of instruments which do not go deep, but only tear up the surface. If this is done in early spring, when the ground is moist, and the whole surface is brought to resemble a fallow field, good grass seeds may be immediately sown. If rich manure, mixed with lime or chalk, is then evenly spread over the land, and the whole well harrowed and rolled, the old and young grass will spring up together, and show a wonderful improvement in a very few months. Great Britain and Ireland are reputed to possess the most verdant pastures and the finest natural grasses in the vegetable creation.

In extent of meadow and pasture land, as well as in flocks, Great Britain and Ireland (says a French statistical account) are the most favoured countries in Europe. They contain 5572 square leagues (more than two thirds of their territory), in meadow and pasture land. Germany comes next, having one quarter of its surface in this description of land. Prussia, Holland, and Belgium have a fifth; Austria and Switzerland a sixth. France does not reckon in this respect more than a seventh part, namely, 4000 square leagues. Italy, Naples, Sicily, and Portugal have only a tenth. (*Brit. Husb.* vol. i. p. 485.; *Pract. Husb.; Penny Cyclo.* vol. xv. p. 34.) See PASTURE.

MEADOW BOUTS. See MARSH-MARIGOLD.

MEADOW FOXTAIL. See ALOPECURUS and GRASS.

MEADOW-GRASS. See POA, COUCH, and GRASSES.

MEADOW OAT-GRASS. See AVENA.

MEADOW PEPPER-SAXIFRAGE. See PEPPER-SAXIFRAGE.

MEADOW RUE. (*Thalictrum*, from *thallo*, to grow green, in allusion to the bright colour of the young shoots.) An

Queen Elizabeth was so fond of mead, as to have had it made every year for her. Her receipt for it has been preserved, and is given by Dr. Bevan, in his interesting little volume on the Honey Bee:—Take of sweet-briar leaves and thyme each one bushel, rosemary half a bushel, bay leaves one peck. Seethe these ingredients in a furnace full of water (containing probably not less than 120 gallons): boil for half an hour: pour the whole into a vat, and when cooled to a proper temperature (about 75° Fahr.), strain. Add to every six gallons of the strained liquor a gallon of fine honey, and work the mixture together for half an hour. Repeat the stirring occasionally for two days; then boil the liquor afresh, skim it till it becomes clear, and return it to the vat to cool: when reduced to a proper temperature, pour it into a vessel from which fresh ale or beer has just been emptied; work it for three days and tun. When fit to be stopped down, tie up a bag of beaten cloves and mace (about half an ounce of each), and suspend it in the liquor from the bung-hole. When it has stood for half a year, it will be fit for use. Such was the receipt.

In Wales, in ancient times, mead was held in very high repute; as appears from an ancient law, which has been given by Dr. Bevan, that—"There are three things in court which must be communicated to the king before they are made known to any other person: 1st, every sentence of the judge; 2d, every new song; 3d, every cask of mead." The mead-maker was the eleventh person in dignity at court, and took precedence of the physician. Besides the preparation of mead, our forefathers were accustomed to flavour their usual

the Duke of Northumb
House, and afterwards to
therine at Peterhoff, near
published the following wo

1. The Modern Gardener, or Un
taining monthly directions for all
dening, to be done either in the Ki
or Pleasure Gardens, as likewise in
Stove; with the method of per
works, according to the best practic
Gardeners. Also an Appendix, g
for forcing Vines, Peach, Nectarin
manner, never before published: s
MSS. of the late Mr. Hitt. Revis
proved, by J. M.; London, 1771. 12
Guide, or Pleasure Gardener's Com
directions, with observations for
and management of the various T
Pleasure Garden Plantation. To
of Hardy Trees and Shrubs for o
dens. Embellished with Copperpl
royal 8vo. (*G. W. Johnson's Hist.*

MEADOW. A field
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hay, which though not eq
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See GRASS, HAY, IRRIGAT

Some meadows of great
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of soiling, that arable fields are
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to hay; and when, from the na-
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ploughed up again, greatly im-
this change of cultivation.
natural meadow has been neg-
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quires much care to restore it to its original fertility. In most cases (says a writer in the *Penny Cyclopædia*) the shortest method and the best is to plough it up, clean and manure it during a course of tillage, without taking very exhausting crops from it, and then to lay it down again, in a clean and enriched state, by sowing the best sort of grass seeds; or, which is preferable, by inoculating or planting in it small tufts of grass from some rich meadow, which will soon increase, and produce a new and improved sward. But when the soil is a very stiff clay, with only a small depth of good mould over it, there is some danger in breaking the old sward, for it will take a long time and much manure to re-produce a proper covering of sward. In this case it is a preferable practice to scarify the meadow, by means of instruments which do not go deep, but only tear up the surface. If this is done in early spring, when the ground is moist, and the whole surface is brought to resemble a fallow field, good grass seeds may be immediately sown. If rich manure, mixed with lime or chalk, is then evenly spread over the land, and the whole well harrowed and rolled, the old and young grass will spring up together, and show a wonderful improvement in a very few months. Great Britain and Ireland are reputed to possess the most verdant pastures and the finest natural grasses in the vegetable creation.

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MEADOW OAT-GRASS. See AVENA.

MEADOW PEPPER-SAXIFRAGE. See PEPPER-SAXIFRAGE.

MEADOW RUE. (*Thalictrum*, from *thallo*, to grow green, in allusion to the bright colour of the young shoots.) An twice ternate, somewhat pinnate; leaflets dark green, and shining above; glaucous and concave beneath. Stem perfectly simple, and almost naked, with a simple terminal cluster of drooping whitish-yellow or rather tawny flowers, which blow in June.

2. Lesser meadow-rue (*T. minus*). This species is perennial, grows in chalky pastures, especially such as are rather mountainous; or in shell sand on the coast. Root creeping. Stem from four to twelve inches high, glaucous, smooth, somewhat angular, more or less zigzag on the lower part. Leaves doubly pinnate, then ternate; leaflets various in figure and size; glaucous on both sides. Flowers, which appear in June, purple, with white edges, and pale, in compound panicles, pendulous; stipules rounded; seeds furrowed.

3. Greater meadow-rue (*T. majus*). This species is twice or thrice the size of the last, and grows on bushy hills in the north of England. It is also perennial, and flowers in June and July. The stem is three feet high, or more, purplish, angular in the upper part. Leaves triply pinnate; leaflets ternate, lobed, of a dark shining green on the upper side, glaucous beneath. The flowers appear in branched panicles, aggregate, and somewhat umbellate. Flowers purplish-green, on long stalks, drooping. Stipules crescent-shaped, notched.

4. Common meadow-rue (*T. flavum*). This species is found very common in wet meadows, and about the banks of rivers and ditches. The plant is perennial, and flowers in June and July. The root is fibrous, yellow. Stem three or four feet high, erect, furrowed, leafy. Leaves doubly pinnate, partly three-lobed; leaflets smooth, veiny, deep grass-green, or slightly glaucous above.

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See Spiræa.

MEADOW THISTL

MEAL. (Dutch, *mee*
of wheat, oats, rye, barle
ferent kinds, ground into
flour. See Flour.

MEASURES. See W
sures.

MEAT. (Sax. mœte,
appellation for the fles
prepared for human food.
Cattle, Mutton, Pork,

"In whatever manne
observes Mr. Donovan,
derable diminution of s
consisting chiefly of wat
matter, and fat. In an e
view, a comparison of th
the two most usually e
roasting and boiling, is in
not occupied the attenti
much as the importance o

	lbs.
unds of beef lost in boiling -	26½
unds of beef lost in roasting -	32
unds of beef lost in baking -	30
unds of legs of mutton, averaging t 9½ pounds each, lost in boiling	21⅓
ounds of shoulders of mutton, aging 10 pounds each, lost in ing - - - -	31⅓
nds of loins of mutton, averaging unds 12 ounces each, lost in ing - - - -	35½
nds of necks of mutton, averaging unds each, lost in roasting -	23⅓

he loss in boiling beef or mutton was
n in roasting. And it appears that
ses by the cooking about one fifth to
rd. A few years since, I undertook
perintendence of some experiments
same tendency, with the view of in-
the results in this volume. These
were made on several parts of the
t animals, with as much attention
racy as the nature of the subject
ted. They were made on different
s of the same kind of meat, at vari-
sons, both in England and Ireland.
xperiments are exceedingly trouble-
nd occasion no small inconvenience;
erefore, the less surprising that the
has been so little investigated; and
lowing results, in the absence of any
o particularly detailed, will, perhaps,
interesting. Allowance must be made
nature of such processes, as the dif-
of fixing an average price of meat,
d poultry, owing to variations occa-
by the supply and the season, the
f uniformity in the prices of the city,
y the exorbitant demands of some
s of these articles. The degree of
was in all cases brought to a stand-
cutting off all excess, and leaving the
n a proper state for housekeepers'
The meat was in all cases cooked as
as possible to the same degree, and
ights were determined with exact-
voirdupois weight throughout is in-
The bones were entirely stripped
r meat previously to their being
d. The only cost taken into account
of meat, leaving out fuel, &c.

periment 1.—A piece of beef, roasted.
isted of four of the largest ribs, and
ot remarkably fat: its weight was
s. During the process of roasting it
lbs. 6 oz., of which 10 oz. were fat,
oz. were water dissipated by evapora-
When the meat was dissected off with
most care, the bones weighed 16 oz.
, the weight of meat, properly roasted
for the table, was but 7 lbs. 11 oz., out
lbs. originally submitted to experiment. This beef would cost in London 8½*d.* per lb. The roasted beef cost, therefore, 12⅕*d.* per lb. In another trial, a piece of beef of the same description, the tops of the ribs having been rejected with their meat, was submitted to the same mode of trial; the weight of bone in 10¾ lbs. was 16 oz., and the fat 11 oz., which agrees with the former estimate."

Other parts are submitted to similar tests, and we learn, of mutton —

"*Experiment* 17.—A leg of mutton, weighing 9¼ lbs., when boiled gave 1 lb. of bone, shank included; it lost in the boiling 1 lb. 2 oz.: the meat weighed 7 lbs. 2 oz. If the butcher's price was 8*d.* per lb., the meat cost about 10¼*d.* per lb.

"*Experiment* 18.—A similar leg, weighing 9 lbs. 6 oz., afforded 15 oz. of bone, and lost 12 oz. in the boiling: the meat weighed 7 lbs. 11 oz. At 8*d.* per lb. butcher's price, the boiled meat would cost 9¾*d.* per lb.

"*Experiment* 19.—A leg of small Scotch mutton, weighing 6 lbs., afforded 10½ oz. of bone, lost 5½ oz. in the boiling, and the meat weighed 5 lbs: cost 9½*d.* per lb., if butcher's price be 8*d.*"

The following are miscellaneous: —

"*Experiment* 28.—A fore quarter of lamb, weighing 9 lbs., afforded, when roasted, 20 oz. of bone, and lost 1¾ lb. in the roasting: the meat weighed 6 lbs. If the butcher's price be 8½*d.* per lb., the roasted lamb costs 12⅔*d.* per lb.

"*Experiment* 31.—A hand of salt pork, weighing 4 lbs. 5 oz., lost in boiling 11 oz. The bone weighed 9 oz.: the meat was 8 lbs. 1 oz. If the first cost of the pork was 7½*d.* per lb., the meat, when duly boiled, cost 10¼*d.* per lb.

"*Experiment* 34.—A knuckle of veal weighing 6 lbs., when duly boiled, lost half a pound. Its bones, perfectly cleared of meat, weighed 2 lbs. 6 oz.; the meat weighed 3 lbs. 2 oz. Hence, if the butcher's price was 5½*d.*, the boiled meat cost 10½*d.* per lb.

"*Experiment* 35.—A goose, properly trussed, weighed 4½ lbs.: in this state it was roasted, and, when 'sufficiently done, was found to have lost 18 oz. The skeleton weighed 12 oz.: the meat weighed 3 lbs. This goose would cost, in London, 4*s.* 6*d.* Hence the roasted meat amounted to 1*s.* 8½*d.* per lb.

"*Experiment* 41.—A turkey, with its liver and gizzard, weighing 4 lbs. 14 oz., was boiled: it lost 12 oz. The skeleton weighed 13½ oz.; the meat, 3 lbs. 4½ oz. If this turkey cost 3*s.* 6*d.*, the boiled meat amounted to 1*s.* 1*d.* per lb.

"*Experiment* 43.—A young duck, weighing 20 oz., lost 5¾ oz. in roasting. Its bones which, when trimmed, and ready for boiling, weighed 23¼ oz. (including the weight of the roe, 2½ oz.). It cost 10*d.* It lost 1¾ oz. in the boiling. The skeleton, carefully collected, along with gills, fins, and tail, weighed 4¼ oz. Hence, the cost of the eatable parts of the boiled fish was 9⅓*d.* per lb.

It will now be necessary to collect the results of all these experiments into a kind of conspectus, for the sake of more easy comparison; and it is to be understood, that, in the following estimates, when the butcher's price is mentioned, it of course comprises meat and bone in the usual manner. But, when the ultimate cost of the cooked meat is specified, it refers to the price cost of the meat only, the bone being considered valueless: and it is supposed that the fatness of the meat was such as good meat is expected to have, without any redundancy being left on it. From an average of five experiments, it appears that, when the butcher's price of ribs of beef is 8½*d.* per lb., the cost of the meat, when duly roasted and fit for the table, is 11¼*d.* per lb., and that the average loss of weight arising from the liquefaction of the fat, and the evaporation of water from the juices, is 18 per cent. From an average of six experiments, it appears that, when the butcher's price of sirloins of beef is 8½*d.* per lb., the cost of the meat, when duly roasted and fit for the table, is 1*s.* 1⅛*d.* per lb., and that the average weight lost during the roasting is 20⅓ per cent. From an average of other experiments, it appears that when the butcher's price of salted briskets of beef is 6*d.* per lb., the cost of the meat, when duly boiled and fit for the

by roasting is $27\frac{7}{10}$ per ce
age of two experiments, it
the butcher's price of sho
7*d.* per lb., the cost of the
is 11*d.* per lb., and the
roasting is 28 per cent.
of experiments it appea
butcher's price of the fo
is 8½*d.* per lb., the cost
roasted, is 1*s.* 1¼*d.* per lb
roasting is 22¼ per cen
ment 30, it appears that,
hams be 10*d.* per lb., the
skinned, and browned wil
per lb., and the loss by
cent. From experiment
pears that, when the ha
pork average 8*d.* per lb
amounts to 10⅓*d.* per lb.
boiling is 13⅓ per cent
periment it appears that,
bacon is 8*d.* per lb., the
boiled, skinned, and bro
10½*d.* per lb., the loss in b
6¼ per cent. From exp
pears that, when the b
knuckle of veal is 5½*d.*
duly boiled, costs 10½*d.*
boiling being 8⅓ per cent.
age of experiments 35,
that, at the prices of ge
average 12½*d.* per lb. for
cost of the roasted flesh
and the loss per cent
average of three experi
that, at the prices of turk
average 10*d.* per lb., the
flesh is 1*s.* 2⅓*d.* per lb.,
cent is 20⅓. From an
riments 41 and 42, it a

l flesh is 2*s.* 8*d.* per lb., and the loss
s 27⅛. From experiments 46, 47,
appears that, at the prices of
uoted, which average 1*s.* 6½*d.* per
w state, the roasted flesh amounts
per lb., and the loss per cent. is
n an average of six experiments,
that, at the prices of chickens
l, the average cost of the boiled
8*d.* per lb., and the average loss
cent. From an experiment it
at, when turbot in the raw state
9¼*d.* per lb., the boiled fish costs
lb.; the loss in boiling is 5⅝
From experiment 56, it ap-
, when mackerel sells in the raw
d. per lb., the boiled fish costs
b., the loss in boiling being 7½
From an experiment, it ap-
the roasted flesh of a woodcock
costs 16*s.* per lb., and sometimes
he flesh of the quail is still more
This bird, when fattened, is
e enormous price of 3*s.*; and,
wance is made for the loss in
d the bones, the meat may be
t 2 oz., which brings the cost of
l flesh to 1*l.* 4*s.* per lb.! Those
ch morsels are necessary are not
d. A haunch of venison, weigh-
will cost 3½ guineas. The meat
en roasted and detached from
ill amount to about 3*s.* 10*d.* per
the animal was more than usually
The following statement gives
in a still more abstract form;
ces apply to London only. The
arranged in the order of their
n the London market:—

Articles of Food imated.	Cost per lb. raw.	Cost per lb. cooked.	Loss per cent. in cooking.
	d.	*d.*	
of beef, boiled	6	7¾	13 1-5
nd of beef, do.	6	8¼	13 7-10
et of beef, do.	6	8¾	18
p. - -	6¾	9⅓	7½
ton, do. -	8	10	10
part, do. -	8	10⅓	6¼
g of salt pork, do.	8	10⅓	13⅓
eal, do. -	5⅓	10⅔	8⅓
f mutton, roasted	7	11	28
do. - -	8⅓	11½	18
ed - -	9⅔	11½	5 5-9
ton, roasted -	8	12	21 7-10
iled - -	10	13 1-9	16
ef, roasted -	8⅓	13½	20⅓
r of lamb, do. -	8⅓	13⅓	22⅓
d - -	10⅔	13⅔	12⅔
ton, over-roasted	8	14	27 4-10
asted - -	10	14⅓	20⅓
ung-beef, ribs -	12	18	9 1-5
ed - -	12½	19	19⅓
, do., cheap season	- -	24	
asted - -	18⅓	31	14 3-5
oiled - -	18⅔	32	13⅓
ted - -	13¼	32	27 1-6
enison, do. -	- -	46	
ge, crammed -	- -	50	
, scarce season -	- -	192	
ned - -	- -	288	

It appears from the experiments, that

The loss per cent. on roasting beef, viz. sirloins and ribs together, is -	19⅙
Do. on roasting mutton, viz. legs and shoulders together, is - -	24⅘
Do. on roasting lamb, viz. the fore-quarter, is - - -	22⅓
Do. on roasting geese, is - -	19½
Do. on roasting turkeys, is - -	20½
Do. on roasting ducks, is - -	27⅛
Do. on roasting chickens, is -	14⅗

Thus, the loss on roasting varies from 14⅗ to nearly double that rate. The average loss on roasting butchers' meat is 22 per cent., and on roasting domestic poultry is 20½.

The loss per cent. on boiling mutton, viz. legs, is - - -	10
Do. on boiling hams, is - -	12½
Do. on boiling salt beef, is -	15
Do. on boiling salt pork, is -	13⅓
Do. on boiling bacon, is - -	6¼
Do. on boiling knuckles of veal, is -	8⅓
Do. on boiling turkeys, is - -	16
Do. on boiling chickens, is - -	13¼

Thus, the loss on boiling varies from 6¼ to 16. The average loss on boiling butchers' meat, pork, hams, and bacon, is 12, and on boiling domestic poultry is 14¾. These estimates of butchers' meat do not agree with those of Professor Wallace. I shall select for contrast all those cases that can be compared.

	Wallace.	My trial.
100 pounds of beef lost in boiling - - -	26½	15
Do. in roasting - -	32	19⅙
100 pounds of legs of mutton lost in boiling - -	21⅓	10
100 pounds of shoulders of mutton lost in roasting	31⅓	28

The average loss in boiling and roasting together is, according to Professor Wallace, 28 per cent.; according to my trials, it is but 18. I know not how to reconcile these results otherwise than by supposing a difference in the meat, or its fatness, or in the duration of the heat. I used meat of sufficient, but not unprofitable fatness, such as is preferred in families; the meat was in all cases a little rare at its centre, and the results were determined with the utmost care. In great public institutions, where economy is studied, and every thing is regulated by weight and measure, tables of this kind do not afford a guide that is to be implicitly relied on. It is obvious that another element must be taken into the calculation, to insure true results; the ratio in which each article of food satisfies the appetite, which varies with almost every individual.

Butchers' meat, taking one kind with

wholesome.

In order, then, to equalise the animal and vegetable matter, and to increase the total quantity, the ratio should be 8½ oz. of boiled mutton, 10 oz. of potato, and the same of turnip; the total amount of food swallowed will be 28½ oz., but the quantity of real nutriment will be but 6 oz., half being animal and half vegetable matter. This is certainly a sufficient meal for most persons who have but little laborious occupation; for, if a pint of liquid be drunk at the same time, the load on the stomach will weigh 3 lb; and this will be increased to 4½ lb. if a pint of wine be swallowed. Now, the difference between 8½ oz. of boiled meat and 10 oz. appears very trivial; but, if the greater of the two quantities be persevered in regularly every day for the term of a a man's adult life of half a century, it may excite a little surprise in the person who practises it, to learn that he will have consumed a flock of sheep, consisting of about fifty-three head, in excess above what he ought to have made use of. In a life of sixty-five years, allowing 8½ oz. per day for fifty years, two thirds of that quantity for ten years, and 3 oz. a day for three years of childhood, the total animal food amounts to 350 sheep. If to this be added the excess above mentioned, the number of sheep, the cooked meat of which is devoured by one man during a life of sixty-five years, is about 400; along with five tons of potatoes, about the same of turnips or other vegetable, nine tons weight of common drink, and six tons weight of wine, at one pint per day for thirty years only: thus, for dinner alone, above thirty tons weight of solids and liquids must have passed through the stomach. Inordinate work will wear out

As the conducting of
a proper manner is so in
with the prosperity of th
it, and the character o
nursery of good stock, I
mer's information, give
Journal of Agriculture,
derived from experience
live stock and meat, and
both for the London ma

1. *Selection of Cattle*
selection of cattle to b
should invariably possess
small bone, carrying the
beef on the most valua
rumps, loins, and crops;
vered, the buttocks and
up, and the whole carcas
ness of flesh, excepting th
parts. They should hand
order to stand well the
and look well in the mark
whether heifers or oxen,
A good coat of hair, too,
a sea voyage on deck, an
cattle to stand the vicis
in the markets, and it e
turned out in safety, in
not be disposed of on th
Thin-coated cattle alway
are, in fact, so under
Cattle only possessing th
perties should be sent to
and any others will assu
the shipper. An ox o
properties, weighing eight
field stone of 8 lb., wil
more money than a co
weighing 100 stones. H
ever, do not take readily
cent for a month about

Angus and Aberdeenshires, of fine s and thick backs, take well; and some, well-bred short horns also take ly, but do not realise so much money alloways or West Highlanders. Fine es are also very saleable.

e meat intended to be sent to the ss market in London should be taken such cattle as we have described. It large quantities of lean and fat that wanted there, but both well mixed. nd heifer beef of equal quality com- the same prices. Rumps, loins, crops, ther fine parts fitted for roasting and , are more in demand than the boiling , and realize comparatively higher , and therefore they alone should be Coarse beef always fetches low prices ndon, and therefore should be pur- d (to use a sporting phrase) at a low in the country to return any profit, e best buyers look more to quality quantity; and as this quality of beef her cheaper in London than in Scot- shippers should be cautious in sending uch thither.

Selection of Sheep and Mutton.—Ripe, act sheep, of light weights, carrying a proportion of lean on the back, loins, lder, with a full round leg and carcass, are admirably suited for field. Such, from 14 lb. to 20 lb. quarter, will take readily; but they most valuable from 16 lb. to 18 lb. nearer the form and quality approach of South Downs the more likely are to command the top prices; for the have long been unrivalled favourites ithfield. True bred Cheviots and the faced Linton breed approach nearly to alities of the South Downs, and com- as high a price. Half-breeds from ter rams and Cheviot and black-faced which resemble the true breeds in form ality, form saleable sheep in London. ld black-faced breed are too thin in and back, and are in London termed y." There are by far too many of nd sent from Scotland, and they are ally, besides, only half-*meated*, or half d of course only fetch middling prices. however, generally please the con- for flavour. Pure bred Leicesters fat, unless they are sent young, and exceed 20 lb. per quarter; when that weight they fetch inferior prices. outh Down or Scotch sheep, of quarter, will fetch 7*d.* per lb. by ass, whereas a heavy Leicester, r, Lincoln, or Kent, of 24 lb. a nd upwards, will realise no more

arcasses of mutton to be sent to London should, of course, be those of sheep such as are here recommended to be sent alive. Large quantities of fat are not so desirable as a proportionable mixture of fat with the lean. In using the loins and other parts of very fat mutton for chops, much of it has to be pared away, and sold for the price of raw fat, perhaps 4*d.* a pound; whereas well mixed chops may be sold for 7*d.* or 8*d.* a pound. This shows the nature of the mistake committed in sending fat heavy mutton to London. The great point is, to select ripe mutton and sheep; for the latter will stand the voyage better than half fat, and will not lose half the quantity of flesh in three days as the latter. No over-grown animals, having masses of fat on one place and not on another, would therefore command the top price: but those having plump carcasses, well mixed with fat and lean, firmly and equally laid on, with fine symmetry and valuable points, will always command the top price, both at Smithfield and the carcass markets.

3. *Selection of Lambs.*—Lambs are a favourite stock to send to London, and they are always sent alive. Leicester lambs are admirably adapted for the London market. They are handsome, compact, thick on all the points, and although they might become too fat when grown to sheep, they cannot be too fat as lambs. Their flesh is white, a property much admired in London, and every joint of them looks well on the table. The lambs of the cross between the Leicester and the Cheviot and black-faced ewes are next best for fat and lean, and cut well into joints, although they have not the handsome figures of the pure Leicester. True Cheviot and black-faced lambs, unless very fat, do not take so well in Smithfield, not being so compact, taking longer time to come to maturity, not cutting up so thick, and presenting small joints on the table; but they make very delicate and high-flavoured chops. No lambs should be sent to Smithfield until they are at least three months old, and have obtained the weight of 9 lb. or 10 lb. a quarter; and if they are not fat enough, and have not attained that weight at that age, they should be kept on. Shippers may calculate on a loss of 1 lb. a quarter on the voyage: unless, therefore, lambs are from 9 lb. to 10 lb. a quarter, they would be too small after that loss, and they then become unsaleable except at low prices. Ewe lambs are preferred, being more delicate than wethers, which are next in value, for ram lambs are very unsaleable. All wether lambs, therefore, intended for Smithfield, should be castrated when a few days old, and their tails cut short, leaving not more than three inches. The docking gives

and from this weight up to 60lb. or 70lb., they are termed *dairy fed porkers*. If at the former weight, they are of good symmetry, fine quality, delicate and white in the flesh, and not more than 1 inch or 1¼ inch thick of fat on the back, they will fetch the top price of the day. Pigs of the average weight of 60lb. will give about 7*d.* per lb.; from 70lb. to 100lb., averaging 85lb., and 2 inches thick of fat, 6*d.* per lb.; from 100lb. to 150lb., averaging 130lb., and about 2½ inches of fat, 5*d.* to 5¼*d.* per lb.; from 150lb. to 200lb., averaging about 170lb., and about 3 inches of fat, 4*d.* to 4½*d.* per lb.; and all above the last weight and thickness of fat, only about 3½*d.* per lb. Besides the large-sized, a very small fat pig is not relished in London. Indeed, we need not be surprised at this preference, when we consider that only the small lean and fat porkers are used for roasting, chops, and pickled pork, and the large fat pigs are chopped down for sausages. No pigs, therefore, should be sent to London exceeding 100lb., exclusive of head and feet, but which are only moderately fat and of fine quality; all other qualities should be cured as flitch bacon and hams. Pigs, if possible, should be sent alive to London. Occasionally they arrive in pretty good order in carcass; but in carcass, in thick weather, the flesh becomes very soft, and the skin dry; and in dry weather the skin becomes quite hard and brown-coloured. Of equal qualities, the live pig will draw from a halfpenny to a penny a pound more than in carcass. Feeders of pigs should be careful on what they feed their pigs, especially fish. The retail butchers are such nice judges of pork, that on buying a carcass at Newgate or Leadenhall market, and cutting a slice, they can detect the

and we think it is, it m
the London butchers n
extensive and varied e
one has only to witness
formed by expert Lon
satisfied that they dis
their art, and execute
utmost precision. In
with which they divide
lities of meat from the
their thorough knowle
of meat; and the vari
different parts of the
shows with what accur
the tastes of the vari
customers.

In practising this pre
make the best use of th
the highest value for i
time gratify the taste of
ber of customers. In
animal, an ox, for insta
ent qualities of meat,
are situated in different
All the best parts are
roasting and steaks, a
boiling, either in pieces,
soups, or minced meat,
of pies, sausages, &c.

The carcass of an o
following pieces, as ma
ring to the numbers o
fig. 1.

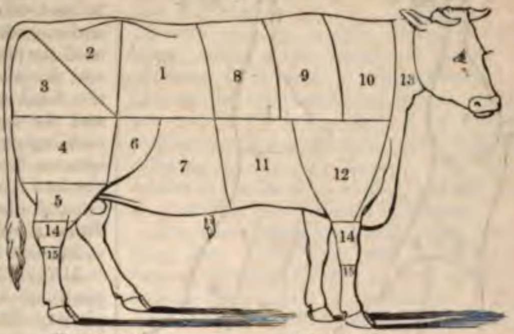
The relative value of
of an ox may be stated at
viz., when the rumps, lo
a fine ox fetch 8*d.* a pou
buttock, and middle rib
itch or adze-bone, thi
brisket, and leg of mut
clod and sticking, and

erefore obvious, that,
methods of cutting
the London affords
of roasting and steak,
more valuable pieces,
same carcass; and
more money would
realised from it.

f what we have said
nagement requisite in
ef to the London mar-
pply equally to send-
n, veal, or lamb to
market. The best
y should be sent to
d the remainder kept
ne market: and were
mendation attended
enses of exportation
diminished on what
for the best pieces
k well together in
tively small space,
ole carcasses of mut-
he roundness of the
y much unnecessary
hich freight must be

is also cut up differ-
ondon and Scotland,
seen on referring to
at the top of next
hich the first repre-
ondon method.
fore quarter, No. 1 is
er, 2 and 2 the neck,
shoulder has been
nd 3 the breast; and
d quarter, 4 is the
h, when cut double,
rtly from both sides
ass, is called a chine
and 5 is the leg. A
ton in London is cut
haunch is cut long,
he hook-bone, similar
ch of venison. The
loin is left attached to that part
quarter called the breast. The
de of cutting up mutton is re-
by *fig.* 2., in which, in the hind
o. 1 is the gigot, and 2 the loin;
fore, 3 the back ribs, and 4 the
shoulders. The gigot is cut about
etween the leg and haunch of
n method; and the fore quarter
t through the shoulders in two
ed back ribs and breast. Shoul-
utton are never cut off in Scot-
e being cooked, except by keepers
houses; but the London plan of
utton is decidedly the best, the
orming an excellent roast, and

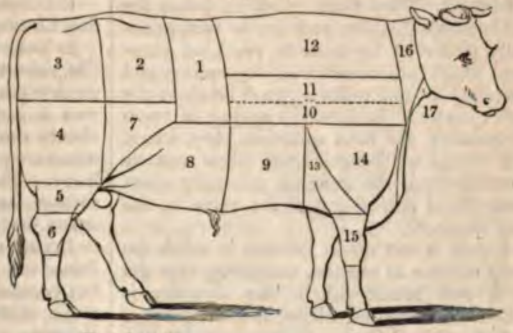
fig. 1.



Hind Quarter.
1. Loin.
2. Rump.
3. Itch or adze-bone.
4. Buttock.
5. Hock.
6. Thick flank.
7. Thin flank.

Fore Quarter.
8. Fore rib.
9. Middle rib.
10. Chuck rib.
11. Brisket.
12. Leg of mutton piece.
13. Clod and sticking and neck.
14. Shin.
15. Leg.

fig. 2.



Hind Quarter.
1. Sirloin or back sye.
2. Hock-bone.
3. Buttock.
4. Large round } rump.
5. Small round.
6. Hough.
7. Thick flank.
8. Thin flank.

Fore Quarter.
9. Nine holes.
10. Large runner.
11. Small runner.
12. Spare rib, or fore sye.
13. Brisket.
14. Shoulder lyer.
15. Nap or shin.
16. Neck.
17. Sticking piece.

the best end of the neck piece being admirably suited for chops.

The different joints of mutton almost vary as much in price in London as pieces of beef. The leg is sometimes sold as high as 10*d.* a pound, whilst the breast of the same sheep will only fetch 4*d.* or 5*d.*; and if, in the wholesale market, the whole carcass is sold at 6*d.* a pound, the hind quarter will be worth 7*d.* and the fore only 5*d.* From these facts it is obvious, that it is the interest of the shipper only to send hind quarters of mutton to London, for which 7*d.* a pound may be easily obtained, and a ready market for them in the west end butchers, who seldom deal in fore quarters.

fig. 1.

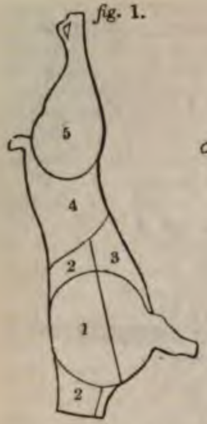
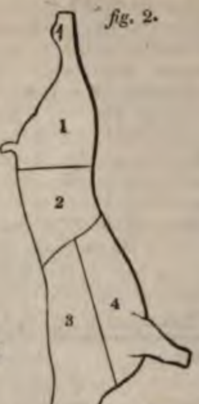


fig. 2.



The fore quarters could be sold at home; hence thus realising as much for them as they could fetch in London, besides saving on them the freight, commission, and wharfage. They form excellent joints for tradesmen's families, and are, in fact, generally preferred by them to the hind quarters, which are considered dry eating, and certainly do not make so good broth as the fore quarter. Besides the saving of room in packing the hind quarters, they would run no risk of being stained when sent by themselves, as the staining generally arises from blood oozing out of the veins in the fore quarter.

Lamb is cut up in London in much the same manner as mutton, excepting that the neck and breast, when the shoulder is taken off, is roasted whole, and the piece is called *ribs of lamb*. In Scotland lamb is cut up exactly as mutton.

Veal is cut up in London in a different way from any other meat. The knife is drawn between the buttock and itch-bone, and through the pope's eye, taking a sloping direction through the coarse end of the buttock, leaving a flap. The piece thus cut out is called a *fillet* of veal. It is like a round of beef with a part of the thin flank left to be skewered around it. The round bone is taken out, and stuffing put into its place. When the itch-bone and hook-bone are cut from the loin, the piece is called a *chump* of veal. The hind quarter of veal thus consists of fillet, chump, loin, and leg. The fore quarter is cut in the same manner as mutton, having shoulder, breast, and neck. In Scotland, veal is cut very much like mutton.

The London mode of cutting up pork is the same as the Scotch method of cutting up mutton, so *fig*. 2. will illustrate the mode; in which, in the hind quarter, No. 1 is the leg, and 2 is the loin; in
3, back-rib, chine or hand; and
and shoulders, spring or belly. The
used for pickling, and the hand for
and for chops, or sausages. In
the hind quarter consists of leg
and the fore of back-ribs and br
pickling or roasting, pork is cut in
quarter like that of English mutt
the fore like that of Scotch. In
tries, the ham is cut out alike. (
Dom. Econ.; Quart. Jour. of Ag
p. 241—281.) See Cattle and

MEDICK. (*Medicago.*) An
genus of herbaceous, mostly pr
plants. The perennial herbaceo
are sometimes cultivated for orna
will grow in any common garde
are increased by dividing the r
plants in spring. The shrubby
in a similar soil, and are readily
by cuttings. The seeds of the
cies require to be sown in the o
in spring. There are six indigeno

1. Purple medick, or lucern (
See Lucern.

2. Yellow sickle medick, or
(*M. falcata*). This perennial sp
on dry gravelly banks and old
root is long and woody. In ha
closely resembles lucern, but the
stems are procumbent, spreading
hairy. The clusters are uprig
shorter, and more dense than th
sativa, but this varies according t
or luxuriance. The flowers, wh
June and July, are generally p
but occasionally violet, and more
green, evidently from a combinati
two colours. The legumes are bla
sickle-shaped, not twisted in a s
lucern. This species is, perhaps
fodder as lucern, though less succ
from its position, less accessible to
It withstands severe winters b
lucern, and is eaten eagerly by
horses, though its stalks are hard

3. Black trefoil medick, or no
lupulina). This annual species is
mon in meadow pastures and
fields, where it flowers from May ti
The black medick has the habit
the procumbent yellow trefoils, an
general resemblance to the prop
or clovers, that it is often mistaken
of the smaller species. The form
of the seed-pods afford a ready d
The root is tapering, and somewh
Stems angular, trailing, about a
not branched except at the bottom
obovate, or wedge-shaped. Flow
yellow, from thirty to forty and u
each spike, which is at first round

ls ovate. Legumes kidney-shaped,
ed and veiny, single-seeded, turning
k when ripe. Sir J. E. Smith speaks of
as "one of the most valuable of artificial
sses, affording excellent fodder for
p;" but this good opinion is hardly borne
by experience, for though Arthur
ng makes favourable mention of it, Sin-
r, in his more recent experiments on the
ses, observes that it is only fit for light
, and these must be deep, as the root pe-
ates to a considerable depth. It does
appear to be fit for separate cultivation,
even to be employed in any large pro-
on in a mixture of other seeds; and the
being annual, its use is, therefore, con-
d to the alternate husbandry.

Spotted medick (*M. maculata*). This
nother annual species, growing on a
elly soil in the southern parts of Eng-
. The root is fibrous, beset with little
y knobs. Stems prostrate, various in
th. Leaflets inversely heart-shaped,
ed. Stipules dilated, sharply toothed.
ers yellow, rather small, two or three to-
er. Legumes spiral, depressed, fringed
long spreading bristles; when ripe,
n, not black. This has been mentioned,
not much recommended as a fodder for
he.

5. Flat-toothed medick (*M. muricata*).
is a doubtful native, growing on the
ust. It is an annual, and flowers in
and July. The stems are, however,
annual; stipules deeply toothed, hairy,
ell as the obovate somewhat rhomboid
ets. Legumes even, with short de-
ed radiating teeth, in a single row.

Little bur medick (*M. minima*). This
ittle prostrate annual species, growing
andy fields, but rare, clothed in every
with fine soft rather silky hairs. Sti-
half ovate, nearly entire. Leaflets
ate. Flowers, blowing in June and
, are four, five, or more in each cluster;
w, with a hairy calyx. Legumes or-
lar, with a double row of hooked spines,
ading in opposite directions. (*Paxton's*
Dict.; *Smith's Eng. Flor.* vol. iii.
7.; *Hort. Gram. Wob.* p. 324.)

EDLAR. (*Mespilus.*) A genus of
e-growing fruit trees, which are very
amental, and therefore worth a place in
y shrubbery. Any common soil suits
m, and they are readily increased by
ding or grafting on the common haw-
or they may be increased by seeds,
do not vegetate till the second year
common medlar (*M. germanica*) is
ous, growing wild in hedges. The
s of this tree are spreading, and
in a wild state; but the thorns dis-
by culture, and are not to be seen in gardens. Leaves deciduous, lanceolate, four or five inches long, a little downy. Flowers solitary, nearly sessile, terminal, large, with white undulated petals, inodorous. Styles five. Fruit depressed, concave at the top, somewhat hairy; austere, not eatable till it is mellowed by keeping. Cultivation has produced many varieties, differing in size and flavour. The Dutch medlar is the finest as to size, and the Nottingham the most delicate in flavour.

The wood, being hard and tough, resembling that of the pear tree, is useful for various domestic vessels, as well as for the smaller implements of husbandry. (*Eng. Flor.* vol. ii. p. 360.; *Phillip's Fruits*, p. 228.)

MEDULLA, or MEDULLIN. (Lat. *marrow.*) In botany that tissue which constitutes the pith of certain plants, as the pith of the sun-flower. *Medullary rays* are the vertical plates of cellular tissue, which radiate from the centre of the stem of exogenous plants, through the wood to the bark. They cause that appearance in timber which carpenters call silver grain, or flower of the wood. The *medullary sheath* is a thin layer of vessels, which surround the pulp of exogenous plants, and thence extend into the leaves and parts of fructification.

MELIC-GRASS. (*Melica*, from *mel*, honey; the Italian name of the great millet.) A genus of perennial harsh grasses, with slender oblong panicles of elegant, often drooping, flowers, greatly varied in the different species. There are three indigenous species.

1. Wood melic-grass (*M. uniflora*), which is found frequent in groves and thickets. The root is creeping; stem eighteen inches high, smooth, slender, unbranched, leafy. Leaves deep green, flat, thin, taper-pointed, with fine rough ribs and edges. Sheaths nearly, or quite smooth, half as long as the leaves. Panicle branched, drooping towards one side. Flowers erect, tremulous, elegant, variegated with green, white, and deep reddish-brown. Spikelet with only one perfect floret.

2. Mountain melic-grass (*M. nutans*). This species, as its name implies, inhabits mountainous woods in the north of England and Scotland. Root creeping, as in the preceding. Leaves smoother, and rather narrower, with an extremely short stipule. Panicle close, drooping, nearly simple, of the colour of the last-described species. Spikelet with two perfect florets. Petals beardless. In the Isle of Ramsay this grass is manufactured into twine for fishing-nets, which are remarkable for their durability.

3. Purple melic-grass (*M. cærulea*). This is a hard, coarse, reedy grass, varying

greatly in luxuriance, and growing in barren, sandy, boggy ground, especially about turfy pools on mountainous heaths. The root consists of many strong fibres, often twisted. From six inches to two feet high, according to the depth of soil it grows in. Culms rather bulbous at the base, with a single joint near the bottom. Leaves taper-pointed, rough, except at the back. Panicle close, drooping, nearly simple. Flowers pendulous, dull violet-coloured or brown. Petals beardless. Spikelet with two perfect florets.

For the purposes of pasture or hay, this grass is comparatively of no value. The country people make of the tough straws a neat kind of besoms, which they sell to the neighbouring inhabitants as a cheap, and no despicable substitute, for hair brooms: they are even made into baskets where better materials are rare. This grass is useful to point out the fitness of deep peat soils that are dry the chief part of the year for the production of ash, alder, and willow trees, &c.; and it will be found that on such parts of the peat as are destitute of this grass, they will not succeed so well, if at all. Mr. George Sinclair made some experiments on an exotic species, the fringed or or ciliated melic-grass (*M. ciliata*), which grows wild in Germany on hilly grounds, downs, and by the margins of woods; but the result of his observations only went to prove that it was one of the inferior grasses with respect to produce, nutritive qualities, and reproductive powers. (*Smith's Eng. Flor.* vol. i. p. 111.; *Sinclair's Hort. Gram.* p. 208. 286.)

MELILOT, COMMON, Melilot Trefoil, King's clover, Hart's clover. (*Trifolium officinale.*) This indigenous plant is very nearly allied to the long-rooted clover: the tapering root, however, appears to be strictly annual. The lower leaves are oblong, wedge-shaped; the upper ones elliptical: they are more serrate, and smaller in every respect than those of the long-rooted clover. The flowers are smaller and more drooping. The legume contains often more than two seeds, which is seldom or never the case in the long-rooted clover.

The common melilot grows wild in thickets, hedges, and the borders of fields, sometimes among corn. Stem two or three feet high, erect. Clusters unilateral, two inches or more in length, on long axillary footstalks. Flowers numerous, all drooping towards one side, of a full yellow, veiny. Stipules awl-shaped. Legumes prominent, acute, transversely wrinkled, hairy.

All the species of live stock are said to eat this clover. The whole plant in drying acquires a scent like new hay, but far

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lly too rich in their composition; and ely agree with Mr. Howison of Cross- House, Scotland, who considers mouldy from a pasture, *without any addition*, better than a compost. From several s' experience, he finds the latter makes ines luxuriant and the fruit large, but er so abundant nor high-flavoured. *Caled. Hort. Soc.* vol. iii. p. 213.) owever, the earth is to be obtained a less fertile source, the practice of Flanagan, gardener to the Marquis of hampton, may be advantageously ted. He forms his soil of three parts loam, and one part well rotted dung. ns. *Hort. Soc. Lond.* vol. iv. p. 188.) Dutch and German horticulturists their composts one or two years be- t is employed, of one third hazel loam, hird scouring of ditches, and one third rotted dung. Miller recommends, as r suited to our climate, two thirds of gentle loam from the surface of an old pasture, and one third rotten neat's- : whilst Abercrombie directs it to be d of two thirds of the top-spit from a common, adding sharp sand, if the contains but little, until it is half sili- matter, one sixth vegetable mould, ixth well-decayed horse-dung, or, if arth is not obtained from a pasture, -dung.

any case, even if simple earth is em- d, it is of considerable advantage to it procured two or three months at before required; and being kept be- a dry shed, to be frequently turned, rised, and the largest stones removed, eds being suffered to grow upon it, or d their seeds in its neighbourhood. ugh a common-hotbed is generally for this plant, yet a pit, as it is tech- y termed, is more economical; and, by ing a more regular temperature to be ned, renders the fruit in greater per- n. The pit is a rectangular frame or built of nine-inch brickwork, in pre- ce to boards (which have to be re- d every five or six years, if employed), feet high at the back, lessening to two nt, six or eight broad, and of any h required, but not less than ten feet. is to contain the tanners' bark, leaves, able-dung employed, and inclosed by a case of the necessary dimensions. Mr. h, gardener to A. Keith, Esq. of Ra- one, N. B., has suggested a mode of ing a pit, which renders the renewal of eat in it easy, and, as the committee d to examine it report, is the means derable saving, compared with the mode of forming an open bed. But lity with which linings may be applied is its best feature; for if by any chance the heat failed, there was seldom any alternative, in the old pits, but to break them up.

If a common hotbed is employed, fifteen barrow-loads of dung is the usual allowance to each light, which make it about six inches higher than is allowed for the cucumber-bed of largest dimensions. The melon is propagated by seed, which may be sown about the middle of January; but the usual time is about the same period of the succeeding month, or not even until its close, if severe weather: to be repeated towards the end of March, and lastly, in the first weeks of April and May. The length of time that elapses between the sowing and readiness of the fruit for cutting, of course depends in chief upon the variety employed. But, at all events, little time is gained by sowing before February is well advanced, and much more risk of failure incurred. On the average, fifteen weeks elapse; in the shortest and coldest days of winter, eighteen. As the spring advances, it decreases to eleven or twelve; these periods necessarily varying in different years. The mode of sowing, managing the seedlings, pricking out, &c., being the same as with cucumbers, only that a few degrees higher temperature is required, I shall refer the reader to that head to avoid repetition. It may be remarked in addition, that the pots in which the seed is sown should be three or four inches deep. Each sowing is best performed at twice, four or five days being allowed to elapse before the second insertion is made; this guards, as much as possible against failure. The pots should be plunged by degrees, and not at once, down to the rim. Those for pricking plants into must be about five inches in diameter. The first stopping is usually performed in the seed-beds. The bed being formed, and the heat become temperate, so that the mould can be applied without danger of being scorched, it must be spread over about two inches thick, and a tumulus, with a flat top, fifteen inches in height, and of the same breadth at the base, formed in the centre of each light. In two or three days the plants may be inserted, care being taken to remove them with as little injury as possible to the roots; for in proportion as these are injured, are the plants retarded. The removal should take place as soon after the attainment of the rough leaves as possible, or, at the latest, immediately on the appearance of the lateral runners. If the bed is not at this time ready, those from the earth of the seed-beds must be moved into pots, and those already in them turned into larger ones, from whence they may be finally removed at a farther as in cucumbers, as also the same precautions taken to admit air and light, and to shade and cover, &c. It is in the training and management of the foliage in particular, that the generality of gardeners are careless, although the labours of the physiologist and chemist have demonstrated how important it is that every leaf should be kept in its natural posture and vigour. So convinced was Mr. Knight of the little attention paid to this point, that he took some melon plants under his especial care. He placed one under each light, the glass of which was six feet by four; the branches were trained regularly, and secured by pegs in every direction; and still further to present the largest possible surface of foliage to the light, the leaves were held erect at equal distances from the glass. As great injury is sustained by these from the common mode of watering, it was so performed as not to touch them. By this simple additional care, the other routine of their management being the same as usual, the fruit attained an extraordinary degree of perfection, and ripened in an unusually short space of time. Mr Knight further directs, however, that whenever a sufficient quantity of fruit is set, the production of more leaves is to be prevented, if they cannot be exposed to the light without overshadowing the fruit, by pinching off the laterals as soon as formed. No part of full-grown leaves, however, should be destroyed, though far distant from the fruit. (*Mem. Caled. Hort. Soc.* vol. ii. p. 262.; *Trans. Hort. Soc. Lond.* vol. i. p. 223.) If the plants succeed well, they will spread over the entire bed in about five or six weeks; at which time a coating of fresh fermenting matter

must be raised three or
of bricks, otherwise th
From this the propriety
plant to a light is evid
being often six or seven
numerous, require, if t
training, the frame to
the season will allow it.

As soon as the fruit
looked over three or fo
to observe which is the
finest; of these, one t
footstalk, and the neare
better, must be left o
all others nipped off,
same time being broke
joint above it. Eight
of the large varieties, a
the smaller ones, is qu
left; if more are suffer
will either be of inferi
or not ripen at all. By
runners are often induc
in like manner be stop
they may produce rem
abundance are produce
if new seed is employ
happen, it is necessary
in doing this, the weak
riant must alike be re
average size being the
must always be kept
should be admitted as
as circumstances will a
and serene afternoons
glasses may be entirely
consideration left off
warm weather they ma
ten in the morning until
afforded to the plants d

ing, to have them painted or
lack; but what would be still
coal-ashes spread over the sur-
e bed, two or three inches deep,
smooth. This, I am of opinion,
le, from its power of absorbing
ing heat, and inferior in no other
drifted sea or river sand, recom-
y Mr. Henderson of Brechin
B., which, he observes, extirpates
or *wood-louse*, by preventing it
itself from the rays of the sun;
wn the steam; affords a bed for
as warm and as dry as tiles or
ains the moisture longer, whilst
s dry itself sooner than those
and is a powerful preventive of
he mildew. (*Mem. Caled. Hort.*
p. 117.) If tiles or slates are
they must be put under the fruit
it has attained the size of a wal-
ther materials immediately after
are well established. A regular
hould be kept up by moderate
applied with all the precaution
for cucumbers; but when the
ecoming ripe, water must be
gether withheld, or applied very
About thirty or forty days usu-
between the setting and full
the fruit; but this varies in the
and even on the same plant. As
es to ripeness, it must be gently
ce or three times during a week,
hat side which lies constantly on
will be blanched and disfigured.
ity is intimated by a circular
the footstalk, sometimes becom-
ish; but more decidedly by the
f a fragant smell. The cutting
performed early in the morning,
ruit kept in a cool place until
ther in an ice-pail, or certainly
ter. The whole of the stalk is
ning to it when cut. For the
of seed, some fruit of the ear-
l crops must be left; of these,
and firmest should be selected,
being guided by the same cir-
s as are mentioned for cucum-
two varieties should be grown in
rame, either when the seed is an
then it would be contaminated,
ruit is alone required, for their
d vigour almost always differing,
reatment is required by each.
ould cucumbers or gourds be al-
egetate in such a situation as to
l impregnation by insects. Both
n and cucumber, such seed only
kept as sinks freely to the bottom
Seed is best for sowing when
our years old; if less than two,
the plants raised from it are apt to produce a super-luxuriance of vine, and a multitude of male blossoms. If new seed is unavoidably employed, it should be hung in a paper or phial near the fire, until wanted, or be carried in the pocket for three or four weeks. If, on the contrary, the seed is very old, it should be soaked in milk-warm water for two or three hours before sowing. When twenty years old, it has been known to produce fruitful plants. For hand-glass crops, plants are required from sowings of the middle of March, April, or early in May, and whose fitness for planting out is marked by the rough leaf, &c., as intimated before.

The bed must be four and a half feet wide; in length proportionate to the number of glasses, which must be at least four feet apart; and eight barrow-loads of dung being allowed to each glass, it will be about two and a half feet high. It may be founded in a trench, if the soil is dry; but it is best constructed on the surface.

The earthing, planting, and other points of management, are precisely the same as for the frame crops. The temperature need not, however, be so high, the maximum required being 70°; but it must never sink below 65°, which may easily be accomplished by linings, &c. The runners must not be allowed to extend from beneath the glasses until June, or the weather has become genial and settled, but be kept within, as noticed for cucumbers. When allowed to escape, all dwindled or super-vigorous shoots must be removed, and the training be as regular as for those in the frames. The glasses raised upon props must, however, be kept constantly over the centre, as a shelter to the capital parts. The bed requires to be hooped over for the support of mats in cold or wet weather, and at night. If, from deficiency of glasses, papered frames are employed, the most unremitting attention is required, the plants being very apt to spindle under them. They may, however, be employed with advantage in the place of mats for sheltering and shading. If the weather is at all unfavourable at the time the fruit is approaching maturity, it is highly advantageous to place hand-glasses over those that are growing exterior to the original one. The latest fruit seldom ripen even with the greatest care and attention unless there are spare frames to inclose them entirely; those which do not are employed in pickling.

For a tolerable supply throughout the season, a small family requires one three-light frame and three hand-glasses: these together will yield, on the average, thirty or forty melons. The largest establishment freer admission of air, a higher temperature, and much less water to the melon. (*G. W. Johnson's Kitch. Gard.*)

MELON PUMPKIN, or SQUASH. (*Cucurbita melopepo.*) See GOURD.

MEMBRANE. In anatomy, is an expansion of any tissue in a thin and wide layer. Since the time of Bichat, the membranes have been generally enumerated as of three kinds: the *serous*, the *mucous*, and the *fibrous*. The mucous membranes are those which line the canals of the body which are exposed to the action of air or foreign matters, such as the lining of the nose, the trachea, æsophagus, stomach, intestines, &c. The serous membranes form the lining of the sacs, or closed cavities, as of the chest, abdomen, &c. The fibrous membranes are tough, inelastic, and of a tendinous character; such as the dura mater, the pericardium, the capsules of joints, &c. (*Penny Cyclo.* vol. xv. p. 88.; *Brande's Dict. of Science.*)

MENDING. A country term used to signify the improving the quality or texture of land by the application of manure.

MENZIESIA. Two species of this evergreen shrubby heath are now indigenous, both of which flower in June and July.

1. Scottish Menziesia (*M. cærulea*), which is rare, but grows on dry heathy moors. The stem is determinately branched, four or five inches high, decumbent in the lower part, leafy above. Leaves crowded, linear, obtuse, bright shining green, not half an inch long. Flower-stalks terminal, aggregate, simple. Flowers five-cleft, decandrous, of a pale bluish-red.

2. Irish Menziesia (*M. polifolia*). This shrub grows on mountains in the west of

ever, recorded of the f
its use occasionally in
stems are imbranched,
leafy in the upper p
acute, serrated, two or
Flowers on axillary st
erect spikes, the barren
rous. See DOG'S MER

2. Annual mercury
species is found both in
ground; but not very fr
much branched, simple
from six to twelve inch
smooth, of a bright shi
to turn bluish after dry
Branches numerous, c
Leaves ovate-lanceolate
rated. Flowers green;
small tufts, ranged in
fertile ones fewer, stal
qualities of this are lik
species, though suppose
lent. (*Smith's Eng. F*

MERCURY, THE
LISH. See GOOSEFOO

MERINO SHEEP.

MERLIN. See HA

MERLIN'S GRASS
mon names of the E
(*Isoetes lacustris.*) See

MESHES. In bota
any tissue. Among fi
the space between the t

MESLIN-CORN.
wheat and rye produced
ture.

MET. A provincial
tains a strike, or four p

METEOROLOGY.
teors, or the science

omprehends climatology, and
rt of physical geography; and
determine the diversified and
anging influences of the four
f nature now named, on land,
d in the atmosphere. It is
meteorology to investigate
the modes of operation, and
rumental, as well as final, of
of interesting phenomena
an influence on the animal
kingdoms. To this science
amination of the force of ra-
the sun, or the temperature
iced by his beams; the in-
constitution, mechanical as
al, of that intimate intermix-
is bodies which is the subject
lled *atmospheric* changes; the
ie laws governing the vari-
ite; that also of those which
iminution of heat in the at-
proportion to the altitude;
ient of the principles deter-
iantity and state of the aque-
of the atmosphere; and the
of knowledge, in short, on
of science presented by the
self, or by its modes of re-
aqueous and mineral king-
general laws of its influence
matter. This branch of na-
also comprehends the exam-
great series of phenomena,
comprised by the foregoing
by which, on the one side, its
e united with those of phy-
ly, and on the other side with
nomy. The temperature of
the earth itself, and that of
well at the surface as at every
ith—subjects of the greatest
respect not only to the pre-
he earth, but also to its former
tion—are so intimately con-
ie temperature and other af-
e atmosphere, that the study
mes, in fact, a department of
And the various kinds of
igneous meteors which *appear*
osphere, though some of them
l probability, in distant regions
system,—such as the zodiacal
ar lights, or aurora borealis
the meteors called shooting
stupendous masses of matter
called *fire-balls*, which cast
he earth immense blocks of
r showers of heated stones,—
ther wide field of meteorolo-
The Meteorological Society
s tended much to enlarge our
rmation on this interesting branch of science, which must ever command the especial consideration of the shepherd, the farmer, and the cultivator of the soil in general. This society has, in the course of years, accumulated a vast fund of evidence from all parts of the world; and as it is from an attentive observance of the various meteors, and the apparent causes which influence and regulate them, that we can alone hope to arrive at any correct data and inferences on the important subjects of climate, temperature, and the change of the weather in general, it is gratifying to find that the society is now periodically publishing some portions of that body of facts which have been collected by the assiduity of its members, in a Quarterly Journal. This work, with those of Howard and Whistlecraft on the *Climate of England*, we recommend to all desirous of increasing their stock of knowledge on climatology, &c., and who wish to acquire some useful hints for predicting the probable character of the weather. Among subjects connected with meteorology which are treated in separate articles, we may notice ATMOSPHERE, BAROMETER, HYGROMETER, WEATHER, and the various terms referred to under METEORS. (*Brande's Dict. of Science; Mag. Nat. Hist.* vol. i. p. 150.; *Penny Cyclo.* vol. xv. p. 141.)

METEORS. A name given to any phenomena of a transitory nature originating in the atmosphere. Meteors are of various kinds: some are produced simply by a disturbance of the equilibrium of the atmospheric fluid, and are called *aërial meteors;* such are WINDS, WHIRLWINDS, &c. A second class arise from the deposition of the aqueous particles which the atmosphere holds in solution, and which are precipitated in consequence of a diminution of pressure or temperature, sometimes in a fluid and sometimes in a concrete form. These are called *aqueous meteors*, as DEW, FOGS, HAIL, RAIN, SNOW, VAPOUR, &c. A third class of meteors or atmospheric phenomena are caused by the action of the aqueous particles dispersed in the atmosphere, or the rays of light. These are called *luminous meteors*, and comprise fata morgana, halo, mirage, parhelia, and rainbow, &c. A fourth class are the *igneous meteors*, comprehending those which present the phenomena distinctive of combustion. See AEROLITE, NORTHERN LIGHTS, LIGHTNING, SHOOTING STARS, &c.

METHEGLIN. (Germ. *meth*, mead.) A beverage made of honey and water, fermented by the addition of yeast. See MEAD.

MEU, or MEUM. See BALDMONEY and FENNEL.

on the smaller branches. The scarlet berries, which are the favourite food of some species of finch (*Loxia*), are poisonous to many animals. There are varieties with pink and white flowers; and the berries also vary to a yellow or orange hue. The bark of the root is employed in medicine. It is excitant and sudorific. The active principle is a fixed acrid aloe resin. (*Smith's Eng. Flor.* vol. ii. p. 228.; *Sylva Flor.* vol. ii. p. 75.) See Spurge Laurel.

MICE. (*Mus.*) A very destructive sort of vermin to many of the cultivator's growing and housed crops, and which should, therefore, be destroyed as soon as possible. Cats, dogs, owls, and hedge-hogs are the natural enemies of rats and mice, and should, therefore, be encouraged about the farm. See Field-Vole, Harvest Mouse, and Vermin.

To destroy Rats and Mice in Corn Stacks.—The following method was adopted by the late Mr. John Gibson of Millbeck Hall, Keswick, and is still continued by his son, Mr. Joseph Gibson of the same place, with never-failing success. It is accomplished by simply driving in a few hedge-stakes at about four feet distance round the stack intended to be housed, and having a woollen or linen web of about six-fourths or seven-fourths wide upon the stakes, so as to be perfectly close at the bottom, of which particular care must be taken, in order that none of the vermin may creep under the folds. It is certain that none will attempt to climb over the top, and it matters not whether there are fifty or a hundred within the enclosed area, they will be quite safe. An active lad and a dog may easily destroy any number, and he must be a clumsy fellow if he lose one in a hundred. A few neighbours,

rat-catcher, at the expens
a year.

MID-RIB. In botan
of a leaf, which passes f
the apex.

MIDDLE-HORNS.

MIGNONETTE. (
appease; the Latins cons
tion useful in external br
mignonette (*R. odorata*)
versal favourite, on acc
pleasant odour emitted b
summer it merely requi
of other hardy annuals; b
ing plants through the
months, two other sowin
and the plants potted, a
tan or ashes, with the pro
The suffruticose, or shr
be increased by cuttings
ton's Bot. Dict.) Thoug
by care in a green-hou
pruning, the cultivated
rendered perennial, and

MIGNONETTE, TH
seda lutea.) See Rocke

MILCH COWS. See
Cattle, Dairy, Milk, B

MILDEW, or RUST.
diseases which attack our
not one is so destructive
is the "plague" of our w
that fatal distemper is
some district of climes
own, so the mildew is alw
waiting for circumstances
outspread, and ready to
pected harvest of the
constantly present is thi
order, that in the fairest
grown in the richest corn

ar occurs in which their crop of wheat early annihilated.

Its prevailing injurious nature was well own in an age as distant as that of the brews; and it had not spared the Greeks d Romans. Even the poets, as Horace his Odes, speak of it as the "sterile Ru- go" (*Carmin.* lib. 3. ode 23.); and warning ces have not been since wanting to speak ully of its ravages. Mr. Marshall says, certain preventive of the mildew wouldt a discovery worth millions to this coun- ;" and many others have coincided in estimate of its injuries.

This disease is known to be the effect duced by a minute fungus belonging to nus closely allied to that which causes smut. The roots of this fungus pene- te the vessels of the plant, and are nou- hed by the sap intended for perfecting seed; consequently, if the fungi are so nerous in each stem, as to make it a rked "mildew year," the grain is either tially or totally shrivelled, owing to the ls of these parasites intercepting the sap its upward passage.

The ignorance relative to this disease is a consequence of its novelty. It is not, the American blight, a malady recently ming in our crops, but was known and ed in the earliest ages to which our wledge extends. Thus, when God held a warning to the Israelites the afflic- he would bring on them if disobedient, numerated the pestilence and the sword stroy their persons, "with blasting and mildew," to lay waste their fields ut. xxviii. 22.; 1 Kings, viii. 37.; 2 n. vi. 28.); and when the same Al- ty Being had punished that rebellious le, he reminded them by his prophet; ave smitten you with blasting and mil- when your gardens and your vine- , and your fig-trees, and your olive- increased, the palmer-worm destroyed ." (Amos, iv. 9.) "I smote you with ng, and with mildew, and with hail, in e labours of your hands." (Haggai, ii.

The Hebrews called it *yarcoon*, im- g a yellow pallidness arising from mois- To the Greeks it was known as he *ερυσιβη*; and Theophrastus, who his *History of Plants* about 320 before the Christian era, observes viii. c. 10.) that it occurs more fre- tly to corn than to pulse; that in the ate of Greece barley was more subject than wheat, and particularly a variety known as *achillum* barley. Experience taught them, that the crops on high- lands were seldom attacked by this se; but that the hollows surrounded by , where winds could not get at the crops they bore, were most frequently infected. It is chiefly generated, concludes Theophrastus, during the full moon.

By the Romans the mildew was denominated "*Rubigo*." Pliny informs us, in his *History of Plants* (lib. viii. c. 28 and 29.), that it was the prevailing opinion that this disease arises from certain dews settling upon the corn, and obtaining a caustic or burning quality from the intense heat of the sun. This naturalist himself thought, on the contrary, that the disease arises from cold, considering that infection first occurs during the sun, and always about the new or full moon. Pliny, and the still later writers of the *Geoponica* (for this work is composed of fragments of Roman writers living after the removal of the seat of empire to Constantinople, though written in the Greek language), considered that the best remedies were stinking pungent smokes; hence they recommend fish, horns, goat's dung, &c. to be burned on such side of the field as would enable the wind to diffuse the smoke over and throughout the crop. They evidently had the same prejudice as is now entertained by our own farmers, that the mists which frequently prevail during mid-day in the hottest periods of summer are the cause of the mildew; for they direct those fumigations to be performed at such time as it is seen in the atmosphere. They also thought that if branches of the laurel were fixed among their corn, the mildew would pass from the crops to those branches. (*Geopon.* lib. v. c. 33.; *Plinii Hist. Plant.* lib. xvii. c. 17., &c.) One of their practices recommended is much more rational, namely, to bruise the leaves or roots of the colocynth, to macerate these in water, and before the sun has risen, to sprinkle the infected crop with the liquor thus obtained. It is possible that the juice of the colocynth, which is violently purgative to the human system, may be destructive to the fungus constituting the disease. It approaches to that which, in modern times, has been found the only effectual curative treatment; and the direction that the application should be performed in the morning evinces that it was a direction suggested and confirmed by experience. Columella (lib. ii. c. 12.) says, that hoeing corn during wet weather is apt to induce mildew.

Some modern writers have considered that the rubigo of the Romans is the disease known to us as the smut; but, independent of the name, which evidently referred to the red or rusty hue of the disease, and which is not a characteristic of the last-named disorder, we have the direct testimony of Virgil (*Geor.* I. 150.), that the propitiate this presiding deity, a festival entitled *Rubigalia*, was instituted by Numa in the eleventh year of his reign, that is, 704 years before the birth of Christ. It was celebrated annually on the 25th of April, in the neighbourhood of a grove, at the fifth milestone on the Claudian Way, and comprised sacrifices, races, and obscenities. Reddish-coloured bitches (*rufæ canes*) were sacrificed, because the lesser dog-star was then in the heavens, and was considered unpropitious to corn. (*Plinii Hist. Plant.* lib. xviii. c. 29.; *Varii Flacci Facti.* p. 63.)

Ovid, who enters fully into the religious performances of the festival, says, that the limbs of a sheep and the entrails of a dog were offered as a sacrifice on the occasion; and that the priest informed him that he knew of no reason for the latter animal being sacrificed, but that its name coincided with that of the constellation which at that season was apparent in the sky. The prayer addressed by the priest to the presiding deity marks so strongly their knowledge of the extent and inducements of the disease, that I shall give a nearly literal translation of a part:—

"Oh blighting Rubigo, spare the corn plants,
And let the ear wave gently o'er the surface of the earth;
Suffer the crops which have been nourished by the propitious
Stars of heaven, to grow until they become fit for the sickle.
Thine is no small power: the crops thou hast marked
The dispirited cultivator reckons as lost.
Neither winds, nor showers, so much injure the corn;
Neither when bitten by the frost does it acquire a hue so pallid,
As if the sun fervently heats the moist stalks;
Then, oh! dread goddess, is the opportunity for thy wrath;—
Be merciful I pray, and withold your rusting hands from the crops;
Nor harm the cultivated land: it is sufficient to be able

results of their researc
tablish it as a distinct
though they differ as to
they attach it. It is th
of *Persoon's Disp.* t. 3
Nestler, n. 675.; *Grevill*
p. 433.; *Hooker's Smith*
pt. ii. p. 363.: and it is
of *Sowerby's Bot.* t. 140
of Bot. vol. ii. p. 51.; *Pur*
vol. ii. p. 1128.

It grows on the le
wheat, &c., appears in
often confluent, forming
on the culms; at first b
changing to black.
clavate, very slightly co
tum; upper cell the shor
It must not be confou
parasitical fungus, whic
the wheat leaves and c
not so injurious, nam
Decandolle's Flora Fran
coma Rubigo, Lk. Sp.
Smith's Eng. Flor. vol.
low; heaps oval, scatte
guous; epidermis at len
tudinally; sporidia sub-
easily dispersed. Those
consult drawings of th
may find them in *Sower*
quoted, and in a pam
1806 by Sir Joseph B
Short Account of the
Blight, the Mildew, an
which almost all subseq
been copied. If the str
amined with the assistan
glass, its striped surfa
arise from longitudinal
outer bark or epiderm

ities to which they lead, doubt-
their minute roots into the cel-
re beneath the bark, and intercept
wn nourishment that sap which
ceed to the grain for its deve-
nd completion. The corn neces-
mes shrivelled, proportionally as
re more or less numerous on the
as it is the nutriment that would
ected the interior of the grain,
iefly extracted by the fungi, for
r form is nearly completed before
occurs, the proportion of *flour*
always much reduced. Sir J.
served, in 1804, which was a
year," that some of the wheat
yield from a sack so much as a
ur.

phrey, then Mr., Davy, placed
used by this fungus beyond a
hemical analysis. He found that
of

		Flour.	Bran.
ilian wheat afforded of Gluten	239	961	39
Starch	722		
, average crop, Gluten - -	190	955	45
Starch - -	765		
uten - - -	240	940	60
rch - - -	700		
of 1804, Gluten -	130	650	350
Starch -	520		
of 1806, Gluten -	32	210	790
Starch -	178		

n one instance, a loss of 31 per
ur in the mildewed when com-
the average English wheat, and
r of nearly 74 per cent. (*Elem.
hem.* p. 150.) Mr. W. Jones of
n, Somerset, found that wheat
y mildewed produced one fifth
r than that not affected. (*Com.
f Agr.* vol. v.)

lmost always been able to detect
ia upon the lower part of the
erally on the shoot-blade (*folia*
early in June; but it is not till
ng month that the season deter-
ther the ravages of this fungus
ore than ordinarily extensive.
t July the farmer should scru-
and almost daily, examine his
p, especially that which appears
and most luxuriant; and if he
y considerable number of tufts
gus upon the stems, must lose no
ng those curative measures which
ailed in the close of this article.
hot and dry, it may be concluded,
uch fear of disappointment, that
be but little injury incurred by
w. The reason of this is very
for in such a season no fungus
tate vigorously. This order of
riably delights and flourishes in
mosphere, and in a subdued light,
ied by gentle warmth. A *muggy*
the most expressive term to describe that wherein the mildew vegetates most rapidly. In such seasons likewise it unfortunately happens that the wheat plants remain longest succulent, their pores expanded, and their fibres relaxed; circumstances peculiarly favourable to the admission of the seeds of the fungus, to their vegetation, and to the penetration of their roots. That it is in such seasons the *Puccinia* vegetates most rapidly and extensively, is supported by the observations of others; for, although they consider such a season as the actual cause of the mildew, their testimony is equally valuable, though from it they have drawn erroneous conclusions. Thus, M. Duhamel says, that the mildew is caused by mild, hazy, or gloomy weather, while the corn is at the height of its vegetation; that is, about the time of its blooming. When a hot sun has succeeded such weather, he observed the wheat crops mildewed in a few days. He always observed wet springs very productive of this disease; but it rarely occurs in clear, dry, hot years. One or two writers have given most incomprehensible theories of the cause of mildew. Thus, "A Lincolnshire Farmer," in the *Annals of Agr.*, says, the cause is "mild winters and the inflammation of oxygen gas at the eve of harvest;" and Dr. Lewis, in the same work, considers that corn is mildewed probably by the atmosphere being "phlogisticated;" and, proceeding in his *explanation*, he adds, "The atmosphere, particularly in summer, being loaded with putrid effluvia, so as to be incapable of attaining the height necessary to undergo the chemical process of putrefaction by the action of the vitriolic, nitric, and muriatic particles with which the air of the lighter regions is charged, and therefore it descends in that undepurated and unwholesome fluid we call mildew." Did the Doctor understand what he meant himself?

Mr. R. Somerville concluded that the mildew originates from the attacks of insects introduced with the manure (*Com. to Board of Agr.* vol. ii. p. 200.); but he evidently intended by his descriptions the minute acarus (a species of louse) which is almost always to be found upon decaying vegetable matter; and in the cases of mildews, this insect is the follower, not the introducer, of the disease. The Abbé Rozier, in his "Dictionary," observes that it is "caused by the drops of fog or dew, dissipated by a hot sun;" an opinion which is the echo of Ovid's verses forming part of the Flamen's prayer for the preservation of the Roman crops from this disease —

> "Quantum, si culmos Titan incalfacit udos;
> Tunc locus est iræ Diva tremenda tuæ."

which the plant is subject." This observation follows the detail of an experiment, in which he found that sprinkling wheat plants growing on ground very dry with cold water in the afternoon of a warm bright day, caused them to be extensively mildewed. "A considerable absorption, therefore, probably took place; and to this absorption," says he, "and the effects of a sudden change of temperature, as secondary causes, I am disposed to attribute the appearance of the disease; but whether the seeds of the mildew were carried into the pores of the plants by the water, or existed there before, is a question which I shall not attempt to solve." (*Banks, On the Blight in Corn*, p. 30.) There is no difficulty in accounting whence the seeds of the fungi came; for Mr. Knight records, in the previous page, that other wheat plants close by were extensively mildewed.

The observations of Mr. Marshall, which were the results of long experience in many counties in England, coincide with the preceding opinions. "In a dry warm summer," he remarks, "which is well known to be favourable to the health, vigour, and productiveness of the wheat crop, the seeds of the fungi are harmless, so long as the fine weather continues. On the contrary, in a cold wet season, which gives languor and weakness to the wheat plants, few crops escape entirely. A succession of cold rains, while the grain is forming, is very inducive." Mr. Marshall previously concludes that "The fungi are an effect, not the cause, of the disease;" an error which is at once refuted by the fact, that if all the fungi are removed from a plant it is speedily cured.

Of other circumstances favourable or

The practical farmer
(*Egremont's Obs. on th*

The slightly superi
soils to protect the
them from being the m
by the mildew, proba
temperature of such s
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of temperature. Dr.
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inches below the surfa
tober, when the air
35°, the temperature
neath was 48°, and at
50°. This statement l
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of cooling, or, in othe
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in a calcareous and in
rose most rapidly, an
named most slowly.
cooling followed the
experiments substantia
will be found in Sir H.
Chemistry, p. 179. Ev
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a tendency to check a q
heat in the substances
vegetables, particularly
best calculated to save t
and from vegetable d
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tors of heat, or, in ot
longest in heating or c

e upon elevated exposures. "A
Farmer," Mr. Lambeth, and
in the forty-fourth vol. of the
rriculture, agree in this observ-
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s tribe; such situations being
damp, and subject to a moist,
here.

es of wheat are liable to the
the *white* is always the earliest
the bearded or rivet the last.
rise from the latter variety
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little more silex, and thence
ores less easily acted upon by
changes, and consequently less
entrance of the seeds of this
oreover, the hardness of the
ecks their rapid outspread when
Mr. Sirs considered spring
not liable to this disease of the
that is the general opinion in
nd. (*Com. to Board of Agr.*
.) Other authorities deny that
t is exempted from it; and to
I incline, in the absence of any
cisive knowledge on the point.

ing is advisable, because the
, by this means, have a chance
e time of blooming before they
ely attacked; and the more
growth of the seed, the more
the power of this parasite to
fection. Another reason sug-
Mr. W. Jones of Wilmington,
om. to Board of Agr. vol. v.),
en sown late, the plants are
ppy in July, and even at the
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he disease; and this green state
enders them more than ordi-
to suffer by such a reduction
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uriant crops, and plants grow-
nghills, the former are liable
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ventive; for in "mildew years,"
attacked; and instances have
ere, in fields sown in Sep-
ober, and November, the first
have been most injured.

ry has been anathematised as a
is vegetable pest; but I have
t with any facts which establish
It is true that Rolesbury in Nor-
ly known as "mildew Roles-
that the berberry abounds in
rhood of that village; but I
low-lying arable districts, pro-
ble to the mildew, having no
berberries in their vicinity. It is true that a band of mildew has been traced across a field of wheat from a berberry bush growing in one of its hedgerows; but then I have seen a similar track of the disease commencing from an oak. It is also true that Mr. Knight, the late excellent President of the London Horticultural Society, found wheat, sprinkled with water, in which berberry branches had been washed, speedily become infected with the mildew; but he also ascertained that wheat, sprinkled with clear water, became similarly diseased. I have tried many experiments, with a view to ascertain the truth or error of this supposition, but have not succeeded. However, I am convinced that the parasite which affects the berberry is not the *Puccinia graminis:* the sporidia are dissimilar, and the colour totally unlike; but it may be, and certainly much resembles, the *Uredo rubigo*. It is no objection to say that the identity is unlikely, because the plants attacked are so widely distant; for, as already noticed, these parasites will vegetate on very various and even dead vegetable matters. The parasite which infects the leaves of the berberry is *Æcidium berberidis:* it is a beautiful minute gastro mycus, and there is no resemblance between it and the rust of wheat except in clover. It is a vulgar error to suppose that an *Æcidium* on the berberry could produce a *Puccinia* on wheat." See BERBERRY.

The age of the seeds, the thickness of sowing it, and previous or subsequent cultivation, appear to have no preservative influence; therefore, it now only remains to consider whence the seeds of the fungi come to the crop, which will lead to a consideration of the modes of prevention; and, lastly, whether there is any practicable cure. There seems to me little doubt that the fungus is communicated from the soil to the crop. It is certainly not conveyed thither with the seed-corn, for no washing, no cleansing, nor pickling of this has ever been observed to have any effect. In "mildew years," all fields of any infected districts are affected; and when it is only partial, one end, or a breadth across the middle of a field, of which the seed has all been treated alike, will be grievously injured, whilst the other parts suffer little more than ordinarily; for I have previously noticed, every year and in all fields, the mildew is partially present. There is little difficulty in accounting for this. Every *Puccinia* sheds some hundreds of seeds, more minute and lighter even than those of the puff-ball; and as every wheat crop annually produces some, these are wafted over neighbouring closes by every wind during their observed; this was left during the whole winter in a closet, which at this season is unusually damp. Upon opening the box, in the spring following, I found the *Puccinia* had grown, and spread in various rectilinear forms, upon one of its sides, and upon the bottom, a fact which I remember to have seen confirmed in one of the volumes of the *Quarterly Journal of Science*. The fungus, then, though its natural habitat is the culm of the wheat, will vegetate upon other vegetable bodies; and this satisfactorily explains the mode in which it may, after being preserved through the winter, be conveyed to the succeeding year's crop, — to say nothing of those seeds which may be attached to the straw of the preceding year, and be conveyed to the next year's crop by various modes.

These facts demonstrate that *prevention* is impossible: for however careful a farmer may be to avoid every source whence the seeds of the *Puccinia* may arrive, yet every summer wind may waft them to his crops from other, even far distant, lands. To prevent the communication to the wheat from the soil by the stooling, or spreading power of the fungus, it will be well to sprinkle the surface with salt, immediately after sowing, at the rate of five or six bushels to the acre; and in the spring, early in May, to apply, in a similar manner, about the same quantity of caustic fresh-slacked lime, — applications of which are not only destructive of the *Puccinia*, but also of slugs, and promote the general health of the crop.

For testimonies to the power of common salt to prevent, in some instances, the occurrence of mildew, I would refer the

soil containing a greater
mon salt than is found i
but because the sea ha
most nightly in the sum
as it were, the crops in
cinity of the coast; and
solution a portion of salt

The following well at
tion from the late Rev.
of Hollenden House,
conclusive on this subj
directions to the farmer
at what expense, a pract

"It gives me great
in my power to furnish
formation respecting the
which, perhaps, you are
a neighbour of mine h
remedy for the mildew
most unequivocal succes
discovery two years ago
that time were upon a
they have this year exte
acre and a half, but u
that leave not a shado
being an absolute specific
most aggravated stages
this I will state to you
In the year 1818, I fo
wheat, which I conceive
improved variety; from
as much wheat as last
four feet wide and 10
the produce I had pro
and to augment that
ground, previously to p
nured; and as soon as
I gave it a good dressing
dressing was repeated
consequence of this super

s being thus succulent, I ven-
it a dressing with salt and
eavy shower of rain fell a few
rds, the dressing was repeated
ing. The proportion of salt
one pound in a gallon, laid on
er's brush, the operator bear-
he mixture in one hand, and
he other, making his casts as
corn, or else with a common
which, being swung with great
the water very rapidly; two
over about four acres a day,
ead, the other to supply the
e result was, that the mildew
ly subdued, and the wheat
to maturity; and although the
ot so bold as it might have
sound and marketable. In
f the field where the mildew
not under the aggravated
described above, but as it
rs, the wheat was not in the
y it, after the salt and water
it was, indeed, as fine a sam-
e grown. Both mine and my
heat was examined by many
ers, who are so decidedly con-
efficacy of my remedy, that
ever to be without a reserve
o meet the enemy the moment
The effect of the salt upon
o those who do not consider
f its operation, is truly asto-
lieve it to be *instant death to*
is, however, is certain, in less
ht hours the straw nearly re-
ginal colour and brightness.
and celerity of its operation
thus: the mildew, it is now
ed, is a parasitical plant of the
the principal constituent of
water; when salt, therefore,
hem, the aqueous particles are
absorbed, and their vitality
he action of salt upon mush-
aking mushroom catsup, con-
eory." (*Johnson's Essay on*
. 52—54.)

rd decided testimony to the
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at its extremities by two men
p and down each ridge of the
to remove the fungus; and
ubt that this treatment is partially effectual, for the parasite is removed whenever it comes in contact with the rope, but the points of contact necessarily are limited. (*Essay by G. W. Johnson, Quart. Journ. of Agr.* vol. ix. p. 253.)

Prof. Henslow (*Journ. of Roy. Eng. Agr. Soc.* vol. ii. p. 220.) endeavours to prove (by strengthening with additional evidence his previously expressed opinions), the specific identity of the fungi producing rust and mildew. See Rust, Ergot, Dry Rot, &c.

Mr. John Baker of Leeds, in commenting upon my brother's essay, is of opinion that the berberry has a considerable influence in the communication of the mildew to wheat, and gives several instances which seem to support his view of the case. But the distinction between the parasite of the berberry has already been mentioned, and it is scarcely necessary to repeat that the one cannot produce the other.

MILE. (Lat, *mille pasuum*, a thousand paces.) The Roman pace being 5 feet, the Roman mile was consequently 5000 feet: but a Roman foot being equal to 11·6496 modern English inches, it follows that the ancient Roman mile was equivalent to 1618 English yards, very nearly 11-12ths of an English statute mile, or 142 yards less than the English statute mile. The English statute mile was defined (incidentally, it would seem) by an act passed in the thirty-fifth year of the reign of Queen Elizabeth, by which persons were forbidden to build within three miles of London; and the mile was declared to be 8 furlongs of 40 perches of 16½ feet each. The statute mile is therefore 1760 yards, or 5280 feet. See Measures.

The mile is used as an itinerary measure in almost all countries of Europe, particularly those which were formerly under the sway of the Romans; but it is very difficult to conjecture the causes which have given rise to the great diversity of its values. It has been supposed that in some countries the Roman mile was confounded with the ancient Celtic league.

The following table, given on the authority of *Kelly's Cambist*, shows the length of the modern mile, and also the league, of various countries, and their relation to the English statute mile.

		Yards.	Stat. mile.
Modern Roman mile	-	1628	·925
English statute mile	-	1760	1·000
Tuscan mile -	-	1808	1·027
Ancient Scottish mile	-	1984	1·127
Irish mile -	-	2240	1·273
French posting league	-	4263	2·422
Spanish judicial league	-	4635	2·634
Portugal league -	-	6760	3·841

	Yards.	Stat. mile.
German short mile -	6859	3·897
Flanders league -	6864	3·900
Spanish common league -	7416	4·214
Prussian mile -	8237	4·680
Danish mile -	8244	4·684
Dantzic mile -	8475	4·815
Hungarian mile -	9113	5·178
Swiss mile -	9153	5·201
German long mile -	10126	5·753
Hanoverian mile -	11559	6·568
Swedish mile -	11700	6·648

According to the same authority, the Arabian mile is 2148 yards, the Persian parasang 6086 yards, the Russian werst 1167 yards, and the Turkish berri 1826 yards. The English geographical mile is 1-60th of a degree of latitude, or about 2025 yards; the geographical league of England and France is 3 such miles, or 6075 yards; and the German geographical mile is equal to 4 English geographical miles, or 8100 yards. (See an excellent disquisition on the history of the English mile in the *Penny Cyclopedia*, vol. xv. p. 210.; *Brande's Dict. of Science*.)

Distances were marked by stones, *milliaria*, by the Romans; the London Stone, in Cannon Street, is supposed to have marked the centre of the Roman roads in Britain. See League.

MILFOIL, THE HOODED. See Bladderwort.

MILFOIL, THE WATER. See Water-Milfoil.

MILFOIL, THE WOOLLY YELLOW. See Yarrow.

MILIARY. In botany, a term signifying granulated; resembling many seeds.

MILITIA. A body of citizens, trained to martial exercises, generally called into service only in periods of war, and not liable to serve out of their own country. Such bodies of soldiers exist, under some name or other, in most European countries, as the National Guard of France, the Landwehr of Germany. In this country the militia is subdivided into regular and local militia: then, again, there are volunteer corps and yeomanry cavalry. The militia originated in England soon after the abolition of military tenures, in the reign of Charles II. And upon the 13 Car. 2. c. 6., 14 Car. 2. c. 3., and other statutes of that reign, the present order in which the militia stands in law, was founded. There are numerous statutes in existence with regard to this valuable branch of the military service. By the 42 G. 3. c. 90. the lord lieutenants of counties are empowered to appoint the officers of militia, who are to take rank immediately after the officers of the same rank belonging to the regular army. By the 46 G. 3. c. 90. the qualification of
the officers of the militia is determi
declared to be — a colonel an estate
per annum, a lieutenant-colonel
major 200*l*., a captain 150*l*., and
nant 30*l*., an ensign 20*l*. per ann
the 42 G. 3. c. 90. the chief constabl
hundred is to cause every parish
to return a list of every male pe
parish, between the ages of eig
forty-five; and by sect. 29. a powe
by any person improperly placed
is given. By sect. 43. certain p
exempted from serving in the mil
are peers, commissioned officer
members of the universities, cler
cenced teachers of registered con
constables, articled clerks, seame
tices, members of the watermen's
volunteer corps, yeomanry cavalr
senting clergymen. All others a
be ballotted for and to serve for
unless they find a substitute (sect
appeal is directed for those who
perly ballotted for. By sect. 94
stables are to find carriages and
the conveyance of the militia; an
are to be allowed 1*s*. per mile for
with five horses or six oxen, and
cart with four horses. The bal
the militia is now annually sus
act of parliament.

MILK. (Germ. *milch*.) A
fluid, secreted by animals for th
ment of their young. See La
Butter, Cheese, Dairy, Cattl

Cow's milk is that principall
Europeans; that of the goat, a
the sheep, is used in some pa
island; that of the mare is a fa
verage in Tartary when it is fer
milk be left at rest, the fatty glo
rate, rise to the surface, and fo
if it be long agitated they attra
coalesce, and form butter. Co
heavier than water; its specific
1·03; its constituents are:—

Caseine, with fatty matter
Sugar of milk - -
Extract, lactic acid, and lactates
Chloride of potassium -
Alkaline phosphate -
Phosphate of lime and other salt
Water - - -

For the analysis of cream and
Butter.

The number of cows kept in L
its environs for the supply of mi
mated by Mr. Macculloch to a
9000, and their annual produce of
equal to 78,800,000 quarts. For th

orkshire cow is preferred to all others. laily average of milk yielded by one breed is estimated, according to Mr. tt, at twenty-two or twenty-four quarts. roduce of a celebrated cow, however, ging to Mr. Cramp of Lewes, was not to this. (*Com. Board of Agr.* vol. v.) The quantity and quality of the produced by a cow is materially in- ed by the food and distance from g. Some interesting experiments to nine this were made by MM. Bous- lt and Le Bel. They observe, " In servations, of which the following table ts the abstract, it will be seen that antity of milk given by the cows pro- ely diminished. This diminution can- attributed to the regimen to which ws were subjected, since, in again g them on the food on which they had usly fed, the same quantity of milk ot obtained as at first; the diminu- ontinued. The distance from the at which the cow has calved seems he principal cause of the decrease of lk. This cause is so strongly marked, may even prevent the influence that ture of the food exercises over it being seen. . . . . . Indeed, this re- ermits us to state, that the nature of d consumed does not exert so very sensible an influence on the quantity and chemical composition of milk (we do not say on its quality), if the cows receive equal nutrition from the different kinds of food. It is very evident, that if the weight of the feeds were not calculated according to that of the equivalents, great variations would be observed in the products of milk; but then those variations would be principally caused by the augmentation or diminution of the nutritive matter. We know, for example, that cows, which, during winter, are reduced to simple feeding on chopped straw, cease almost entirely to produce milk, and with difficulty recover their ordinary rate of production; in cognizance of such a fact, we are led to ascribe the return and abundance of milk exclusively to the properties of the green food in spring, whilst that effect is in a great part produced by a real increase in the feeds.

" In establishments where a regular rotation is followed, healthy and abundant nourishment to cattle in winter is in a manner assured, the difference, if any exist, betwixt the feeding in winter and summer, being in all cases much less considerable. These are the results of experiments made during a year on eight cows constantly fed together on a great variety of food." (*Quart. Journ. of Agr.* vol. x. p. 344.)

First Series of Experiments, — Country Cow.

r of nce ng.	Milk given in 24 hours.	Solid Matters in 100 lb. of Milk.	Food given equivalent to 15 Kilogrammes, or about 30 lb. of Hay.	Composition of Milk.				
				Cheese.	Butter.	Sugar of Milk.	Salts.	Water.
	Litres.							
1	5·0	21·6	Potatoes, hay - -	15·1	2·6	3·6	0·3	78·4
3	7·5	- -	Ditto					
4	10·6	11·2	Hay, green clover -	3·0	3·5	4·5	0·2	88·8
5	12·0	13·1	Green clover - -	3·1	5·6	4·2	0·3	88·9
0	5·6	12·3	Hay - - -	3·0	4·5	4·7	0·1	87·7
7	6·0	12·4	Turnips - - -	3·0	4·2	5·0	0·2	87·6
5	5·6	12·9	Red beet - -	3·4	4·0	5·3	0·2	87·1
9	5·0	13·5	Potatoes - - -	3·4	4·0	5·9	0·2	86·5
0	3·6	- -	Hay					
0	3·4	- -	Potatoes					
0	3·5	12·5	Jerusalem artichokes -	3·3	3·5	5·5	0·2	87·5
2	2·8	13·2	Hay and oil-cake -	3·4	3·6	6·0	0·2	86·8

Second Series of Experiments, — Swiss Cow.

6	9·3	13·5	Potatoes, hay - -	3·3	4·8	5·1	0·3	86·5
2	8·9	12·8	Hay, green clover -	4·0	4·5	4·0	0·3	87·2
3	9·8	11·2	Green clover - -	4·0	2·2	4·7	0·3	88·8
4	7·8	12·6	Clover in flower -	3·7	3·5	5·2	0·2	87·4

ere is a paper on the adulteration of by M. Barruel. (*Quar. Jour. of Agr.* p. 304.) He states that the sub- es used to adulterate milk in London and Paris are usually flour, sugar-candy, potash, and sometimes iodine, to give it its bluish colour.

Statement of the comparative Quality of Milk from Eight Alderney and Eight Kerry (Irish) Cows, upon the Farm at Oakley Park, in May, June, July, and August 1840, *by Mr. R. White, tested from a Lactometer holding one Pint of Milk, and divided into* 100 *Parts by Index.*

Cows.	Portion of Cream in 100.	Difference.	Observations.
May.			
Alderneys	25		
Kerrys	10		
		15	In favour of Alderney.
June.			
Alderneys	20		
Kerrys	10		
		10	Ditto.
July.			
Alderneys	23		
Kerrys	10		
		13	Ditto.
August.			
Alderneys	16		
Kerrys	13		
		3	Ditto.

Butter churned from three pints of cream from each:—

Alderneys - - 1 lb. 8¾ oz. } 16 oz. to the pound.
Kerrys - - 1 lb. 4½ oz. }

This was taken in August, when the Alderneys' produce of cream was at the lowest. (*Jour. Roy. Agr. Soc.* vol. ii. p. 421.)

MILK-FEVER. Cows in high condition are most subject to puerperal fever. This inflammatory disease sometimes appears as early as two hours after parturition; if four or five days have elapsed, the animal may generally be considered safe. On the appearance of this fever, from six to ten quarts of blood should be taken, according to the age and size of the animal. The bowels must be opened, or the disease will run its course; and purging once established in an early stage, the fever will, in the majority of instances, rapidly subside, leaving the strength of the constitution untouched. (*Youatt on Cattle*, p. 547, 548.)

MILK-HOUSE. See DAIRY.

MILKING. In the operation of milking the great rules to observe are regularity, gentleness, and cleanliness. The following observations are taken from an American periodical: "When you go to milk, take a vessel of cold water and sponge. Wash the udder and teats clean, dashing on the cold water. This will prevent the teats from becoming sore, and the udder hot and feverish, besides rendering the process of milking much neater. Milk with clean hands. The whole business of milking is frequently conducted in such a slovenly manner that the milk is entirely unfit for food. The cow should be milked while eating her fodder at morning and evening. She should always be milked and fed at the same time in the day, and uniformly by the same person. Milk without int
Be sure to milk the cow as dry
To be milked by different hands,
times in the day, in a slow, i
gossiping manner, and leaving
milk in the udder, will ruin the
the world." If the cow has so
ment them before milking with
and after milking, dress them w
lowing salve: Melt together o
yellow wax, and three ounces
as these begin to get cool rub i
of an ounce of sugar of lead, a
of finely pounded aloes. (*You*
p. 552.)

MILK-PARSLEY. (*Selin*
linor, the Greek name for pars
to this genus on account of the
in the leaves.) This is a har
plants of no interest. The onl
species is the marsh milk-par
lustre), which is perennial, or, a
it, biennial, growing in wet and
dows. Root tapering, simple,
long fibres. Stem solitary, er
five feet high, hollow, deeply
branched and corymbose at the
deep purple at the base. Leav
or six on the stem, alternate,
nate; leaflets deeply pinnatifid,
withel liptic-lanceolate segment
large, horizontal, of numerous
Flowers white, numerous, uni
root serves the Russians for gin
whole herb abounds with a w
fetid juice, of the consistenc
which soon dries to a brownish
(*Smith's Eng. Flor.* vol. ii. p. 9

MILK-VETCH. (*Astraga*
is an extensive genus of her
shrubby plants; many of the
very handsome, and well sui
flower garden. The herbaceous k
require planting in the open a
nual kinds may be sown where
flower. *A. lotoides* is the hand
should be sown in a moderately
bed, and planted out in the b
sufficiently strong. (*Paxton's*
The common indigenous speci
namely —

1. Sweet milk-vetch, or wil
(*A. glycyphyllos*), which grow
places on a chalky or gravelly
ing in June. The root is pe
running deep into the earth, si
crown. Stems several, two o
long, prostrate among grass or o
Leaves a span long, of nine or
form oval bright-green leaflet
inch in length. Flowers pale
loured, in ovate spikes. Legu
inch long, obscurely triangular,

l furrow, incurved. The leaves
t a sweetish taste, soon changing
te to a nauseous bitter. Cattle
d of them, nor is this plant ap-
y agricultural use.

e mountain milk-vetch (*A. hy-*
This species grows wild on open
is heaths, on a chalky or sandy
the sea coast. Root creeping,
igh slender. Stems zigzag, pros-
, from two to five inches long.
npounded of small dark green,
it, leaflets, hairy on both sides,
tipules. Flowers few, variegated
lish-blue and white, in round
gumes ovate, deeply channelled
lack, compressed, hairy, hooked
.

mountain milk-vetch (*A. ura-*
less common species, found on
h mountains, in a sandy soil.
woody, and the whole herb re-
for its shining silky hairiness.
. Leaves stalked, all radical;
te, acute, all over silky like the
owers on stalks longer than the
rich bluish-purple, rarely white,
lense heads. Legumes oblong,
nted, shaggy, erect. This is a
ome species even in its dry state,
often retaining much of their
the herbage all its brilliancy.

wish mountain milk-vetch (*A.*
. This species grows on rocks
lands in Scotland. In size and
much like the last; but the
narrower, lanceolate, acute, more
much less silky, being only be-
ith shining hairs, and often quite
cept the midrib. Flower-stalks
sometimes recumbent. Flowers
ured, or buff. Legumes more
ted, hairy, erect. (*Smith's Eng.*
ii. p. 294.)

ORT. (*Polygala*, from *poly*,
gala, milk; reputed effects of the
ttle that feed upon it.) All the
his genus are very showy. The
ds require sowing in the open
eferring a peat soil. Some of
possess useful medicinal qualities.
enumerates above 160 species
us, but only one is British.

non milkwort (*P. vulgaris*) thrives
and heathy pastures. The root
nd woody. Herb smooth, of a
ng green, with several procum-
artly ascending simple leafy an-
s, from three to six inches high.
ear-lanceolate, scattered, nearly
lowers in a simple terminal clus-
ly blue, but frequently pink,
urple; always marked with green
lines. It is hard to say why this plant obtained the name of *Polygala*, or milkwort; and indeed that name has been given by some authors to several truly papilionaceous herbs or shrubs more deserving the reputation of yielding good food for cows. Our *Polygala*, like some other European species of the same genus, is bitter, and when given in infusion is said to promote expectoration, and to be good catarrhs: but its influence is too little to give it importance as a medicinal agent. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. iii. p. 258.)

MILKWORT, THE SEA, or BLACK SALTWORT. See SEA MILKWORT.

MILLER, PHILIP, F.R.S., was born in 1691. His father is stated by Professor Martyn, Dr. Plunket, &c., to have been gardener at the Apothecaries' Company's Garden at Chelsea, and the subject of this notice succeeded him in that employment in 1722. He died December 18th, 1771. The Horticultural Society erected an obelisk over his grave in 1810.

Switzer and other contemporaries give evidence of his open, generous character; and Professor Martyn observes, "He was of a disposition too generous, and careless of money, to become rich, and in all his transactions paid more attention to integrity and honest fame than to any pecuniary advantages." The following is a list of his writings: —

1. The Gardener's and Florist's Dictionary, or a Complete System of Horticulture. 1724. 2 vols. 8vo. Miller published an Abridgement of his Dictionary in 1735, 2 vols. 8vo. A second edition in 3 vols. 1741. A third edition in 1748. A fourth edition in 1754. A fifth edition in 1 vol. 4to. in 1763; and a sixth, of similar size, in 1770. It was published in Dutch in 1746, and in German in 1750. In French in 1785. 2. A Method of raising some Exotic Seeds which have been judged almost impossible to be raised in England (this appeared in the "Philosophical Transactions," vol. xxxv. p. 485. No. 403.), by germinating them in a Bark Bed, and transplanting them into Earth. 1728. 3. An Account of Bulbous Roots flowering in Bottles filled with Water (vol. xxxvii. p. 81. No. 418.). This practice was then lately discovered. 4. A Catalogue of Trees, Shrubs, and Flowers, which are hardy enough to bear the Cold of our Climate and the open air, and are propagated in the Gardens near London. 1730. folio. Plates coloured. Arrangement Alphabetical. Without his name. 5. Catalogus Plantarum Officinalium quæ in Horto Botanico Chelseiano aliuntur. 1730. 8vo. 6. The Gardener's Kalendar. 8vo. 1731. This has been a popular work, and passed through many editions. To an edition in 1761 was prefixed a "Short Introduction to the Knowledge of the Science of Botany," which was afterwards printed as a separate work. The fourteenth edition is dated 1765. 7. Figures of Plants to illustrate his Dictionary. These commenced in folio numbers in 1755, and were completed in 300 tables, forming 2 vols., in 1760. 8. The Method of cultivating Madder, as it is practised by the Dutch in Zealand. 1758. 4to. 9. A Letter to Mr. Watson relating to a Mistake of Professor Gmelin, concerning the Spondylium vulgare hirsutum, in the "Philosophical Transactions," vol. xlviii. p. 153. 10. Elements of Agriculture, from the French of Duhamel. 1764. 2 vols. 8vo. 11. A Letter to the Rev. Thomas Birch, D.D., Secretary to the Royal Society (Phil. Trans. vol. xlix. p. 161.). 12. Remarks upon the Letter of Mr. John Ellis, F.R.S., to P. C. Webb, Esq. (Phil. Trans. vol. l. p. 430.). (*Johnson's Hist. of Gard.*).

MILLER'S THUMB. See BULL'S HEAD.

ton's Bot. Dict.) The common millet (*P. miliaceum*) grows several feet high, and is terminated by a large branched panicle hanging to one side. It is very prolific in seeds. These are small and smooth, in some sorts brown, and in others yellow. The straw produced is bulky, and valued for provender. (*Low's Prac. Agr.* p. 261.)

MILLET-GRASS. *Milica.* (Fr. *millet;* Lat. *milium*, from *mille*, a thousand, in allusion to the immense number of seeds produced by it.) These are hardy, annual, and perenial grasses; but our climate is seldom warm enough to ripen the seed, or to allow of their being cultivated to advantage here. The hardened corolla, forming a coat to the seed, affords a mark of distinction between this genus and *Agrostis*, no less obvious than important, as those most deeply versed in grasses will most readily allow.

There are two native species:—

1. Spreading millet-grass (*M. effusum*). Growing very common in moist shady places. The root is perennial and fibrous, with several creeping shoots. Stems erect, slender, generally three and four feet high, with about four joints, leafy, smooth. Leaves bright green, flat, very smooth, thin and weak. Flowers solitary, slightly drooping, ovate, in a loose spreading panicle, without awns; panicles from four inches to a foot in length. Mr. Curtis observes, that it is distinguished from the panic grasses, to which it has the greatest affinity, by having a calyx of two valves only. The produce of this grass is very light in proportion to its bulk, and it is but little nutritive. Birds

ING.

MILNE, COLIN, L
Aberdeen, and educate
lege, in that town, unde
uncle. He died in 181
naturalist, and publish
works, of which we s
Botanical Dictionary, 1
1778, and 1806. It
cussions interesting to
Johnson's Hist. Eng. G

MILLS. (Lat. *mol*
seems to have signified
for grinding corn, but
general sense to denot
machines, whose action
circular motion. The
usually indicated by a
mill, cotton-mill, flour-
mill, spinning-mill, &c.

The machinery by w
to accomplish the ulti
mill must obviously var
Many voluminous wor
have been published,
accounts of particular
Brewster's edition of *F*
Gray's experienced Mi
on Millwork, by Tredgol
The Repository of Arts,
the principal works on
is given in *Gregory's*
See WINDMILL.

The *Kibbling Mill* is
tice. It is composed o
der, usually about eight
and six inches in diamet

a fly-wheel revolves at the other. It
l for beans, peas, and other pulse, for
nd various kinds of grain, and is a
seful and ingenious contrivance, but
es care in its adjustment and general
ement.

a *Mill.* A mill for grinding beans,
cted by Seaman and Bryant of Mel-
Suffolk, is as simple and effective an
ent of the kind as any we have seen.
aced on a wooden stand, with crank,
el and hopper; and consists of a
y-fluted barrel, working against a
utting plate; the latter being set at
oper distance from the barrel by
of a screw. It is used chiefly for
nd peas, but may be employed for
g malt, by exchanging the barrel and
plate for a pair of rollers. A plate
ean mill is given under the head

Norfolk Crusher is similar in ap-
e to the foregoing, and is worked
rollers of equal dimensions, each
anged at one end, and reversed so as
ent the grain from falling off at the
The rollers are perfectly smooth,
nsequently, as its name implies, it
the grain instead of cutting it.

Suffolk Crusher is simply a variety
bove, and differs from it in having
d roller finely grooved, and of half
nensions of the front one; this has
ge, but works within the flanges of
nt roller, which are attached at both
To render these mills effective for
g oats, the rollers should be left
as they come from the lathe, to draw
kernels, as the latter are apt to start
t the moment of entering between
ers, if they are polished. A grooved
al roller has not been found adequate
perfect bruising or cutting of oats,
mill that shall effect this object may
idered a desideratum in agricultural
ics. A cut of the Suffolk Crusher
found under the head CRUSHER.

LS, JOHN, F.R.S., was author of
owing works.

tical Treatise on Husbandry, from the French
el. 1729. 4to. With additions, Plates, &c.
and complete System of Practical Husbandry.
ls. 8vo. This was published in weekly numbers,
leted in 1763. It was twice translated into Ger-
764. 3. The Natural and Chemical Elements
lture, from the German of Gillenborg. 12mo.
Essays on Agriculture. 8vo. 1772.

LSTONE GRIT. A geological term
l to a group of strata which occur
n the mountain limestone and the
ncumbent coal formations; it is a
-grained quartzose sandstone.

TONES. (Germ. *mühlsteine.*) The
ular stones, which, when put in
machinery, *grind corn and other* articles. The diameter of common millstones is from five to seven feet, and their thickness varies from twelve to eighteen inches. These stones have been principally imported from Rouen and other parts of France; the burr-stones of that country being supposed more durable than our own. Millstones are, however, found at Conway, in North Wales, and in some parts of Scotland, which are said to equal any imported from foreign countries. In order to grind the corn, the millstones have channels cut in them, proceeding from the centre to the circumference, perpendicularly on one side and obliquely on the other. Both stones are cut in the same way, so that when they are placed upon one another, the furrows run crossways to each other, and by this means crush or grind the corn. When the furrows become blunt, the upper stone is taken up, and both stones are dressed with a chissel. Good millstones usually last thirty-five or forty years. (*M'Culloch's Com. Dict.*)

MINT. *Mentha.* The poets celebrate Minthe, a daughter of Cocytus, as being transformed into mint by Proserpine in a fit of jealousy. *Ovid Metam.* 10. v. 729.) This is an extensive and well-known genus of useful herbs, with the culture and propagation of which every one is familiar. There are more than a dozen native species, besides numerous cultivated varieties. The roots are perennial, creeping widely. Stems ascending or erect, branched, leafy, acutely quadrangular. Leaves stalked, mostly ovate, serrated, undivided, without stipules. Flowers numerous, light purple, in stalked very dense whorls, often crowded into leafless heads or spikes. All the herbage is more or less hairy, but variable in that respect; rarely woolly or finely downy; full of pellucid dots, lodging a copious essential oil, which is pungently aromatic, cordial and stimulant, and is thence used in medicine as an excitant and stomachic for promoting digestion. The following are the indigenous species. Horse mint (*M. sylvestris*), round-leaved mint (*M. rotundifolia*), spear or green mint (*M. viridis*), black or peppermint (*M. piperita*), bergamot mint (*M. citrata*), hairy mint (*M. hirsuta*), fragrant sharp-leaved mint (*M. acutifolia*), tall red mint (*M. rubra*), bushy red mint (*M. gentilis*), narrowed-leaved mint (*M. gracilis*), corn mint (*M. arvensis*), rugged field-mint (*M. agrostis*), and penny-royal (*M. pulegium*). (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 72—88.; *Trans. Lin. Soc.* vol. v. p. 171—217.) See CAT-MINT, CORN-MINT, HORSE-MINT, PEPPERMINT, PENNY-ROYAL, SPEAR-MINT, &c.

MISSELTOE. (*Viscum*; from *vescus*, bird-lime, on account of the sticky nature of the

MITE. See CHEESE MITE.

MITHRIDATE MUSTARD. See SHEPHERD'S PURSE.

MITHRIDATE PEPPERWORT. See PEPPERWORT.

MIXEN. A compost heap.

MIXTURE OF SOILS, in agriculture, is the addition of one soil to another, to improve its fertility.

There is perhaps no agricultural improvement more important in both its immediate and permanent effects than the careful, judicious mixture of soils, and there is no question more likely to repay the cultivator for the care he bestows upon it.

This mode of improving the land was one which very early engaged the attention of the farmer. Nature herself, in fact, pointed out to him the means of producing the richest of soils by earthy mixtures in very intelligible language. The solid matters brought down from the distant hills by the flood waters, and deposited in the valleys where the waters rested, evidently formed, by the mixture of different strata, and by their union only, the rich alluvial soils of the old and the new worlds; for that the mere mechanical separation of the earth into a fine state of division is not the sole cause of the increased fertility is apparent to every farmer.

It is useless, he well knows, to expect the *débris* of the hills to produce fertilising effects on soil of a similar composition. It is the dissimilarity of the earths which ensures a maximum fertile mixture: thus, in the soil of the rich marshes of the banks of the Thames are found the clay of the London Basin, the sands of Middlesex, and the chalks of Oxfordshire and Kent; and in a

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ciduous trees will now
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are remarkable, and
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the soil here gave no
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careous earth to their "tight-
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indications with regard to the
' soils which are self-evident to
tor; and there are others which
erstood in particular districts.
farmers consider that marl is
the surface when the weed
ssilago forfara) abounds; and
s will be much benefitted by
ich produce the weeds corn
briddle (*Chrysanthemum sege-*
smart-weed, or pale-flowered
olygonum pennsylvanicum).
nsfer of the earths the farmer
profitable practice, especially
stance is great, to have them
ug in spits, and dried in the
is way the weight of either
or clay is much more consider-
than the cultivator would sup-
e found that when moist chalk
is way it loses from 20 to 24
water. Strong adhesive clay,
r circumstances, loses from 32
nt., and marl from 18 to 26 per
weight; so that, supposing he
bic yards of each of these fer-
nerely having them previously
es in weight of carriage

	Tons.
halk	20 to 24
lay	32 to 42
iarl	18 to 26

are only these earths present to
n all cultivated soils, and as the
which they bear to each other
chief difference between fertile
lands, I shall confine my atten-
paper to the application of
Clay, 3. Sand, to land which
deficient in them; and in en-
the investigation, I shall sup-
the farmer is aware that it is
excess of one of these earths
rs a soil unproductive, and that
ion of the deficient earths ope-
antageously by tending to ren-
position more similar to those
oils, in which the earths are
more fertile proportion. It is
importance, however, that the
uld be aware of this fact; let
end, contrast the analysis of a
like that of Bagshot Heath,
mposed of

	Parts.
Coarse silicious sand	380
Fine sand	9
Iron, clay, and chalk	11
	400

with that of the soil of a Lincolnshire pasture, which contains, in the same weight,

	Parts.
Fine calcareous sand and silicious sand	160
Soluble matters	6
Organic matters	40
Chalk	32
Oxide of iron	8
Alumina (pure clay)	25
Silex (earth of flint)	65
Water and loss	64
	400

The soil of Bagshot, he will observe, contains nearly twice as much silicious matters, and only one fifth the proportion of chalk and alumina, that is present in the pasture from Croft in Lincolnshire.

Chalk and marl are both used for the sake of the carbonate of lime they contain, and they may, therefore, be treated of under one head. The proportion in which I have witnessed these applied per acre naturally varied with the expense of the carriage of the material. On the light gravelly soils of the coast of Essex, I have used, in common with my neighbours, about 20 to 25 tons of the chalk of Kent per acre, at a cost of about 6*s*. per ton; but of marl the quantity applied in the same district is from 50 to 100 tons per acre, which may be commonly procured for the expense of carriage and spreading; and this addition to the soil is a very permanent improvement. Chalking, the Essex farmers say, lasts for twenty years, and marling for a man's life.

Upon analysing a productive soil, worth 30*s*. per acre, which had been thus chalked about five years previously, it was found to contain

		Parts.
Stones and gravel, principally silicious	27	
Vegetable fibres	1·5	
		28·5
Soluble matters, principally vegetable extract		3
Carbonates of lime and magnesia		18
Oxide of iron		4
Animal and vegetable matters		1
Alumina		4·5
Silica		40
Loss		1
		100

considerable. I have seen from 50 to 100, or even 150 tons per acre, spread on the gravel and clay lands with decided success.

The cultivator sometimes deludes himself with the conclusion that applying sand, or marl, or clay to a poor soil merely serves *to freshen it* for a time, and that the effects of such applications are only apparent for a limited period. Some comparative experiments, however, which were made sixteen years since on some poor hungry inert heath land in Norfolk, have up to this time served to demonstrate the error of such a conclusion. In these experiments the ground was marled with twenty cubic yards only per acre, and the same of compost; it was then planted with a proper mixture of forest trees, and by the side of it a portion of the heath, in a state of nature, was also planted with the same mixture of deciduous and fir trees. Sixteen years have annually served to demonstrate, by the luxuriance of the marled wood, the permanent effect produced by this mixture of soils. The growth of the trees has been there rapid and permanent; but on the adjoining soil, the trees have been stunted in their growth, miserable in appearance, and profitless to their owner. Time has made no alteration; while the marled soil has yielded an annual and luxuriant crop, the land left in its original state has demonstrated by its produce that something was wanting, some earthy ingredient only needed to render it no longer barren, and the adjoining *marled* land has further shown of what that addition was composed.

The expense per acre of this marling,

per annum was added t
estate.

This excellent farmer
system of hand-barrowin
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the whole, deemed this
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say, into the sand; and
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they add nothing to the
agricultural knowledge.

ay marl, he thought, could be nvenient distance, seventy-five per acre was a good covering; lly or soapy marl, twenty or yards will be sufficient. The eing spread, should be repeat- and harrowed, to divide and the better.

ication of sand to the farmers' soils is a practice which, in icts of this country, is attended ecided success. Thus, in that folk which is bounded on two rivers Orwell and Stour, there fine red sand abounding with in their perfect and broken , when applied to the clay soils of twenty to thirty tons per ductive of very excellent per- l effects.

ley of the Kennett, in Berkshire, oportions, I have witnessed the ravelly debris of the Bath Road the peaty soils of that district nt effect, and with equal success f clay meadow land; the result it with about thirty tons per he same road sand is equally he land is not only prevented ng in the summer months, but of grass is very materially

yment of sea-sand is a very an- in the west of England; it is , to which no one can assign of its commencement: many ns per annum are carried away rs who cultivate the lands in urhood of Padstow Harbour, rses' backs, and they think it their while to carry this sand nto the interior of the country. manner the farmers of Devon the sand at the mouth of the when they have filled their it up the river. They deem ined sand the most immediate s, but both are very durable, improvements to the soil. The they say, lasts for many years. osition of the sands of Padstow d of the estuary of the Tamar, ilar; they contain from sixty to cent. of carbonate of lime, and eferred by the farmers, when obtained, mixed with the sea

ut the least commonly practised proving the staple of a soil by ions, is claying; a system of fer- good effects of which are much tely apparent than chalking, and f the chief causes of its disuse. It requires some little time to elapse, and some stirring of the soil, before the clay is so well mixed with a sandy soil as to produce that general increased attraction and retentive power for the atmospheric moisture which ever constitutes the chief good result of claying poor soils. Clay must be, moreover, applied in rather larger proportions to the soil than chalk; for not only is its application rarely required as a direct food for plants, for the mere alumina which it contains, since this earth enters into the composition of plants in very small proportions, but there is also another reason for a more liberal addition of clay being required, which is the impure state in which the alumina exists in what are commonly called clay soils. For instance, chalk usually contains, when perfectly dry, about 98 per cent. of carbonate of lime. Mr. Kirwan found in a specimen of chalk two per cent. of alumina, or

	Parts.
Lime - - - -	53
Carbonic acid - - -	42
Water - - -	3
Alumina - - -	2
	100

But the heaviest clay soils seldom contain more than 20 per cent. of alumina; in the stiff clays of Sussex and the Weald of Kent are found only about 28 per cent. of this earth: even the adhesive clays employed by the potter yield only about 33 per cent. of alumina, porcelain earth only 47 per cent.

The following is the analysis of a heavy Sussex clay soil:—

	Parts.
Silica - - - -	54
Alumina - - -	28
Carbonate of lime - -	3
Oxide of iron - - -	5
Organic matters - -	4
Loss, chiefly moisture - -	3
	100

The farmer, therefore, who applies 50 tons per acre of such a clay to a sandy field, only adds about 14 tons of alumina to the soil; but if he applies 50 tons of chalk, he adds 49 tons of carbonate of lime.

Hence is the reason why, in all efforts to alter the earthy constituents of a soil, a much smaller quantity of chalk produces more decided effects than the addition of a much larger proportion of the most tenacious clay. Chalk, too, when merely spread on the surface of the soil, and exposed to the action of frost, speedily crumbles to powder, and becomes intimately combined with the other earths of the soils. The clay, however, is too adhesive to be thus readily, and without some little from that of hazel nuts to hen's eggs, and that extending to a depth of many feet.

In this case the clay was drawn in *hand carts* by three men, rather better than a quarter of a mile. The cart contained about 880 lb. of clay, or about 13 cubic feet. Eight of these cart loads, or about $3\frac{1}{8}$ tons, were spread on each square rod of $16\frac{1}{2}$ feet, which, when first spread loosely and in lumps, made the soil five or six inches deep, and when it had become settled and solid, about four inches; each cart took back a load of shingle to fill up the hole made by the excavation of the clay. The work was laborious, but the men readily earned about 1*s.* 6*d.* per day, and were contented. They did their work by contract, receiving 3*s.* per square rod for the shingle they thus covered, or 24*l.* per acre; and for this sum they carried 520 tons of clay. The clay is of the ordinary red description, so common in Sussex, and though not particularly adhesive, is yet sufficiently so to form a plate, on which in wet weather the water stands, although this superstructure of clay is resting on a mass of coarse shingle stones, fifteen feet in depth. This experiment was made on a small field of about three acres in 1839, and promises as well as a similar effort made with the same clay in 1832.

In this instance an acre and a quarter of shingle was covered with the same clay to a similar depth. But the clay being only divided in this case from the shingle by the Eastbourn and Hastings Road, the expense was less; the men digging, carrying, and spreading the clay, for 2*s.* per rod, or 16*l.* per acre. This land was let in 1834, for a term of 14 years, at 40*s* per acre. The tenant has succeeded in making it produce

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to do more than this would have an injury to the land, for eating s upon it with sheep, and for the crop; when sufficiently clayed to wheat after seeds, a point requiring ttention, I always found it effectually or any other crop.

he way in which it was done. It was ary, in the first place, to fix upon the avourable situation for the pit, keep- ree objects in view. 1. The most nient place for carting to the plot of d intended to be marled. 2. The ituation for a pond to answer for a nent watering-place, cutting, if pos- across a fence, so as to water two one from each mouth of the pit. ere the clay could be got with the lifficulty. After the place was fixed the work was carried on by five s, a driver, four horses or beasts, and rts (which are of the Scotch kind, hort bodies, and broad wheels); the s dug with a gradual descent, so that horses could draw out about a ton, was shot out where wanted, the last ing by the time the other was loaded: three horses were always ready for ded cart: the clay was spread by the s, at broken times after being ex- to the action of the air; rain, after frosty or droughty weather, would it to fall to pieces, sufficiently for ing and ploughing in. The expense for digging, filling the carts, and ling, was from 4*d.* to 5*d.* per cubic (full one ton), varying according to uantity of stones imbedded in the the total expense per acre was as s:—

	£	*s.*	*d.*
ging and spreading 150 yards, 4½*d.* per yard - -	2	16	3
r horses four days, at 2*s.* 6*d.* ch, 10*s.* per day - -	2	0	0
er four days, at 2*s.* 6*d.* per day	0	10	0
r expenses (wear and tear) -	0	3	0
l expenses in marling one acre	5	9	8

inton marled eighty acres in this way; y employing a windlass to draw the out of the pit, he reduced the ex- per acre 7*s.* As regards the im- nent of the land by marling, the value produce in four years before marling

	£	*s.*	*d.*
	14	7	0
r years after draining:—			
n marled upon fallow -	22	15	0
n marled upon seeds -	24	16	6
nce in favour of marling upon eds - - - -	2	1	6

"The land," Mr. Linton adds, "is never so productive the first two years (or until the clay has got well pulverised and mixed with the sand) as it is afterwards, and it will not grow a good crop or a fine sample of barley for five or six years after the clay is laid on, I have therefore sown oats instead. If people (he concludes) would improve the land they have, particularly light land, by draining, marling, &c., they would realize a far greater return for the outlay than by purchasing more." (*Journ. Roy. Agr. Soc.* vol. ii. p. 67.)

From these facts the cultivator, I think, will arrive at the conclusion, that the judicious admixture of soils, and other applications of manual labour, for the purpose of increasing their productiveness, can hardly fail, sooner or later, to amply repay him for the labour he thus employs. It is an improvement, let him remember, that, when once accomplished, lasts for ever, since the very character of the soil is changed; his organic manures, such as farmyard compost, oil cake, and even bones, are gradually dissolved or decomposed, and disappear from the land, are absorbed by his crops, or evolved in the gases of putrefaction; but no such results arise from either deepening the soil or the addition of the earths, they, when once united to the soil, remain there to increase the crops, to lessen the toils, and to add to the profits of succeeding cultivators, even in distant periods. And to effect these important, these national results, let him, too, remember, that no neighbouring lands are impoverished, no organic matters are drawn from one field to enrich another; the dead, the deep buried earth is merely brought to the surface, and that which is utterly profitless in the mass diffuses riches and gladness when spread over the farmer's fields.

MOENCHIA, THE UPRIGHT. (*Moenchia erecta.*) An elegant little indigenous herbaceous plant, growing in pastures and heathy ground, growing on a barren gravelly soil. The root is small, fibrous, and annual in habit. The whole herb is glaucous, and very smooth. Stems several, three or four inches high, round, leafy. Leaves opposite, sessile, linear-lanceolate, entire, single-ribbed. Flowers white, erect, solitary, blowing in May. (*Smith's Eng. Flor.* vol. i. p. 241.)

MOLASSES. (Port. *Melasso.*) The saccharine principle in the dregs or refuse drainings from the casks, &c., of sugar, and the uncrystallisable part of the juice of the cane separated from the sugar during the process of granulation. It consists of sugar prevented from crystallising by acids, saline and other matters. All cattle are fond of of cattle.

MOLE. A species of the genus *Talpa*, common in this country and other parts of Europe. This quadruped exhibits in perfection that modification of structure by which the mammiferous animal is adapted to a subterranean life. Its head is long, conical, and tapering to the snout, which is strengthened by a bone, and by strong gristles worked by powerful muscles. The body is almost cylindrical, thickest behind the head, and gradually diminishes to the tail. There is no outward indication of a neck, that part being enlarged to the size of the chest by the massive muscles which act upon the head and fore legs. These, which are the principal instruments by which the mole excavates its long and intricate burrows, are the shortest, broadest, and strongest, in proportion to the size of the animal, which are to be met with in the mammiferous class. The food of the mole consists of worms, insects, and the roots of plants; its voracity is great, and it soon perishes if food be scarce or wanting. The sense of sight is very feeble, the eyes being minute and rudimental; but the other faculties of smell and hearing, as being more serviceable in its dark retreat, are extremely acute. The female prepares a nest of moss, dry herbage, roots, and leaves, in a chamber commonly formed by excavating and enlarging the point of intersection of three or four passages.. The young are brought forth to the number of four or five in April, and sometimes later.

The farmer views the operations of the mole as destructive to his crops, by exposing and destroying their roots, or by overthrowing the plants in the construction of the mole-hills; his burrows, moreover, become

lightened agriculturalis
prompt measures to pre
crease of the mole, woul
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(James Hogg), from
years' hard-earned expe
ation, speaks of the p
destroying the moles on
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exterminated, the pinin
two baneful diseases, co
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There can be no ques
much injury to gardens
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tulips, and other tubers
spread surface of the fi
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Journ. of Agr. vol. i. p. 6
of Science.)

MOLE-CRICKET.
garis. Acheta gryllotal
tive insect is known in
under the several nam
jarrworm, eve-churr, an
mole-cricket measures t
and four lines in brea
dark-brown. The most
in the insect is the size
fore arms. The power
to move them is great.
main trunk is divided
double gristly partition
bony frame, with an inf
which the inner part
clavicle of the arm is h
mechanism the arms are
cricket burrows under

ly resemble black ants, and feed, like ld ones, on the tender roots of grass, and various culinary vegetables. They y their presence under the earth by ithered yellow patches in the meadows, by the withering decay of culinary ve- bles in the gardens. In October or ember they bury themselves deeper in earth, as a protection from cold, and again to the surface in the warm in March. Their presence is disco- d by their throwing up the earth like s. The best method of destroying is to dig up the young brood; but ing water or oil of any kind poured their holes will be found effectual. *llar on Insects*, p. 144.)

OLE-PLOUGH. See Draining and ughs.

ONADELPHOUS. In botany, having laments cohering into a tube, or one lle.

ONANDROUS. A botanical term ed to plants having only one stamen, ale organ.

ONEYWORT. See Loosestrife.

ONILIFORM. In botany, formed a necklace; that is to say, articulated alternate swellings and contractions, bling a string of beads.

ONKEY-FLOWER. (*Mumulus.*) y exotic plants, well worth cultivating, cularly the hardy herbaceous kinds, h are admirably suited for ornamenting r borders. They thrive in any com- garden soil, and are readily increased ivision of the roots or from seeds. The s of *M. guttatus* are eatable as a salad. *ton's Bot. Dict.*)

ONK'S HOOD. See Wolf's-bane.

ONOCOTYLEDONOUS. In botany, g only one seed-leaf or cotyledon.

ONTAGU'S HARRIER. (*Circus tagui.*) This is a name given by Mr. ll to a species of harrier, which is dis- ished from the hen harrier by being more slender in shape and not so y, the average weight of Montagu's er being about nine and a quarter es, that of the hen harrier about thir- ounces. Its food is small birds and les. The nest is placed on the ground, rally among furze; the eggs, seldom eding four in number, are very similar ose of the hen harrier. (*Yarrell's Brit. ls*, vol. i. p. 100.)

OONBLIND. See Blindness.

OON-FLOWER. See Ox-eye.

OON-TREFOIL. A name for one of pecies of medick (*Medicago arborea*).

OONWORT. (*Botrychium*, from s, a bunch; in reference to the form e fructification, which is much like a bunch of grapes.) The species of this genus of ferns are curious and interesting plants; one only is indigenous, the common moonwort (*B. lunariâ*), which is a perennial, growing in mountainous pastures or meadows. The root consists of several simple, cylindrical, clustered or whorled fibres. The herb is very smooth, a little succulent, of a pale opaque green, erect, not a span high. Leaf solitary, pinnate; leaflets fan-shaped, notched. (*Smith's Eng. Flor.* vol. iv. p. 328.)

MOOR. An uncultivated surface of country, without trees, and with few grasses or other herbage fit for pasture; and usually containing scattered plants of heath, with a dark peaty soil. Moor lands are generally the least fitted for culture of any description of surface, not rocky or mountainous. Moors are covered with a very thin layer of soft, black, sterile soil; and the subsoil is generally gravel or retentive ferruginous clay. By the destruction of the heath or other bad herbage, and by sowing down with grass seeds, they may be improved. In many cases, also, trees will grow on drained moors; in which case the soil ultimately becomes ameliorated by the shade they afford, and the fall and decay of their leaves. See Heath, Morass, Peat Soils, and Waste Lands.

MOORBAND PAN. This is a name given in Scotland to an indurated combination of clay, small stones, and iron in a particular state, situated either immediately, or at some distance below the path of the plough, and which is nearly impervious to water. All indurated incrustations, how ever, formed under the sole of the plough, says a writer in a valuable agricultural journal, are not *moorband pan.* In good alluvial loam of greater depth than the plough furrow, and rendered adhesive by pressure, an incrustation or firming of the subsoil, that is, the bottom upon which the plough moves, is frequently formed by the sole of the plough rubbing constantly on the soil at the same depth. This incrustated earth can retain water, but its effects on soils and plants are innocuous compared to those of moorband pan. Nevertheless, its disruption by deep ploughing is of benefit to the soil, and we have experienced it in very fine deep mould. From an analysis by Mr. John Gray of Dilston, of two portions of moorband pan obtained from Mylnfield Plain, 120 parts of one were found to contain 34 of oxide of iron, 74 of silex, and 6 of alumina or clay and loss; the other contained 43 parts of oxide of iron, 64 of silex, and 8 of alumina and loss. (*Quar. Journ. of Agr.* vol. x. p. 131. 272., vol. xi. p. 86.)

of a lead colour, sometimes inclining to a purple, with notched or jagged, short alternate bractes. This is an elegant and singular grass, flowering too early (April to June) to be often seen by mountain travellers. (*Smith's Eng. Flor.* vol. i. p. 114.; *Sinclair's Grasses*, p. 303.)

MORASS. Moor lands saturated with water to such an extent as not to bear the tread of cattle. A morass is to a moor what a marsh is to a meadow. It is evident that the drainage of morasses and moors by lessening the evaporation of water from their surfaces, must tend to improve the local climate. See Peat and Plantations.

MORDANT. Any substance used to fix dyes or colouring matters upon different stuffs.

MOREL. (Germ. *moschel.*) The *Moschella esculenta* is one of the few edible fungi found in this country, which may be used as food with safety. It occasionally occurs in woods and orchards, whence it finds its way to the markets; but it is of comparatively rare occurrence. It has a hollow stalk an inch or two high, and a yellowish or greyish indented head two or three inches deep. See Fungi and Mushrooms.

MORTAR. A well known cement employed for building purposes, which is thus described by Dr. Thomson: "It is composed of quicklime and sand, reduced to a paste with water. When dry it becomes as hard as stone, and as durable; and adhering very strongly to the surface of the stones which it is employed to cement, the whole wall in fact becomes nothing else than one single stone. But this effect is produced very imperfectly unless the mor-

wards Morveau found
portions to answer best

Fine sand -
Cement of well bak
Slacked lime -
Unslacked lime -

The same advantages
using as little water as
the lime. Higgins foun
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When a little clay is
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for making *water* mort
mortar may be made b
cess: Mix together fou
six parts of black oxide
ninety parts of limest
Calcine this mixture to
acid; mix it with sixty
form it into a morta
quantity of water. (*A*
259.) The best mortar
is made by mixing lime
volcanic sand brought f
informs us that basaltes,
mon in this country, ma
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cedars still flourishing there were
r him. He is mentioned here on
f his having written

e Art of Husbandry, or the Way of Ma-
Improving of Land, being a full collection
a been writ either by Ancient or Modern
th many Additions of new Experiments and
is not treated of by others; as also an Ac-
Particular Sorts of Husbandry used in se-
les, with Proposals for its further Improve-
hich is added, the Countryman's Kalendar.
8vo. Again in 1709, 1712, and 1714. The
is dated 1721. The last edition, with im-
was in 1761. This work was approved of in
hich it appeared, and was even translated
lish language, and published at Stockholm
W. Johnson's Hist. of Gardening.)

IATELL. (*Adoxa Moschatellina*;
om *a* privative, and *doxa*, glory;
the want of show in the flowers;
g of the same colour as the leaves,
yellow.) This is an interesting
digenous plant, flourishing best
shade of trees; it is increased by
n its wild state it grows in groves,
nd under shady hedges. The root
al, of several white, fleshy, im-
concave scales, producing fibres
ers from their interstices. Stem
rect, simple, angular, three or four
h. Leaves broadly and unequally
bed; the radical ones twice ternate
rs have a musky scent when moist,
rmed into a round terminal head.
Eng. Flor. vol. ii. p. 242.)

ES, in common language, are any
mall-leaved, Cryptogamic plants.
b-moss is a lycopodium; Iceland
cer mosses are lichens; and the
species of Jungermannia are all
nded under the same term. But in
al botany no plants are considered
cept such as belong to the natural
yaceæ or *Musci*. Such plants are
ved; without spiral vessels or
with a distinct axis of growth;
he sporules, or reproductive matter
n cases called sporangia or thecæ,
y a cap or calyptra. The struc-
e sporangia is as complex as that
ms and leaves is simple. Each
m is closed by a lid or operculum;
ich is a transverse membrane,
the rim left after the fall of the
. The edge of the rim is fur-
h one or more rows of teeth, in
some multiple of four; in the
a columilla or column, and be-
latter and the sides of the same
orules. It is not a little singular
plants should have cases called
, containing powdery matter;
ich are found animacules, not dis-
le from such as are called sper-
d which swim about freely in
None of the mosses are of any
e, except for the purpose of packing plants, and surrounding their roots when they are sent to a distance. They are bad conductors of heat, and might be employed, instead of straw, to guard delicate-growing plants from the influence of frost. (*Brande's Dict. of Science.*)

MOSS LAND. Land abounding in peat moss, but not so much saturated with water as to become peat bog or morass. Many remedies have been prescribed for the destruction of moss. A good scarifying or harrowing, with short sharp tines, succeeded by a top-dressing of salt or soot, is probably the most efficacious: lime in any form is less powerful, though (especially when combined with sand) it remarkably promotes the growth of trefoil tribes and other grasses, highly palatable to cattle, but does not avail to the exclusion of moss. Mr. Bishop of Perthshire, who has obtained from the Highland Society of Scotland a prize for an essay "On the Management of Pasture in regard to the Destruction of Musci," suggests as the most certain remedy, that a great portion of the summer's grass should remain unconsumed on the ground until the following winter, when the barer it is eaten before the new growth of spring, the finer will be the following summer's grass. Breaking up the land, and sowing appropriate grasses after a course of culture, is a certain remedy, but often a very inconvenient one. Mr. W. Bell (*Trans. High. Soc.* vol. i. p. 147.) gives an account of certain experiments which he carried on very successfully for converting moss into manure by the application of whale oil.

Mr. A. Blackadder, speaking of the manures for decomposing moss (*Quart. Journ. of Agr.* vol. vi. p. 484.), says: Adjacent rock strata ought to be carefully explored, as in general they have each their corresponding earthy covering more or less adapted to the purposes of vegetation. Where the rocks are of the primitive class, or of the coal formation, their disintegrated portions, and ofttimes their superficial covers, are of inferior value as a soil; but even the rock-earth of the latter, as also of clay-slate, lime, or even the old red sandstone, though not previously mingled nor superimposed in the moss, are yet valuable as ingredients of composts for top-dressing, as are also those of the finer sandstone, green-stone, and sea-sand, containing calcareous matters in a state of decomposition, or even where these are absent. While sand laid over moss produces rapid decomposition, and consequent vegetation, no such effect is produced by the purer clays. Putrescent matters, whether animal or vegetable, possess the most powerful influence. Lime, unless in compost, seems to have no such effect pense at which these can be laid down at the moss must enter into the calculation. Or, again, if the moss is to be entirely removed, whether an adequate supply of water can be obtained, with access to a river or to the sea, into which it may be floated off. Nothing adds more to the intrinsic value of moss than mixtures of other soils during the progress of its formation, either by means of the winds carrying drift sand, or by water transporting earthy particles. When, again, a considerable quantity is thus superimposed, the soil ceases to be a moss, properly so called, and is an alluvial soil upon a moss subsoil. In either case, little more is required than thorough draining, in order to the production, by the ordinary means, of the best crops; and such is the description of the greater part of the mosses hitherto successfully improved in Scotland. The same writer (*Ibid.* vol. vii. p. 169.) furnishes some causes of the failure in moss improvements.

In the seventh volume of the *Com. to the Board of Agr.* p. 438., there is an account, by Mr. Roscoe, of the drainage and improvement of an extent of several miles of Chatmoss, in the county of Lancaster. See Bog Draining, Peat Soils, and Waste Lands.

MOSS RUSH, or GOOSE CORN. (*Juncus squarrosus.*) See Rush.

MOTH. See Corn Moth and Insects.

MOTH MULLEIN. See Mullein.

MOTHERWORT. (*Leonurus;* from *leo*, a lion, and *oura*, a tail, in allusion to the appearance of the spike of flowers.) The herbaceous species of this genus grow freely in common garden soil, and increase readily by seeds. The other kinds require to be treated like other hardy and semi-

synonymous with mac
stance, in the stems o
(*Conium maculatum*).

MOULD. A genera
divided earthy substan
upper stratum or surfac
in which all kinds of ve
and thrive. See Analys
and Humus.

MOULD-BOARD.

MOULD ON HOPS
ease, which is liable to
in the more advanced p
and produce much mis
See Mildew and Hops.

MOULDEBAERT.
Flemish husbandry rese
malt-shovel: it is stro
three bars of iron on the
by twelve bolts, and i
of horses with swingle t
transporting compost, m
spot to another. Its us
as follows: breadth acr
length 3 feet; height of
length of handle 4 feet.
drives, with long reins,
rately on the handle as
ward, collects and trans
of earth to the place wh
down, which is done in t
manner, by his letting
causes the front edge o
dip and catch against th
it is at once turned over
load. The extremity
which a rope is affixed
strikes against, and rests
tree bar, and in this ma
baert is drawn along to
earth or compost: the dr

ge of plumage, to which some species rds are subject at the breeding season. moult is always accompanied by the opment of a new plumage, which may a different colour from that which is

UNTAIN ASH. See Rowan Tree.

UNTAIN-EBONY. (*Bauhinia;* in ry of John and Caspar Bauhin, bo- of the sixteenth century.) A genus wy and interesting evergreen shrubs, will succeed well in a mixture of loam, and peat. (*Paxton's Bot. Dict.*)

UNTAIN FINCH. See Finch.

UNTAIN PARSLEY. (*Selinum linum.*) A species of wild parsley.

UNTAIN LINNET. See Linnets.

UNTAIN-SORREL. (*Oxyria reni-* ; from *oxys*, acid.) The mountain-sorrel nd wild in elevated bogs, rills, and the clefts of rocks. It grows well in com- arden soil, and is increased by dividing roots or by seeds. The root is strong, ng deep into the ground, subdivided fted at the crown. Stems solitary, a span high, roundish, striated, pa- , almost leafless. Leaves almost all l, stalked, kidney-shaped, bright undivided, with radiating ribs. Pa- erect, branched, twice as tall as the . Flowers small, green, drooping, on ry, whorled, simple stalks. The herb is powerfully and gratefully with some astringency. (*Smith's Eng.* vol. ii. p. 188.)

USE. See Mice, Fieldvole, and st Mouse.

USE-EAR CHICKWEED. See weed.

USE-EAR SCORPION-GRASS. corpion-Grass.

USE-TAIL. (*Myosurus.* It derives mmon and generic name from the nstance of the seeds being seated on a receptacle, and appearing exactly he tail of a mouse.) In the flower- n this species should be sown in a situation. This small annual herb, ut a stem, grows wild in our corn- on a gravelly soil. The root is small brous. The herbage is smooth, vary- luxuriance. Leaves numerous, nearly from one to two inches long, linear, . Flowers small, upright, pale yel- h, solitary, on simple radical stalks. th's *Eng. Flor.* vol. ii. p. 124.)

OUSE-THORN. (*Centaurea myacan-* A species of cantamy, native of ce, blowing a purple flower in August.

OW. A pile or heap of corn, straw, y placed together for the purpose of kept dry. See Stack and Rick.

OW-BURNT. A term applied to such substances as are over-heated in the mow by the process of fermentation.

MOWING. The act of cutting down corn, grass, &c. by the scythe. There are some differing opinions by several parties, in the fourth volume of the *Com. to Board of Agr.* p. 207., as to whether it is best to feed or mow the grass in the first year after laying down to grass. See Hay-making.

MUCILAGE. A turbid slimy fluid, produced by treating some vegetable substances with cold water, others with hot. It resembles Gum, but is distinguished from it by not forming a thick curd with the solution of Goulard's extract. See Starch, Linseed, Marsh Mallow, &c.

MUCK. A farming term for any sort of material, such as dung, straw, &c., that is moist, or in a fermenting or decomposing state.

MUD. The mechanically suspended matters of water deposited at the bottom of rivers, ponds, ditches, &c. As much of this kind of material should be collected as possible, and be thrown up into heaps in order to become mellow. It contains much carbonaceous matter, and is an excellent manure either in the simple or compound state, mixed with compost, or with a bushel of lime or salt to each cubic yard.

MUDWORT. (*Limosella;* from *limos*, mud, in allusion to the habitation of the species; whence, also, the English name.) The common mudwort (*L. aquatica*) is an indigenous annual subaquatic plant, growing in muddy spots, where water has stagnated during winter. The herb is diminutive and quite smooth. Root fibrous, throwing out naked runners, which fix themselves at the ends by fresh fibres, and form new plants. The leaves are lanceolate, somewhat spatulate, erect or spreading, an inch long, on footstalks twice that length, sheathing at the base. Flowers flesh-coloured, on shortish, crowded, axillary stalks, about half an inch long or more, recurved after the blossoms are past. The mudwort flowers in July and August. (*Smith's Eng. Flor.* vol. iii. p. 145.)

MUGWORT. (*Artemisia vulgaris.*) This species of Artemisia grows very common about hedges, in waste ground, and the rough borders of fields. The root, like most of the species, is woody. Stems three or four feet high, erect, branched, panicled, leafy, furrowed, smooth, often reddish. Leaves alternate, flat, deeply pinnatifid and cut, somewhat lyrate; dark green and smooth above, downy and snow-white underneath; the lower ones stalked, upper sessile. Clusters upright, leafy, simple, of reddish or brown ovate woolly flowers, more

Flor. vol. iii. p. 405.)

MULBERRY TREE. (*Morus;* from the Celtic word *mor*, signifying black, in allusion to the colour of the fruit.) The species of Morus, or mulberry, grow from ten to thirty feet high. A moist situation and loamy soil, with a free exposure to the sun, suit them best.

1. The common mulberry (*M. nigra*) is in general cultivation for the sale of its fruit, which is well known.

2. The white mulberry (*M. alba*) is extensively cultivated in many countries for its leaves, which form the chief food of silkworms.

The mulberry tree may be propagated by layers, cuttings, or grafting. The principal use of the fruit of the black mulberry is for the dessert; but from its cooling and laxative properties, its juice, diluted with water, is sometimes used as a beverage in fevers. It is also employed in the form of syrup for medicinal purposes, chiefly to colour other fluid medicines. The juice is also used to give a dark tinge to liquors and confections. When properly fermented and prepared, the fruit yields a pleasant vinous liquor, known under the name of mulberry wine. In the cider counties they are sometimes mixed with apples, to form a beverage known as mulberry cider. The bark of the root has an acrid bitter taste, and is a powerful cathartic; hence it has been successfully used as a vermifuge, in doses of a scruple, in powder. The wood of the tree is yellow, tolerably hard, and may be applied to a variety of uses in turning and carving. It is, however, necessary to steep it in water before it is worked, in order to remove the tough and fibrous bark, which is capable of being converted into strong

on account of their gr
rability. No animal
or more hardy; but th
is disagreeable to those
action. The diseases t
liable are few. He att
of the horse, and is mu
tained. The mules of
are frequently very fin
seventeen hands in h
some, and peculiarly
but very inferior in l
particularly about the
importation of Spanish
try has tended great
mules, many of which,
are sufficiently thick-s
those purposes in which
horses are employed.

To have large and
mare should be of a l
portioned, with rather
rate-sized head, and a
the ass should be of the
(*Willich's Dom. Ency*
Husb.; Penny Cyclo. vo
Encyclo. of Rur. Affai
and HYBRID.

MULLEIN. (*Ver*
from *barbascum*, beard
bearded filaments.)
bascum are strong ro
producing an abundan
flowers, and on that a
adapted for planting in
back of flower border
They grow freely in
readily increased by
perennial kinds by di
(*Paxton's Bot. Dict.*)
as six wild species com

feet, in fields and waste places,
l gravelly soils. (*Smith's Eng.*
p. 307.)

K. A local term for dirt or

ID. A botanical phrase, sig-
into many parts.

TE. In botany, implies co-
hort sharp points.

N. A contagious malignant
ich frequently prevails in hot
among cattle, carrying off vast
t once used to sweep off the
of whole districts, and there
in which it is not now seen
of the kingdom. It principally
arshy and woody districts, or
-draining has been neglected,
have been exposed and half
e disease is known by the ani-
down their heads, which are
hort and hot breathing, cough,
of the heart, staggering, an
cretion of viscid matter in the
in the throat, and a slimy
e early stage of murrain is one
d the treatment should cor-
this: bleeding and small doses
medicine will be serviceable.
fetid diarrhœa must be met
nts, mingled also with vegeta-
In combating the pustular and
tage, the chloride of lime will
external application; while a
lministered with the other me-
rdly, may possibly lessen the
general decomposition. Above
cted animal should be imme-
oved from the sound ones.
attle, p. 379.)

. (Fr. *muscle*; Sax. muſcula.)
s, susceptible of contractions
ns. Muscles are aggregates of
ular fibres, which appear to be
small globules; but we are, in
t of the ultimate structure of
and of the causes on which
ful powers depend. They con-
ost nutritious species of animal
LESH and GELATIN.

M. (Gr.) A collection of
cts in nature and art. It is
t an agricultural museum, open
ay be desirous of visiting it,
of considerable advantage to
and it would be very desirable
museum with each of the prin-
agricultural societies, where
convenient library room, or
ing. The beneficial effects of
tions have been exemplified in
in the interest produced by the
ade by Professor Low for his class in the University. There are now several very important agricultural museums in different parts of the kingdom. The interest excited by the exhibition of agricultural seeds, roots, and plants at the annual shows of the Highland and Agricultural Society of Scotland, together with the beneficial results of the establishment of the Messrs. Drummond at Stirling, suggested to Mr. Lawson the propriety of exhibiting a collection of a similar nature in Edinburgh. He accordingly fitted up apartments adjoining to his premises in Hunter's Square, and having stocked them with suitable materials, procured by himself or supplied by the liberality of his friends, and of persons interested in agricultural pursuits, opened them to the public in November 1833. In 1838, the Highland Society instituted a museum of its own, on a large scale, in connection with its establishment in Edinburgh. And this museum, a fine building, situated on George the Fourth's Bridge, is now one of the chief collections in the kingdom. It is impossible to enumerate, and it is difficult even to classify, the various objects of interest which are here displayed. I may mention, however, that it contains models of all known agricultural implements and agricultural machinery. An assortment of seeds, grains, and grasses adapted for British culture; specimens of the various kinds of timber produced by forest trees; a collection of insects and grubs known in this country as inimical to trees and plants; samples of dyes derived from native shrubs, with specimens of the shrubs themselves; specimens of minerals, ores, and rocks existing in Scotland, and adapted for useful purposes. Not the least valuable part of the materials already collected, and illustrative of the physical character and riches of the country, consists of the reports and maps, with relative sections, explaining the geological structure of different counties, and showing those parts of Scotland where coal, lime, ironstone, and other valuable mineral products abound. Abstracts of these have been published from time to time in the Society's *Transactions*. But the original maps and sections, drawn on a much larger scale than can appear in an octavo volume, are displayed in the museum, and afford a mass of practical as well as scientific information no where else to be met with. Another important and very interesting part of the collection is a series of models and portraits of different varieties of stock of the most approved breeds, exhibiting their respective points and characters. Messrs. Longmans have recently given a more extended sphere of usefulness to these beautiful and cele-

burgh will be found in the *Quart. Journ. of Agr.* vol. v. p. 418.; and a notice of the Highland Society's museum, *Ibid.* vol. ix. p. 305. The Royal Botanical Society of London have set apart a portion of the garden, now in progress in the Regent's Park, for the cultivation of agricultural plants; and it is the intention of that society to institute a museum illustrative of agricultural botany.

MUSHROOMS. (Fr. *mouscheron;* Lat. *Agaricus*, from Agaria, a city, or Agarus, a river of Sarmatia, now Malamonda.) A more extensive genus than this is not known in the whole vegetable kingdom. Some species, as the common mushroom (*A. campestris*, *A. vaginatus*, &c., are well known for the wholesomeness of the food which is prepared from them. Others, as *A. muscarius*, *A. necator*, the whole genus *Amanita*, and many others, &c., are very dangerous poisons: indeed, the latter quality exists more or less in so many species, and these resemble those that are wholesome so nearly, as to render it advisable to be exceedingly cautious in the use of fungi, for the most dreadful effects are well known to have resulted from want of caution in this respect.

The edible mushroom (*A. campestris*) is nearly inodorous, but has a grateful flavour. The crown or hat is at first hemispherical, then convex, and at last flat; fleshy; about two to five inches broad; white, or very light brown, slightly scaly, the scales soft and fibrous; gills pink, changing to fuscous black; the flesh, when divided, usually changes to a reddish hue. The use of the mushroom, as an article of diet, was known to the ancients. See FUNGI.

To produce mushrooms artificially, beds

and beat, but not trod
completed, the bed mus
litter, or other light co
the wet, as well as to
clean dry straw will do,
matting, is to be preferr

The bed should be m
tered situation, and on
preference to founding i
prevents the spawning
completely to the bottom
the settling of water,
If the site is not dry it m
stones, clinkers, &c., to
nothing destroys mush
excessive moisture, exc
heat or cold. To obvi
of these unfavourable
preferable to construct
If it is constructed in
built against one side,
from it; this is the p
gers, who makes it tw
back, and one in front.
greater certainty during
flue may pass beneath th
no means absolutely ne
due regulation of cover
be kept of sufficient
spawn must not be inser
perature has become reg
The minimum in 50° and
As soon as the violen
abated, which it will in
though sometimes it will
ten days, the large lum
broken into moderately
be planted on both sides
if it is hipped; each frag
the surface of the dung, i

of mould, four inches high and
ll round the bed; upon this,
lung, they lay the spawn; then
ge, six inches, of similar thick-
they set another row of spawn,
eed until the bed is finished;
s no advantage over the first
bed, and is much more tedious.
vering of straw, six or twelve
according to the temperature,
on, and continued constantly.
rthing is finished, the surface
tly smoothed with the back of
hich fixes it properly, and if in
throws off any excessive rain.
bed has been spawned and co-
heat appears to be renewed in
able degree, the greatest part
ing must be removed, but re-
during rain, if the bed is not
; and to guard against this con-
a good practice to mould over
rds of the bed at first, leaving
vered, to serve as a vent for
steam, but when all danger is
y then be completed.

five weeks after spawning, in
utumn, the bed should begin to
not until much later in sum-
ter; and if kept dry and warm,
to do so for several months.
may take place two or three
, according to the productive-
ed. It sometimes happens that
t come into production for five
s, they should not, therefore, be
destroyed. In autumn the bed
ire water until the first crop is
t it is then to be repeated after
ring: a sprinkling only is re-
spring and summer, during dry
same course is to be pursued.
or unequal moisture is stu-
be avoided, the best mode of
water is to pour it through a
to a thin layer of hay, which
sly been spread over the bed,
lowed to percolate by degrees.
as waterings are not allowable,
e mould moist, hot fermenting
be put on outside the covering.
in the open ground, in a warm
ing to wet weather, it may be
red for not more than two or
. During excessive rains the
covering of mats, &c. must be
d on the other hand, if a mo-
shower occurs during summer
sive droughts, it may be fully
y taking off the covering. In
the covering being carefully
nly such are to be taken as are
or more in diameter, before they become flat, but are compact and firm. Old mushrooms especially should be rejected for the table, as it is found that some which are innoxious when young, become dangerous when tending to decay; they also then lose much of their flavour. Each individual is detached by a gentle twist completely to the root; a knife must never be employed, for the stumps left in the ground decay and become the nursery of maggots, which are liable to infect the succeeding crop. Some gardeners merely vary from the preceding, by building entirely of dung, without any layers of earth. A third mode is as follows: a sufficient quantity of the droppings of hard fed horses, entirely free from litter, and well dried, being collected, is to be laid, of the requisite length and breadth, four or six inches thick, in a dry sheltered situation, and suffered to remain for eight or ten days open to the air, as fermentation is to be avoided; then earth is laid on two inches thick; a second and third layer of each, with similar precaution, are added, contracting either to a pyramidal or rounded top gradually: no spawn is employed. Being left to itself it will produce mushrooms in four or five weeks later than if spawn was employed, but is in general more productive and lasting; and although it of course will occasionally fail in producing at all, yet it must not be hastily broken up. No water must be given until spawn is observable, and then with the requisite precautions.

Many gardeners grow mushrooms in the same bed with their melons and cucumbers. The following is the mode adopted by the Rev. W. Williams of Westbere, near Canterbury: he obtains, he says, good crops without detriment to either. The spawn is inserted in the mould and on the hills of the beds as soon as the burning heat is passed. In September or October, when the bines of the plants decay, the bed is then carefully cleaned, the glasses put on and kept close; and when the mould becomes dry, water is frequently but moderately given, as well as every gentle shower admitted when necessary. A gentle heat is thus caused, and the produce extraordinarily abundant, frequently two bushels from a frame ten feet by six; and individuals have been produced two pounds in weight. Mushrooms are thus produced without any trouble but the giving moderate waterings, until frost prevents their vegetation; the glasses, if wanted, are then removed, and the beds covered lightly with straw, but not otherwise. The warm showers of the ensuing spring will again cause an abundant production, as also in the autumn, if left; but the beds are generally broken up for the equal parts, and each fragment to be laid four inches asunder on the surface of the dung: after six days an inch and a half depth of fresh dung to be beaten down as before. In the course of a fortnight, or as soon as it is found that the spawn has run nearly through the whole of the dung, mould must be applied two inches and a half thick, and the surface made level. This mould must be prepared six months before wanted, by laying alternate layers of six inches depth of fresh stable dung, and three inches of light mould, to such an extent as may be deemed necessary for the supply of a year; in six months the dung will be sufficiently decayed, and the whole may then be broken together, and passed through a garden sieve for use. In five or six weeks the mushrooms will begin to come up, and, if the mould appear dry, may then be gently watered; the water being slightly heated. Each box will continue in production six or eight weeks. Another mode mentioned by Mr. Wales produces them more slowly, and more sparingly, yet of superior flavour: —he has boxes, or hampers, having rather more than an inch in thickness of the compost laid on their bottom; on this are laid fragments of the bricks, each being broken into ten pieces, as thick as they can lie; these are then covered with three and a half inches of the above described mould, well pressed down. When the surface appears dry, tepid water must be applied, but in nearly double the quantity required in the preceding mode. The mushrooms will appear in four or five weeks. (*Mem. Caled. Hort. Soc.* vol. ii. p. 436., et seq.)

Mr. J. Oldaker, late gardener to the Emperor of Russia, has introduced a house purposely constructed for the growth of the

forcing-house, but if bui
another building, the or
ation is to have a hipped
to roof.

As the compost, the
beds, &c., are very differ
mon practice, I shall giv
of Mr. Oldaker's directi
employed is fresh hors
neither been subject to
tion, cleared of the lo
fourth of the short litter
with one fourth of dry t
fresh earth: this enab
made *solid and compact*
genial to the growth of
beds are to be made b
the above compost three
shelves and floor, whic
close as possible with
layers being added and
the bed is seven inches
face as level as possible
thicker the fermentation
powerful, or, if much le
insufficient for the n
spawn. As soon as th
warmth of 80° or 90° th
second time to render th
and holes made with a
in diameter and nine
compost in every part
prevent too great a deg
and causing rottenness.
attain a proper heat in
after being put together
inches thick must be add
increase the heat, part of
removed, and fresh hors
with the remainder. T
inserted in three or four

e production, they may be
but those for succession left
ee or four weeks in summer,
e in winter. If the spawn is
hot weather, air must be ad-
ely as possible until it has
through the beds, otherwise
ome spongy, and the crop be
nor abundant. The mould
ld be maiden earth, with turf
neither too dry nor too wet,
will not be capable of being
must be laid regularly over
nches thick. From the time
he room is to be kept at a
f 50° or 55°: if higher, it will
stroy the spawn; if lower, it
lowly, and if watered in that
s of mushrooms will be pre-
ng perfection. Water must
ith extreme caution, being
n as new milk, and sprinkled
with a syringe or small water-
water destroys both the crop
if suffered to become dry, it
give several light than one
g. Beds thus managed will
ral months, and a constant
up by earthing one bed or
o or three months. If when
tion the mushrooms become
and weak, the temperature is
igh, and air must be propor-
tted. As the beds decline, to
the earth must be taken off
the dung is decayed, they
rmed, any good spawn being
may appear; but if the beds
, and full of good spawn, a
compost, three or four inches
e added, mixed a little with
beat solid as before. Mush-
grown in a cellar, or other
with equal success, and not
with a greater advantage, the
ng adopted; but no fire is ne-
ss water. (*Trans. Hort. Soc.*
. 336.) Spawn is constituted of
e fibres, arising from the seeds
, of which it has the exact
ve fallen into situations suit-
r germination. These situ-
hich it is to be obtained, are
hills; dungy horse-rides in
horse-mill tracks; dry spongy
droppings of hard-fed horses
greater abundance than the
other animal; in the neigh-
old privies; more sparingly
where horses, oxen, or sheep
t. The dung of the two latter
reater perfection than that of
es; it has also been found in pigeons' dung. (*Trans. Hort. Soc. Lond.* vol. iv. p. 473.) But the most certain mode of obtaining it is to open the ground about mushrooms growing in pastures, though it is said not to be so productive.

It must be collected in July, August, and September, being reckoned in the greatest perfection in this last month; it may be found, however, and should be collected when it appears, in the spring. It generally occurs spread through the texture of cakes, or lumps of the dry rotted dung, or in lumps of the earth. These must be collected as entire as possible, and preserved in a heap under cover, and enveloped with straw or mats. It must especially be a very dry situation, and, if the spawn itself is damp, be gradually dried before heaping; a current of air passing through the shed is of great utility. If kept dry, spawn may be preserved three or four years; if damp, it will either vegetate before being planted, or putrefy. Spawn must not be so far advanced in vegetation as to appear in threads or fibres, for when in this state it is no longer applicable to a mushroom bed; it may produce a mushroom if left to itself, but otherwise is useless. Spawn proper for inserting in a bed should have the appearance of indistinct white mould. (*Trans. Hort. Soc. Lond.* vol. iv. p. 474.) Mr. Wales, who has been before mentioned, always obtains spawn artificially; that it is capable of being so raised has been long known and practised. (*Hist. de l'Acad. for* 1707, p. 47.) The following is the manner in which he obtains it. Two barrow loads of cow-dung, not grass-fed, one load of sheep's dung, and one of horse's, well dried, and broken so small as to pass through a coarse sieve, are well mixed and laid in a conical heap, during March, in a dry shed, being well trod as it is formed, to check its heating excessively; this heap is covered with hot dung four inches thick, or only with mats if the shed is warm, for here, as in all the stages of growth, the heat should only range between 55° and 60°. In about a month the heap is examined, and if the spawn has not begun to run, which is shown by indistinct white fibres pervading its texture, another covering of equal thickness to the first is applied over the old one; in another month it will indubitably make its appearance: the time varies from three to ten weeks. (*Caled. Hort. Mem.* vol. ii. p. 431.) If a small quantity of spawn only can be collected, it may be increased in either of the two following manners, the first of which is chiefly recommendable on account of its simplicity and facility of adoption. Small pieces of the spawn may be planted a foot whole being mixed together with as much of the drainings from a dunghill as will make it of the consistency of mortar; being well incorporated, it is then to be spread in a dry, sheltered, airy place, on a smooth surface, six inches thick, beat firm and smooth with a spade. When become of the consistency of clay, it is to be cut into slabs about eight inches square, a hole punched half through the middle of each, and piled to dry, an opening being left between every two bricks. When perfectly dry, a fragment of spawn is to be buried in the hole previously made: it will shortly spread through the whole texture of the slabs, if kept in a warm dry place, when each may be broken into four or five pieces, and when quite dry laid on shelves separate, and not in heaps, otherwise a bed will be formed for the spawn to run in. (*Mawe's Abercrombie.*) Mr. Wales recommends the composition to consist of three parts horse-dung, without litter, two of rotten tree leaves, two of cow-dung, one of rotten tanners' bark, and one of sheep-dung. These being mixed to the consistency of mortar, are moulded in small frames like those used by brickmakers, six inches long, four broad, and three deep. Three holes to be made half through the bricks, an inch apart, with a blunt dibble, for the reception of the spawn: they should be put on boards, for the convenience of moving abroad during fine days, as they must be made perfectly dry, which they often appear to be on the outside, when they are far otherwise internally. Before they are perfectly dry they require great care in handling and turning, from their aptitude to break: but in about three

allowed to dry for a
are stored, will then
(*Mem. Caled. Hort.*
Mr. Oldaker recomme
made of fresh horse
short litter, to which
third of cow's dung, a
earth to cement them
to be inserted when
(*Trans. Hort. Soc.*
One bushel of spawn
five feet by ten, two
that length, and so
(*Mawe's Abercrombie*
Kitch. Gard.) See F
MUSK-ORCHIS.
species of this genus
freely in chalky soil or
peat, and sand; they
of the roots. One s
the green musk-orc
which grows on chalk
flowering in June and
sists of several thick
globular hairy knob, t
which is the source of
sent year. One of t
rarely more, bears at
young knob, destined
and to flower in the
The stem is four or fi
dical leaves two, rare
sheathing; spike dense
or two inches long, of
lowish flowers, smell
honey, especially in a
Eng. Flor. vol. iv. p. 2
MUSSELS, or M
edilis.) A species of sh
on the rocky shores on

ort before it is fermented. It is also
to the saccharine juice of several fruits
tible of the vinous fermentation, and
ularly to the expressed juice of the
before its conversion into wine.

STARD. (Fr. *moutarde*; Lat. *Sin-*
from σιναπι, on account of its making
es water, σινει ωπας.) A genus of up-
branching, annual or biennial herbs,
hairy or bristly. There are five wild
s common to our islands:—

Wild mustard (*S. arvensis*). A very
esome annual weed in corn fields;
bundant in waste ground, newly dis-
l. The seeds serve as an inferior
f mustard, or, rather, to adulterate that
from the common mustard. See
LOCK.

hite mustard (*S. alba*), 3. Common
d (*S. nigra*), are annuals, in general
tion, but are also found wild on waste
l and by road-sides, &c. See Cul-
ed Mustard.

Narrow-leaved wall-mustard (*S. te-*
a). This perennial species is found
g on old walls and heaps of rubbish
most ancient cities. The root is
g, rather woody. Herb for the most
ntirely smooth, and more or less
us all over, fetid when bruised. Stem
erect, one and a half or two feet
ith numerous round leafy branches,
nally besprinkled with a few hairs.
scattered, a little fleshy of a glau-
reen, very smooth, irregularly lobed
t, the lower ones stalked, once or
innatifid; uppermost lanceolate, un-
l, and sessile. Flowers large and
me, but unpleasantly scented, light
coloured. Pods erect, on spreading
linear, compressed, slightly beaked.
two-ranked.

and mustard (*S. muralis*). This an-
species flourishes on sandy barrèn
l near the sea. The root is small and
g. Stem branching from the bot-
bout a span high, spreading, leafy in
er part, clothed all over with reflexed
hairs. Leaves usually quite smooth,
ightish green, not glaucous, varying
in form, sinuated, always acute, not
ed at the extremity, and tapering at
se into a footstalk. Flowers lemon-
ed, smaller and paler than the last,
se abrupt corymbose clusters, greatly
ted after flowering. Pods ascending,
reading stalks, linear, compressed,
y beaked. (*Smith's Eng. Flor.* vol. iii.
—4.)

STARD, CULTIVATED. The
s of *Sinapis* generally grown in the
n-garden for domestic purposes are
hite mustard (*S. alba*) and the common or black mustard (*S. nigra*). The first is the one grown for salads; but the seed of both is employed in the manufacture of mustard.

The soil they succeed in best is a fine rich mouldy loam, in which the supply of moisture is regular: it may much rather incline to lightness than tenacity. If grown for salading, it need not be dug deep; but if for seed, to full the depth of the blade of the spade. In early spring and late in autumn, the situation should be sheltered; and, during the height of summer, shaded from the meridian sun. For salading, the white may be sown throughout the year. From the beginning of November to the same period of March, in a gentle hot-bed appropriated to the purpose, in one already employed for some other plant, or in the corner of a stove. From the close of February to the close of April, it may be sown in the open ground on a warm sheltered border; and from thence to the middle of September, in a shady one. Both the white and black, for seed, may be sown at the close of March, in an open compartment.

For salading, it is sown in flat-bottomed drills, about half an inch deep and six inches apart. The seed cannot well be sown too thick. The mould which covers the drills should be entirely divested of stones. Water must be given occasionally in dry weather, as a due supply of moisture is the chief inducement to a quick vegetation. The sowings are to be performed once or twice in a fortnight, according to the demand. Cress (*Lepidium sativum*) is the almost constant accompaniment of this salad herb; and as the mode of cultivation of each is identical, it is only necessary to remark, that, as cress is rather tardier in vegetating than mustard, it is necessary for the obtaining them both in perfection at the same time, to sow it five or six days earlier. See Cress.

It must be cut for use while young, and before the rough leaves appear, otherwise the pungency of the flavour is disagreeably increased. If the top is cut off, the plants will in general shoot again, though this second produce is always scanty, and not so mild or tender. For the production of seed, whether for the manufacture of mustard or future sowing, the insertion must be made broadcast, thin, and regularly raked in. When the seedlings have attained four leaves, they should be hoed, and again after the lapse of a month during dry weather, being set eight or nine inches apart. Throughout their growth they must be kept free from weeds; and if dry weather occurs at the time of flowering, water may be applied with great advantage to their roots.

cumstances will allow. (*G. W. Johnson's Kitch. Gard.*)

MUSTARD, FLOUR OF. The seeds of both black and white mustard are employed in making the ordinary flour of mustard for dietitical use. In the dry state mustard is inodorous, and, were it possible to taste without the aid of moisture in the mouth, it would, also, be tasteless; the principle of its odour and taste not existing ready formed in the mustard, but requiring water for its development. The principles which exist in the mustard are two: one an acid, which has been named myronic acid, and is a compound of carbon, sulphur, hydrogen, nitrogen, and oxygen; the other a substance resembling vegetable albumen, which has been named emulsin, or myrosyne. When the myrosyne and the myrenic acid, which is united with potassa in the form of a myronate of potassa in the mustard, act upon each other by the aid of water, the volatile oil of mustard is formed, and odour and pungency given to the mustard. It is the volatile oil which reddens and blisters when mustard poultices are used: and it is important to know that vinegar checks the acrimony of the poultice, and should not be used. Tepid water only is required.

MUSTARD, HEDGE. See HEDGE-MUSTARD.

MUSTARD, MITHRIDATE. See SHEPHERD'S PURSE.

MUSTARD, TOWER. See TOWER-MUSTARD.

MUSTARD, TREACLE. See TREACLE-MUSTARD.

MUTABLE. In botany, a term signifying changing, inconstant.

quired both firmness an
the saline particles abo
ations.

A sheep, to be in
palate of an epicure, sh
earlier than when five
age the mutton will be
culent, of a dark colo
richest gravy; whereas,
old, it is flabby, pale,
ascertain the age of
directs: "To observe
breast-bone when a sh
is, where the breast-bon
in a lamb, or before it
be quite red; from on
the upper and lower bo
to white, and a small
appear round the edge
and the middle part of
yet continue red; at th
small streak of red
middle of the four mi
others will be white;
all the breast-bones wi
gristly colour." South
ton, in point of delic
thought equal to any th
summer as preferable
flavoured breeds, espec
ton. This circumstan
the closeness of the gr
gravity being greater,
impermeable to the ai
looser fleshed mutton,
more subject to putrid
mutton, the finer the fl

It is almost unneces
wedder-mutton' is alway
preferable to that of th

it - 13 st. 10 lbs.

	lbs.	oz.
entrails	13	0
oose fat	21	4
pluck	8	12
	15	12
ss.		
uarter	29	0
	28	12
quarter	33	8
	32	0
one side.		
	23	0
	10	4
	12	0
	10	12
	4	8
	0	12

ol. ii. p. 485.; *Sussex Report,* *ch's Dom. Encyclo.*) See EEP.

The nose of a horse or other o signifies a kind of halter ose of a horse or mule, to or biting.

OF A PLOUGH. A term lied to the copse or part to ght is attached. See Plough.

See Sweet Cicely.

(From *myros*, perfume; Greeks, *myrtus* of the Dutch, every other European language myrtle, from the delightful delicacy of its blossoms, and n of its perpetual foliage, is l well-known genus of plants, ell in sandy loam and peat; f not too ripe, will root freely or soil under a glass. There ozen distinct species, besides ieties. The Myrtus *pimenta* ice or Jamaica pepper.

n myrtle (*M. communis*) is a outh of Europe, growing five h, with very fragrant leaves, nall white flowers in summer. r shrub, the myrtle should rn or south-western aspect, n in winter. (*Paxton's Bot.* *'s Sylva Flor.* vol. ii. p. 88.)

BILBERRY. See Whortle-

THE DUTCH, or SWEET *rica gale;* from *myrio* to flow, n the banks of rivers.) This al aromatic indigenous shrub, in bogs and marshes, espe- velly soil. The stem is up- three or four feet high, with rnate branches. Leaves lan- serrated in their upper part, a half long, deciduous, green n both sides. Catkins nume- ormed during summer in the bosoms of the leaves, and remaining through the winter. In the following March they are full-grown, expanding in May. Scales of a red shining brown, pointed. Berries very small, covered with resinous dots, exhaling a delightful fragrance when rubbed between the fingers. The leaves are aromatic from the same cause. This plant, perhaps one of the more innocent substitutes for hops, is used for brewing by the poor in Sweden. Linnæus says the berries boiled in water yield wax like those of the candleberry myrtle (*M. cerifera*). (*Smith's Engl. Flor.* vol. iv. p. 239.) See Candleberry Myrtle.

N.

NAG. A provincial term applied to a horse of a small size for the saddle; such a horse is very useful for many purposes, where light labour is required.

NAIL. (Sax.) A small spike of iron, wrought into different forms, for fastening wood or other materials together. The nails used for fixing the shoes of horses on with are thinner than those used for carpenter's work, and have a thick compressed head. The word nail is very commonly applied to the talons of birds and the claws on the paws of beasts; and is also a measure of length, two inches and a quarter.

NAKED. (Sax. nacoð.) In botany, applied to stems, leaves, &c., implies without hairs, leaves, or branches.

NAKED BARLEY. See Barley.

NAPE. A provincial term applied to a piece of wood used for supporting the fore part of a loaded wain.

NAPIFORM. Formed like a turnip, tuberous.

NARCISSUS. (From *narke*, stupor, on account of the effects produced by the smell upon the nerves.) This is an old and very popular flower of great beauty, and some of the species are highly fragrant. They are all of very easy culture, growing well in any light sandy soil, or in glasses of water, and increased by offsets from the bulbs. (*Paxton's Bot. Dict.*) The genus is a very extensive one, but only two or three of the species are natives.

1. Poetic narcissus. (*N. poeticus.*) This is found growing in healthy elevated open fields, on a sandy soil. The bulb is ovate, perennial, with a dark brown skin. Leaves twelve to eighteen inches long, nearly erect, half an inch broad, of a rather glaucous deep green, bluntly keeled, their edges acute, reflexed; the disk slightly concave, striated with numerous longitudinal veins. Stem about as tall as the leaves, straight, hollow,

foregoing by the acute keel and straight sides of the leaves; whose edges moreover are inflexed, not recurved. The flowers are smaller, usually two, sometimes three, of a pale sulphur colour, blowing in April and May. The scent is less agreeable than the former. Both are almost equally common in gardens, but the *biflorus* is seldom seen double. (*Smith's Eng. Flor.* vol. ii. p. 131.) See Daffodil.

NARCOTIC. (Fr. *narcotique.*) Substances having the double property of exciting in the first instance, and afterwards stupifying and producing sleep or torpor. In medicine the term comprehends opiates, anodynes, and other drugs which induce sleep, and allay pain.

NASTURTIUM. (From *nasus*, the nose, and *tortus*, tormented.) The acridity of *N. officinalis* affects the muscles of the nose. Few of these plants are worth cultivating; they are of the simplest culture. The seed of the annual kinds has only to be sown in the open ground in spring. (*Paxton's Bot. Dict.*) See Cress.

NATT. A provincial term applied to the hornless breeds of animals of the sheep and cattle kind. Thus we have the natt or Devonshire breed of sheep. It is sometimes written *nat.*

NAVE OF A WHEEL. The short thick block in the centre of the wheel which receives the end of the axletree, and from which the spokes radiate: it is bound with hoops, called nave bands, to strengthen it. It has likewise in each end of the hole through which the axletree passes a ring of iron called the washer, which saves the nave from wearing.

NAVEL-GALL. See Back and Galls.

NAVEL-ILL. See Calf, Diseases of

externally, like the
ing, detersive, cooling
flammations of the skin

2. Greater yellow na
This is a very rare
fleshy and creeping.
than the foregoing, a f
Leaves deeply tooth
slightly peltate. Flow
the size of the last,
low; in a leafy, simpl
rather than cluster, th
very short.

In the garden the
succeed best in a sand
must be well drained,
with too much water
tings taken off and dr
few days root freely.
Smith's Eng. Flor. vol

NAVEW. The
(*Brassica campestris*)
bage tribe, and is an
corn-fields, marshes, a
ditches and rivers.
stem erect, two feet h
glaucous; rough in
small bulbous spreadi
upwards. Radical le
and jagged, rough;
clasping, oblong, pa
somewhat glaucous.
June and July, yellow
as large as those of t
longish stalks, an inch
cylindrical, beaked.
rishing, containing a
sometimes domestically
asthma. (*Smith's Eng.*

NAVICULAR. A
nifying boat-shaped

ing a smoother rind and finer pulp. The ure is in every respect the same as the h. The varieties of nectarines are nu- ous, nearly seventy being described in catalogue of the Horticultural Society London. Forsyth recommends for a l garden the following sorts:—Fair- 's early, Eldrige's scarlet, Newington, Roman, and Temple's. Nectarines, like hes, are subdivided into free stones and stones. (*Loudon's Encyclo. of Gard.; ips's Fruits.*)

EEDLE CHERVIL, or Shepherd's DLE. See Shepherd's Needle.

EP. See Catmint.

ERVES. In botany, the strong ribs leaves or flowers, which are bundles ssels, chiefly spiral. Besides convey- he sap to the leaf, and returning the er juice to the bark, they often afford active characters to the leaf.

ET. (Germ. *netz.*) A textile fabric otted meshes for catching fish and purposes. The formation of a mesh simple a matter to require description is dictionary. Nets are useful to the ner for protecting his fruit trees from depredations of birds. They are fre- tly used to snare birds, rabbits, &c. Fishing Net.

ETTED. A botanical term, implying the veins or membranes are articulated e leaf, or variously intersected.

ETTLE. *Urtica*, (from *uro*, to burn; in ence to the stinging properties of most e species.) An extensive genus of her- ous or shrubby plants of little beauty, which are justly looked upon in the eyes e agriculturist as mere weeds. The age in all our species is copiously armed venomous perforated bristles, each of h has a bag of liquid poison at its base. liquor, by the slight pressure required to e the skin, is transmitted into it, causing irritation. Many of the numerous ic species have not this stinging pro- ; but the sting of our common nettles is o be compared with that of some of the an species grown in the gardens of this try. These are, however, all surpassed rulence by one which in Timor is called *setan*, or devil's leaf, the effects of h are said by the natives in many cases use death. The indigenous species of le are three; viz. 1. Roman nettle (*U. ifera*), an annual plant, growing in e ground amongst rubbish, chiefly the sea. The herb is armed all over peculiarly venomous stings. The stem ranched, leafy, bluntly quadrangular, n purple, about two feet high. Leaves site, of a dull greyish green, ovate, etimes heart-shaped, coarsely serrated with many transverse ribs. Flowers axillary on twin stalks; that of the barren ones loosely panicled; of the fertile simple, much the shortest, bearing a dense, globular, stinging head of tumid flowers. 2. The small nettle (*U. urens*) is found to be in all cultivated ground a troublesome weed, especially on a light soil. It is annual in habit, flowering from June till October, smaller than the last, and of a much brighter green; its copious stings hardly less virulent. The several parallel ribs of the leaves form its distinguishing character. Clusters oblong, scarcely branched, each bearing many barren as well as fertile flowers. The whole plant being refused by every kind of cattle should be carefully extirpated from pastures. 3. The common or great nettle (*U. dioica*), which is a noxious perennial weed, growing almost everywhere, and flowering in July and August. The root is branching and creeping, with fleshy roots, and many fibrous radicles. The herb is of a duller green than the last, erect, three feet high, with less irritating stings. Leaves large, heart-shaped, spreading, pointed, strongly serrated, veiny. Clusters numerous, much branched, in pairs, many-flowered, mostly dioecious. Flowers on one root chiefly barren, on another mostly fertile. The leaves are employed for feeding poultry, especially in the winter; when boiled, they are said to promote the laying of eggs. Asses devour nettles eagerly, but all other live stock refuse them, unless they are dried. In the Western Islands of Scotland, a rennet is prepared by adding a quart of salt to three pints of a strong decoction of nettles; a tablespoonful of which is said to be sufficient to coagulate a bowl of milk. The young tops of the common and smaller nettles may be boiled as potherbs during spring, and eaten as a substitute for greens; being not only nourishing, but mildly aperient. The tough fibres of the stem may be manufactured like hemp, and are often found in winter naturally separated and bleached. The roots are astringent and diuretic. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. iv. p. 133.; *Willich's Dom. Encyclo.; Holdich's Weeds.*) See Dead-Nettle, Archangel.

NETTLE-HEMP. See Hemp-Nettle.

NETTLE-TREE. (*Celtic*). This is an ornamental genus of trees and shrubs, varying in height from six to fifty feet. The most of them do very well in any common garden soil, and are very suitable for the back of shrubberies and plantations. They are increased by seeds or layers. (*Paxton's Bot. Dict.*)

NEWING. A provincial name for barm or yeast.

NICKING. In farriery, an operation

our art. He was author of the following works: —

1. The Scotch Forcing Gardener; together with Instructions on the Management of the Greenhouse, Hot-walls, &c. Illustrated with plates. Edinburgh, 1798, 8vo. 2. The Practical Planter; or a Treatise on Forest Planting: comprehending the Culture and Management of planted and natural Timber; also the Management of Hedges, Fences, and the Construction of Stone Walls, &c. Edinburgh, 1799, 8vo. 3. The Villa Garden Directory; or Monthly Index of Work to be done in the Town and Villa Gardens, Shrubberies, Parterres, &c. Edinburgh, 1809, 8vo. 4. The Gardener's Kalendar; or Monthly Directory of Operations in every Branch of Horticulture. Edinburgh, 1810, 8vo. 5. The Planter's Kalendar; or the Nurseryman and Forester's Guide in the Operations of the Nursery, the Forest, and the Grove. Edinburgh, 1812, 8vo. (*Johnson's Hist. Gard.*)

NIDIFICATION. (Lat. *nidus*, a nest; *facio*, I make.) The process by which birds construct their nests.

NIDULANT. A botanical term, implying nestling or resting as a bird in its nest.

NIGHTINGALE. (*Philomela luscinia.*) In ornithology, a well-known songster, which is a bird of passage, arriving in this country about the middle of April, the male preceding the female by about fourteen days. It is only found in certain of the English counties, and is never heard so far west as Cornwall, nor in Wales or Ireland. It frequents the eastern and midland counties; but has not been found further north than the neighbourhood of York. And yet it visits Sweden, and even Russsia and Siberia; passing the winter in Northern Africa and Syria.

It is described by Mr. Yarrell, in his excellent and exquisitely illustrated *History*, "as having a brown beak. The head and upper part of the body and wings of a uniform rich brown, tinged with reddish chestnut. The chin and lower part of the breast of a lighter tint than the throat and

honest Isaac Walton, wh
as well as he loved fish
nightingale, another of
breathes such sweet lou
little instrumental thr
make mankind to thin
not ceased.'" (*Brit. B*

NIGHT-JAR. (
pæus.) The name of
bird, the type of the
distinguished by the wi
whence, perhaps, has ar
of its sucking the teat
other common name of
equivalent of which it
European languages,
has continued in its
It is scarcely necessary
structure of the bill
sucking impracticable
any other bird. The
active, and hunt their
they have the same lig
as other nocturnal bi
species is remarkable f
emits, like the burr o
ning-wheel. The night-
comes to this country f
latest arrival in order
spotted flycatcher, not
ance here till the mid
nerally leaves again by
or the middle of Septe
appears to prefer moo
mons that are partially
and patches of fern.
two eggs early in June
sion of the ground.
clouded, and veined w
inch two lines long, by

s in our common potato. Some
us are very dangerous and highly
oisons. Two species only are in-
— 1. The woody nightshade (*S.*
). See Bittersweet.
ommon or garden nightshade (*S.*
This is common everywhere in
ell as cultivated ground. The
ous, annual in habit, occasionally
Herb fetid, narcotic, bushy,
erous angular or winged leafy
Stem herbaceous, without thorns.
divided, ovate, lengthened at the
th. Umbels from the interme-
es between the leaves, lateral,
solitary, stalked, simple, downy.
hite, with a musky scent. The
bular, black; sometimes, as it is
yellow. A grain or two of the
has sometimes been given to
arious secretions. Both its poi-
l medicinal powers depend on an
rinciple, which can be procured
rate state, and has been called
t is a powerful narcotic, and the
principle of the Solanums. (*Smith's*
vol. i. p. 318.)

TSHADE, DEADLY, or
(*Atropa belladonna.*) An indi-
nt, with narcotic and dangerous
found growing in hedges and
und on a calcareous soil, fre-
out ancient ruins. The root is
creeping. Stems herbaceous, an-
feet high, round, branched, leafy,
wny. Leaves lateral, mostly two
f unequal size, ovate, acute, un-
Flowers solitary, stalked, droop-
dull purple in the border, paler
s, about an inch long. Berry of
violet black, partially enveloped
yx, which is persistent, the size
cherry; sweetish, and not nau-
that children have often been
eat it to their own destruction.
nous principle is an alkali named
(*Eng. Flor.* vol. i. p. 116.) See
NA.

SHADE, ENCHANTER'S. See
R's Nightshade.

-SOIL. In agriculture, a power-
e. This valuable fertiliser has
employed in this country to the
nt as on the Continent, although
inly one of the most valuable of
ic manures; and to this neglect
ses have contributed. Its dis-
odour, certain vexatious fiscal re-
with regard to its removal, and
modes of applying it, either in
quantities, or mixed with other
in such proportions that its powers
be distinguished in the mass, its
semifluid nature requiring for its removal carriages of a peculiar construction, the extent and completeness of the sewerage of our large cities, and several other minor obstacles, have rendered its use not nearly so extensive as, even in a national point of view, is desirable. Davy, however, described it, five and twenty years since, as "a very powerful manure, and very liable to decompose: a part of it is always soluble in water; and, in whatever state it is used, whether recent or fermented, it supplies abundance of food for plants." (*Lectures*, p. 229.) "The disagreeable smell," he adds, "may be destroyed by mixing it with quicklime; and if exposed to the atmosphere in thin layers in fine weather, and mixed with quicklime, it speedily dries, is easily pulverised, and, in this state, may be used in the same manner as rape-cake, and delivered into the furrow with the seed."

Night-soil is a mixture of urine and fæces; and these have been found to contain the following substances. Fæces were analysed by M. Berzelius: the products were—

	Parts.
Water - - - -	73·3
Vegetable and animal remains -	7·
Bile - - - -	0·9
Albumen - - - -	0·9
Peculiar and extractive matter -	2·7
Salts - - - -	1·2
Slimy matter, insoluble residue, &c. -	14·
	100·

The salts detected in this analysis, equal to 1·2 parts, were carbonate of soda, muriate of soda, sulphate of soda, ammonia, phosphate of magnesia, and phosphate of lime. (*Gehlen's Journal*, vol. vi. p. 536.) To the same great chemist we are indebted for an analysis of human urine. He found 1000 parts to contain—

	Parts.
Water - - - -	933·
Urea (peculiar animal matter) -	30·10
Sulphate of potash - - -	3·71
Sulphate of soda - - -	3·16
Phosphate of soda - - -	2·94
Muriate of soda (common salt) -	4·45
Phosphate of ammonia - -	1·65
Muriate of ammonia - -	1·50
Acid matter Acetate of ammonia Animal matter and urea - -	17·14
Earthy phosphates and fluate of lime	1·
Mucus - - - -	0·32
Silica (earth of flint) - -	0·03
Annals of Philos. vol. xi. p. 423.	1000·

The very chemical composition, therefore, of this compost would indicate the powerful fertilising effects which it is proved to produce. The mass of easy soluble and de-vegetables, when added to the soil; and, in the earliest of all authorities, it is mentioned with becoming reserve. The warmth of the climate would ensure a regular attention to the removal of excrements of every kind. Thus we find that, amongst the Jews, the dung of the bullock slain in sacrifices was directed to be burned (*Exod.* xxix. 14.; *Lev.* iv. 11., viii. 17., xvi. 37.; *Numb.* xix. 5.), and used as fuel; and, in periods of distress, even human dung (*Ezekiel*, iv. 12—15.). Dunghills were evidently formed (*Daniel*, ii. 5., iii. 29.; *Luke*, xiv. 35.), and carried away (1. *Kings*, i. 10.), to be spread on the surface of the earth (*Psalm* lxxxiii. 10.; *Jer.* viii. 2., xvi. 14., xxv. 33.; *Zeph.* i. 17.); and straw was spread to increase the quantity of it (*Isa.* xxv. 10.). And Jerusalem had even a gate called the *Dung Port*, or *Gate* (*Neh.* ii. 13., iii. 13, 14., xii. 31.). The inhabitants certainly applied dung to their fruit trees (*Luke*, xiii. 8.).

The account of eastern customs, furnished by modern travellers, illustrates very remarkably the notices of the sacred historians. "In Arabia," says Niebuhr, (vol. i. p. 91.), "the dung of asses and camels is chiefly used for fuel, because these are the most numerous and common. Little girls go about gathering dung in the streets, and in the highways; they mix it with cut straw; and of this mixture make cakes, which they place along the walls, or upon the declivity of some neighbouring eminence, to dry them in the sun." Tournefort, speaking of Georgia, says, "All this fine country yields not a single tree; and they are forced to burn cows' dung." (*Tournefort*, vol. iii. p. 137.) And again, when speaking of Ezeroon, he says, "You see neither tree

the more thoughtful B
count; what is a nuisan
source of revenue at I
port of my friend, D
indebted for a pretty
the value assigned to
northern states of the C
I will give chiefly in
When describing a Cont
chiefly for the purpose
mode of employing this
nure in Germany, he sa
Imp. Comp.), "The kin
burg is so overstocke
and land, consequently
that every inch of it is pr
into a state of culture
and manuring, no matt
the soil, or its situation
appear. The cultivatio
which requires, in certa
tainous soils, a liberal
manure. Wishing to
from my own observati
journey through the pri
and along both banks
amining many of the
descended that river
visiting Holland. On
French Flanders in my
ticularly to the great fla
nay, Lille, Valencienn
where the surprising re
the application of huma
obtained in Belgian Fl
means, have induced ag
the last few years, to giv
manure the name of 'Fl

And, when speaking
taken in England of this

to be used either for domestic or ary purposes; although, by avoiding atter disgusting alternative, foreign are less free from unpleasant smells London is. In this respect, it may be said that foreigners smell the filth of cities, but do not swallow it; whereas Londoner swallows it, but seldom s it.

n no large city of that part of Europe I have recently visited, possessing a is any portion of the contents of s and cesspools suffered to find its or to be emptied into it, except at erdam, Antwerp, Brussels, Stuttgard, Leipzig; and even there only in a l manner. In Paris the Seine is con- ated by one large drain only, convey- e urine from the large reservoirs of -soil at Montfaucon, and by two er ones proceeding from cesspools. To y generally, or to empty even partially, uch matter into the river, is a practice t which the laws have provided by fines and incarcerations. And such present feeling of all the governments t subject, even in the great cities I just enumerated as exceptions, that perior authorities are seriously en- in devising plans for preventing in every possible infraction of those not because it is desirable to preserve the water of such rivers (since no do- use is made of it), but on account loss of a material, deemed most valu- which such infractions must necessarily

ight-soil is husbanded in every part e Continent I have visited, without tion, with a jealousy and care which how valuable it is considered by the e. In most of the cities of the second and the smaller capitals, night-soil is rce of profit, first, to the householder; to a middleman; and thirdly to the r, who is the last purchaser, and em- it.

n all the towns of the Grand Duchy of n, of the kingdom of Würtemberg, of ria (except Munich and Würtzburgh), e province of Salsburg, of Bohemia pt Prague), of Saxony (except Dres- in some of the minor cities of Prussia, the confederated principalities, in all ities on both banks of the Rhine, par- rly Strasburg, Mayence, Coblentz, , Cologne, Dusseldorf, Nimeguen, &c., ouseholder disposes of the contents of espool for a certain sum of money, es getting the operation of emptying rformed gratuitously. By comparing eturns of the different prices paid in cities for the commodity in question, one year with another, and equalising them by an average price, the inhabitants appear to be benefited to the amount of four francs a head yearly, and the middleman to at least 40 per cent. more on the sum he pays to the original seller. I will cite Strasburg as an example, since most of the other cities of the same extent (on the Rhine, and in many parts of Germany), and a few cities even larger, presented the strongest analogy to the case I have selected. At Strasburg, a company of middlemen engage to empty the cesspools, of which every house has at least two (built air and water tight), once a year for nothing, and pays, moreover, six francs per *charette*, containing ninety-six *baquets*, of the capacity of four gallons each. This quantity the company sells afterwards to the farmers for *ten* francs. (The capacity of the *charette* being to that of a ton as 28,772 ounces are to 35,840, it follows that the price of a ton at Strasburg would be 10*s.*) Now, as there are 14,000 houses in Strasburg, 10,000 of which have cesspools affording the soil in question (which is always semi-liquid), supposing the latter to be emptied only once a year, and to furnish each three *charettes* only, at *six* francs, we have $10,000 \times 6 \times 3 = 180,000$ francs, which the company pays yearly to the inhabitants of a town having a population of 70,000 souls. But as the company resells to the farmer the said soil for manuring purposes, at *ten* francs per *charette*, it follow that this article of traffic produces yearly at Strasburg 300,000 francs, or just about 4¼ francs for each inhabitant."

The high prices paid for this manure by the Continental farmers betrays the estimation in which they hold it. "The contractor at Brussels, M. Champon," says Dr. Granville, "sells his manure for 13*s.* 4*d.* per ton — 400 florins or 33*l.* 6*s.* for a barge-load of fifty tons. M. Smet, the greatest trafficker, perhaps, in this material in East Flanders, gets for some of his 10*s.*, and for the best and larger portion of it 15*s.* per ton; while the contractor at Antwerp disposes of all he has of Flemish manure at 52 florins the *put*, or 624 florins the barge-load, equal to 52*l.*, or 1*l.* 10*s.* 9*d.* per ton. But if we look to what takes place every day at Montfaucon, near Paris, where 200 cart-loads of the contents of the cesspools are daily deposited, to be converted into *poudrette*, we find the latter (a dry and compound manure made from night-soil) to fetch a much higher price than all the rest.

"But by far the most important point of practical knowledge in this matter, put forward by the same great authorities, and the truth of which was afterwards con-

Nearly half a century since the Baron de Schulze, when writing to Sir John Sinclair, observed, "They have now ceased to spoil the fine harbour of Stockholm with nuisances of every kind. The contents of the privies are now collected by undertakers, in barrels, of which they are obliged to have a double quantity to replace those deposited in the reservoirs, from whence they are carried to the country. My eldest son, who has changed the sword for the ploughshare, has particularly attended to this manure, being favourably situated on the Lake Malar, forty-eight English miles from the capital; he conveys it in a covered boat, each loading of which is sufficient to dress about three acres of spring corn, and between four and five of winter corn and meadow ground. This manure, by the motion of the boat, becomes more liquid; and it is conveyed from the hold of the vessel by a bucket at the end of a lever, through a spout into a close cart on shore drawn by two oxen. These carts are provided with a moveable funnel, and with a strainer so regulated by means of a pole that the manure can be administered at pleasure by the driver, without further attention to spreading. That the land may not be overdunged, and the crop consequently lodged, care must be taken not to lay above forty such cart-loads on the Swedish acre for spring corn; each cart containing 180 gallons English, or 1920 lbs. Except that other powerful manure produced by refuse of the herring oil-works, none can come into competition, for richness, with the contents of the privy mixed with urine. The effects of this manure, no doubt, diminish gradually; yet its operation may be

some English laboure
the employment of r
overcome by a little
stream which flows thr
Eastbourn, in Sussex,
months since, much c
the night-soil which h
it from the adjoining
in vain that their own
use it for their garden
lady of the place, who
mote the comfort of he
desired her bailiff to g
to *purchase it* of them.
ever, universally rejec
they have no longer s
of their privies to be w
fully applied them, an
sults, to their own g
that if it was worth a f
it of them, it must be
for their gardens.

"By this term, nigh
indefatigable Arthur Y
is to be understood t
made of what a Fr
'l'espèce de fumier que
de nommer;' from wh
would not have expec
so much of the value
An Englishman says,
better to let it alone
it perfectly decent and
sider human ordure as
that can be procured
first consider the farme
where his great object
manure as possible wi
to depend on purchase
be made in certain situ

ı price. In the last century,
he galley slaves at Marseilles
and sold to the farmers as a
ıpes, olives, and figs; the last
uced by it were the best in
Nice it sells high, and every
ın house of office for pas-
China it seems to be a ma-
thers, in the most request;
hey are well acquainted with
London it sells at from 3*s.* to
seventeen miles distant, with
all expenses, it costs 25*s.* a
yet it answered greatly. It
l by the scavengers in very
(not too deep) in a grass
ımmer trenches cut through
d then being thrown in heaps,
ght carriage. Three waggon
240 to 300 bushels, are enough
f grass land, upon which I
ers best; but mixed with
rf, or dry pond mud, its use
cation is excellent. I have
vith all other manures, and
ne of them I could procure
y many degrees. It is a
to imagine that manuring a
substance will give a bad
I dressed part of a pasture
he whole of that year with
and young cattle, and I re-
rious gentlemen that saw it
the ground that part was
en, while there was much
&c. in every other part of
Annals of Agr. vol. xxxiii.

er 20th, 1772," adds Arthur
ıarked divisions each of four
s on a summer fallow; the
e pebbly gravel, and manured
nents as follows: —

ce of Wheat per Acre.

		Bushels.
- -		12½
t-soil - -	320	37½
- -	240	32½
- -	160	31¼
farmyard com-		
- -	60	25
- -	30	23¾
e yard of chalk	30	25

of night-soil," he continues,
ous; it just trebles the pro-
the experiments I have made
ıure, I have ever found this
uniform." (*Annals of Agr.*
It is evident, also, from the
f Arthur Young, which are
rmed by those of the Essex
my own, that night-soil is an
ıure for potatoes. The following table contains the results of A. Young's trials. The soil on which these experiments were made was a poor gravelly loam.

Produce per Acre.

				Bushels.
Soil simple produced		-	-	120
Night-soil	10	waggon loads,	each 96 bush.	600
—	6	—	—	650
—	2	—	—	500
Bones	10	—	—	650
—	6	—	—	640
—	2	—	—	560
Hog dung	60	one-horse cart loads		480
—	30	—		480
Yard compost	60	one-horse cart loads		300
—	120	—		480
—	30	—		140

(*Survey of Hertfordshire*, p. 177.; *Brit. Husb.* vol. i. p. 267.)

These experiments are useful, as indicating the comparative value of each fertiliser, although the quantities employed were evidently excessive. Mr. Hewett Davis, of Spring Park, near Croydon, finds six tons of night-soil, mixed with peat, to be amply sufficient for an acre of ground. He thinks this manure the best for turnips. Night-soil is, however, in spite of all the obstacles of prejudice and inattention, much more extensively used in the neighbourhood of the large manufacturing towns of the north of England than it was formerly. Mr. Dixon, of Hathershaw, in Lancashire, thus describes his mode of using it. (*Journ. Eng. Agr. Soc.* vol. i. p. 135.) "For the conveyance of night-soil and urine, we have the largest and strongest casks, such as oils are imported in; the top of which is provided with a funnel to put the matters through, and the casks are fixed on wheels like those of a common dung-cart. I am fully aware that there are many localities where neither peat nor night-soil can be readily obtained; but it is worth a farmer's while to go even more than twenty miles for the latter substance, provided he can have it without deterioration: the original cost is often trifling. On a farm where turnips or mangel-wurzel are cultivated to some extent, the system here recommended will be almost incalculably advantageous. A single horse is sufficient for one carriage; mine holds upwards of a ton each; six tons of this manure in compost with peat, or, if that is not convenient, any other matters, such as ditch scourings, or high headlands which have been properly prepared and laid dry in a heap for some time, would be amply sufficient for an acre of turnips or mangel. This manure is by far the most invigorating of any I have ever yet tried. Bones in any state will bear no comparison as a help for any crop; but it must be remembered

p. 371.) This substance has been recently examined by Professor Hermstadt, who reports it to be a perfect substitute for common dung; that it is most efficacious in wet seasons; and that in dry seasons it is less useful upon sandy soils than upon greasy clays. (*Quart. Journ. Agr.* vol. x. p. 285.) There is no doubt but that very excellent composts may be made from night-soil; and, in fact, several are now prepared in London, on a very bold scale, for the service of the farmer; but the success of these is usually impeded by the preparers professing that their preparations may be used in quantities much too small. Then, again, one or two patents have been taken out in this country for artificial manures, by persons who were evidently very grossly ignorant of what they professed to understand. (*Johnson on the Fertilisers*, p. 92.) See Farm-Yard Manure; Manures applicable by the Drill; Urine.

NIPPERS. A term applied to the four teeth in the fore part of a horse's mouth, two in the upper and two in the lower jaw: they are put forth between the second and third years. Nippers, in farriery, are the pincers which the smiths use in shoeing.

NIPPLE-WORT. *Lapsana* (from *lapago*, to purge; in allusion to its once supposed medicinal virtues). A genus of plants of little interest, and of the commonest culture. There are two indigenous species, both annual plants, belonging to the natural order *Compositæ*.

1. Common nipple-wort, or dock cresses (*L. communis*), is met with very frequently in waste as well as cultivated ground. The root is branching, with many fibres, simple at the crown. Stem solitary, two or three feet high, round, branched, leafy

NITRATES OF PO

DA. Two salts lately
agriculture. The first
is known in commerce
saltpetre, and is princip
the East Indies, where
surface of the ground, e
trict of Tirhût in Benga
in Ceylon, Persia, Eg
Spain; but that which
land comes chiefly from
state, and contains abo
of pure nitre. It, howe
lity; but the average lo
is generally about 15 to
is also formed by art
various parts of Europe
is composed of nitric
one equivalent; and p
one equivalent; or 52·9
47·1 of alkali = 100.

Nitrate of soda, whic
petre, is obtained chief
it is found in a thick st
tion of 3500 feet abo
Pacific Ocean. (*Darw*
443.) It is sold, it seen
on the coast of Peru
is composed of nitric
potash 37·9 parts. (*Ri*
Chem. vol. i. p. 39.)

It is only in modern
has been extensively
tiliser; for it is not lo
commerce has been pro
sufficiently large and r
the farmer to profitably
That the knowledge o
lities, however, is not a
is too self-evident to
(*Georgics*, lib. i. v. 193

in 1570, a learned German counsellor,
baschius, in his *Treatise upon Rural*
rs, describes the use of this salt as not
common dressing in his time for cole-
. A century afterwards, Evelyn, in
iscourse on Earth, told the farmers of
ge that if they could but obtain a
ful supply of saltpetre, they would
d but little other compost to meliorate
ground." And even Jethro Tull, in
arly part of the last century, who
d very zealously the necessary use of
res of all kinds—even Tull placed
at the head of his list of those sub-
s which he deemed to be the essential
f plants.

tpetre, therefore, must not be regarded
odern introduction into agriculture;
has long been used in limited quan-
by previous generations of cultivators,
like us, were content to notice the
which it produces, without being
o exactly comprehend its mode of

idle to merely substitute words in
ation of unknown effects, and to say
ltpetre is a stimulant, or that it yields
en to the plant; and there is little
ce of its entering into the compo-
of any of the more commonly culti-
crops: there is, therefore, but a slight
ility of its being a direct food of the
to which the farmer usually applies
he only common exception is that of
, in which a minute portion of cubic
(nitrate of soda) is found to exist.

although these nitrates have not
detected in the farmer's crops, yet
re known to exist in many plants,
kely as essential ingredients. Thus
re is found in the common horse-
in the nettle, and the sunflower.
evalier discovered it in the *Chenopo-*
lidum, M. Vauquelin in the deadly
hade. Dr. John found it in the *Me-*
anthemum crystallinum, M. Chev-
woad. The growth of the sunflower
erially promoted by watering it with
solution of this salt. It languishes
which do not naturally contain it;
hen the salt is added to the earth,
t immediately makes its appearance
plant in the usual proportions.

although we are not aware of its
nce in the ordinary field crops, yet
may beneficially exist in them, and
a considerable influence at certain
s of their growth, although in minute
rtions; and notwithstanding we have
rect evidence of the fact, it is not
ly that its presence may tend to vary,
vegetable world, the essentially pre-
combinations of nitrogen in a way which the skilful investigations of the chemist have not yet succeeded in tracing. Such researches, however, have already proved that nitrogen (which, with oxygen, the acid of saltpetre is formed) performs a much more important part in vegetable economy than was once supposed; and many facts are already apparent which should encourage us to persevere in the examination. For instance, it has been observed by the farmer that these two nitrates (the base of whose acid is nitrogen) have a very powerful effect in adding to the deep green colour of plants. Now this is precisely the effect produced by other fertilisers, which also contain nitrogen; such as gelatine, urine, oils, blood, soot, fish, &c. In fact, I am not aware of any manure producing this rapid, darkly green, luxuriant growth, from which nitrogen is absent. Saltpetre is naturally generated on the earth's surface under favourable circumstances, and in situation much more frequent than the farmer is wont to suspect. Wherever ammonia is copiously generated, as in stables, farm-yards, &c., and wherever the nitrogen, which forms a component portion of ammonia, at the moment of its extrication has access to potash or calcareous matter, there saltpetre is usually formed. This is naturally done so copiously, in some of those situations in which the farmer is placed, as to form fine crystalline exudations on the walls; and it is in such places that those plants which abound in saltpetre, as the nettle, the horse-radish, &c. commonly flourish with uncommon luxuriance. It has been proved by those who gather the saltpetre from the earth's surface in southern Africa and Hindostan, as well as by those who prepare the artificial saltpetre beds in Spain from the sweepings of the streets of Madrid, that nothing more is requisite for the formation of saltpetre in these beds of earth, than the presence of a certain proportion of decomposing animal and vegetable matters, with some potash, and calcareous matter. Now all these essentials for the formation of saltpetre must in many situations be afforded by the farmer's own soils. There are, in fact, many lands in the cultivator's possession where, especially in dry summers, the formation of saltpetre in minute proportions is continually taking place; where the putrefaction of animal matters must in small proportions be productive of ammonia; and where an abundance of potash is already existing in the soil, to neutralise the nitric acid produced, and form with it nitrate of potash or saltpetre. For it has been ascertained that if *at the moment when nitrogen is evolved* it is

produce the least results upon those deep rich alluvial soils which must abound in decomposing organic matters in some degree countenances the conclusion, as does the smallness of the quantity of saltpetre applied; for if once we concede the possibility of the soil, under favourable circumstances, being able to generate this salt, then it will be allowed that one hundred weight per acre is not a large crop for the soil to produce. That in this way it is generated in some of the richest soils of the East, to such an extent as to cover the surface with a white incrustation, is known to every oriental traveller. To a still greater extent is the land in those countries impregnated in many situations with the nitrate of lime, a salt which, possessing the same acid as nitre and cubic nitre, has lime instead of potash or soda for its base; and from some experiments which I have made, I have little doubt but this nitrate, which is of much less cost than either the nitrates of potash or soda, will be found a valuable agent for the use of the cultivator. For its excessive deliquescent or moistening properties, which render it so unmanageable for many manufacturing purposes, make it more valuable to the cultivator of the poor, dry, thirsty soils, where artificial fertilisers are most in request. If nitrate of lime was imported at a reasonable rate, the farmer could readily, if he wished, make his own cubic petre, at a very low price, by mixing the nitrate of lime with glauber salts (sulphate of soda), by which means a rapid decomposition takes place, the result of which is nitrate of soda (cubic petre), and sulphate of lime (gypsum). The inferior impure refuse glauber salts, made by the cotton bleachers in the preparation of

upon the old clay gra
in Berkshire, with va
1st, at the rate of 1
trate of soda $1\frac{1}{4}$ cwt
terin's manure 14 bu
gypsum $1\frac{1}{2}$ cwt. per
soda $1\frac{1}{4}$ cwt. and gyp
These were all appl
month of April; but
duced a better crop
yet the extreme dr
operated very materi
cess of almost all ar
the produce of the
below an average cr
were decidedly the b
rate of rather more
per acre; while the pr
ple was less than twer
The grasses were of
nanting the upland p
a considerable portion
roots of lucern, whic
gypsum alone, and in
cubic petre mixed, w
plication to a very re
plants nearly doubling
portion of the land.

In some experiment
sent, on the barley an
chalk formation in t
Winchester, the effect
excellent; the green c
rendered much more
creased produce far m
for the expense of th
same success attende
both red clover and
lands; but when I t
same rate per acre o
old garden whose ear

land. Those of Mr. Lightfoot were on ravels of Hertfordshire, which have a ratum of chalk; and yet he produced one cwt. per acre of saltpetre effects than equal to those produced by fold- he land with sheep. And when Mr. el of Witham tried it on the Essex it produced hardly any effect, except sing the colour of the wheat; but he used the same quantity (one cwt. acre) on his light barley land, after ish turnips, the increase was fifteen ls of barley and 640 lbs. of straw per and on a sandy field of oats, the in- e from its application was twenty ls of oats and half a load of straw. uccessful experiments of Mr. Kimber- Trotsworth on clover, in which he pro- with one cwt. per acre of nitre results qual to that from twenty-five cubic of horse-dung, were upon the sandy of Surrey "of moderate quality." veritt of North Creake bears out en- these conclusions, when he applauds "upon all light warm soils," but ts that "on cold clay land on an ge of seasons it will not more than the outlay;" and yet this excellent r had no reason to be dissatisfied with ccess, having obtained from an appli- of one cwt. per acre of saltpetre to light land" an increase of six bushels half of wheat. The experiments of Harvey of Harlstone entirely con- hose of Mr. Everitt; and in the *Re- f the Harlstone Farmers' Club*, in it is stated to be "the unanimous n of the meeting" that saltpetre was ent in its effects on heavy clover but that on light land it was highly cial to "wheat, clover, and other and tares."

of my neighbours too, an excellent r of Essex, in 1839, found on the fine arley soils of his farm the following from top-dressing his barley with wt. per acre of saltpetre, compared he soil undressed, dressed with night- ith sprats, and with farm-yard ma-

	Qrs.	Bushels.
oil simple yielded - -	5	$4\frac{1}{4}$
d with 1 cwt. of saltpetre	6	6
d with 50 bushels of sprats acre, ploughed in - -	7	1
d with 20 bushels per acre disinfected night-soil (Port- us) - - - -	6	$4\frac{1}{2}$
d with 10 loads of farm ure per acre - - -	5	6

ave noticed, also (and the same remark s to cubic petre), that the effect of tre is the soonest apparent when it is finely powdered, and spread on the land in moist weather. The explanation of this must, perhaps, be found in the superior rapidity with which, in such seasons, it mixes with the soil. The cultivator will remember that moist weather is also the best adapted for the application of other top-dressings, such as gypsum and soot. I have found in the application of crushed bones to grass lands, that they never produce such good effects as when rolled into the soil by a heavy roller, when the ground is softened by wet weather. The Staffordshire farmers will readily attest the same fact. If long-continued dry weather succeeds the application of the nitrates to clover, the leaves of the grass, wherever the powdered nitrate has fallen, become covered with yellowish spots.

The application, too, of either nitre or cubic nitre to grass renders it much more attractive to live stock, who, if turned into a grass field only partially dressed with either, will almost invariably resort to the portion of the land dressed with the nitrates. This is one argument in favour of the conclusion that these salts are in minute proportions absorbed by the crops to which they are applied. We know that this is the case with other saline manures, such as gypsum (sulphate of lime) and common salt; and every cultivator who has dressed his grass with either salt or gypsum will attest how decidedly his live stock prefer the grass so treated to every other portion of the same field.

The effect of cubic petre, as a fertiliser for heavy soils, seems to be rather more favourable, as far as my observations extend, than that of saltpetre; and in this I am confirmed by the observations of many of my neighbours. Yet still I am of opinion that, in the great majority of instances, both the cubic petre and the saltpetre will be found much more valuable top-dressings for light lands than for the heavier soils; and I am not much inclined to alter my opinion from the results of many of the carefully observed experiments of the very dry season of 1840; for in such periods it is almost hopeless to expect that any kind of top-dressing will produce results such as may serve to guide us in our future practice. Thus, in seasons such as the last, I have repeatedly witnessed the failure of top-dressings of all kinds; not only of the salts, such as lime and salt, gypsum and soot, and malt coombs, but even of the richest manure. My neighbours in Essex know very well that if a dry summer follows the application of their sprats (perhaps the most powerful of all animal manures), the application is entirely useless.

own experiments. The clover also, which was sown with the barley in most instances, seemed to derive a considerable benefit from the dressing; and I have noticed, on more than one occasion, the advantage of sowing the cubic petre in moist weather. In the dry summer of 1840, the effect of the cubic petre was very inferior to that produced by it on similar land and crops in 1838 and 1839—an effect which entirely supports my conclusions with regard to the inefficacy of all top-dressings in periods of long-continued dry weather. Of this opinion, too, is a very excellent and extensive farmer of Surrey.

Mr. Hewitt Davis noticed too the effect on some of the clays as well as the sands of Surrey in 1840,—that the effect of cubic petre upon young wheats at the rate of 1¼ cwt. per acre was excellent, not only in producing a very deep green colour, but in inducing a very considerable rankness of growth. But then, in his experience and observations, he has noticed that the wheat thus dressed has a stronger tendency to blight than that growing on the adjoining lands. On his farms, however, this rankness of growth is not felt as an evil; for on all soils, heavy as well as light, he practises an excellent system of *thin* sowing, the effect of which, as I can attest, is excellent in producing most abundant crops; either on the poor hungry black gravels and sands of Addington in Surrey, or on the tenacious clays of Sussex, he never drills more than five pecks of seed wheat per acre at intervals of twelve inches. It is true that by this plan the appearance of the wheat during the winter months is not so vigorous as many farmers would at first sight

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of the Royal Agricul
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trates very considera
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and others. And alt
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two powerful salts w
most apparent on t
am much inclined to
will find that this is
case.

In most soils the
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to decompose the nitr
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the application of th
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Such, then, are the
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In pursuing a path

owerful effects, are amongst the
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of our country have conducted
le experiments.

many experiments with these
be met with in the agricultural
he last few years. In the *Journ.*
oc. vol. i. p. 275—278—280, 281.
vol. cxvii. to cxxxix.; *Quart.*
vol. i. p. 208.; *Ibid.* vol. xii.
ans. High. Soc. vol. ii. p. 195.;
ol. ix. p. 269.; are some trials
and nitrate of soda, as dress-
ous crops at Rozelle, in 1840,
Hamilton, of Carcluie, Ayr-

randum of saltpetre, nitrate of
ommon salt, used as top-dress-
south-east garden park, of a
d well drained, 11th April,
sture laid down with grain in
cre sown with 1½ cwt. of nitrate
asured and marked as such;
e of one rood, without any
ain, one acre sown with 1½ cwt.
next to this half an acre dressed
ourths of a hundred weight of
t.

In little more than a fortnight
having had some favourable
re was an extraordinary change
listinct acres dressed with salt-
itrate of soda, as compared with
he field. The grass continued
these divisions much stronger,
f an infinitely richer and darker
the cattle lying much upon it,
fond it. This superior appear-
ued through May and June,
s later. The grass was, after
o close that no difference could
f any existed; it was particularly
tly observed in September, Octo-ber, November, and now 8th December; and no difference was then or is now perceptible between the ground dressed with the saltpetre and what was not so dressed. The pasture seemed equally benefited by the nitrate of soda as by the saltpetre; and as the latter cost in proportion to the former as 30*s.* to 20*s.* per cwt., there can be no question of preferring the nitrate of soda. No improvement could be perceived to have taken place from the dressings with common salt.

2. Another trial was made on pasture of the second year, in the lawn, on light land and dry, 14th April, 1840; one acre, measured and marked, sown with 1½ cwt. of saltpetre; adjoining this, one acre sown with 1½ cwt. of common salt; and next one acre, measured and marked, sown with 1½ cwt. of nitrate of soda.

Result. — Every remark applicable to the experiments in the south-east garden park applies equally to this. In both, in the different breadths sown by the cast of the hand where the two breadths joined, and the ground had got an extra quantity, the grass was richer and darker, showing that 1½ cwt. per acre is not an over-dressing, whether of saltpetre or of nitrate of soda.

3. Memorandum of dressings of saltpetre, common salt, and of nitrate of soda, on the 16th of April, on oats already brairded in Stott's Fauld, partly on well drained dry and partly on light land; one acre and fifteen falls, measured and marked, sown with saltpetre at the rate of 1½ cwt. per acre; next to this, one acre and fifteen falls, dressed with common salt in the same proportion; next to this, one acre and fifteen falls, sown at the same rate with the nitrate of soda.

Result. — It was long before any effect was perceived on any of the oats dressed as above. About the end of June a difference was perceived on the acre and fifteen falls sown with saltpetre, which had previously shown worming, and then came away darker and stronger, and became a heavy crop of oats and straw. The acre and fifteen falls dressed with nitrate of soda never seemed to be benefited by the dressing. Being an inferior light sandy soil, with a red irony bottom, it was injured by the early drought, and never recovered; the salt here, as on the pastures, seemed to have no effect.

4. Memorandum of dressings of saltpetre and nitrate of soda, in Laughlan Glenfield, principally strong clay, thorough-drained, and subsoil-ploughed, 26th April, 1840, on red clover, &c. for green cutting: one acre, measured and marked, sown with saltpetre, at the rate of 1½ cwt. and 2¾ cwt. of ni-

not show a better crop than where it was not dressed. Nearly an acre was dressed with nitrate of soda after the first cutting, on the 10th of August, where one had before been applied, but it did not seem to do much good.

5. Memorandum of dressing of saltpetre and nitrate of soda on some winter-sown wheat in Bridge Park, on clay land, thorough-drained, and subsoil-ploughed, 20th April, 1840.

First Lot.—Twenty falls, measured and marked, dressed with 28 lbs. of nitrate of soda. *Produce:* Wheat 7 bushels, 17½ lbs., or per acre (by an acre a Scotch acre is meant throughout, and a Scotch acre is about one fifth longer than a statute acre; and by "a fall" a perch of land), 58 bushels, 26 lbs.; straw 64 stones, 18 lbs., or per acre 518 stones. Weight of wheat per bushel 157½ lbs. Sold to baker for 28*s.*

Second Lot.—Twenty falls, measured and marked, sown with 28 lbs. of saltpetre. *Produce:* Wheat 6 bushels, 38 lbs., or per acre 52 bushels, 24 lbs.; straw 95 stones, 12 lbs., or per acre 764 stones. Weight per bushel 58 lbs. Sold to baker for 28*s.*

Third Lot.—Forty falls adjoining, measured and marked, without any dressing. *Produce:* Wheat, 11 bushels, 1 lb., or per acre 44 bushels, 4 lbs.; straw 79 stones, or per acre 316 stones. Weight 59 lbs. Sold for seed at 35*s.* per boll.

Fourth Lot.—A small quantity of oats adjoining to this winter wheat was dressed with saltpetre, which produced a great effect on the strength and colour of the oats; but the produce was not weighed or measured after being cut.

Fifth Lot.—Trial of nitrate of soda on

spinach, carrots, cau
and onions, but witho
vantage.

Mr. S. Martin of W
has given, in the *Sus*
lowing details of his
trate of soda as a top-
a four acre field in his
soil of the field select
loam with a substratu
was a rye-grass ley,
beasts until the last
when it was ploughed
twice stirred and harr
with 120 bushels of lim
to its being sown with
drop" in the autumn.
of April this year, I ap
of soda per acre over t
the exception of two l
the field); in the sec
applied to two lands a
which none had been
1 cwt. per acre. Prev
tion of the nitrate the
sickly appearance, getti
and looking as we ca
but in a very few
appearance was much
(with the exception of
which none had been
mained in a very sickly
a faint yellow to a
two lands upon which
was sown, were much
than the other, and
from the remainder at
distance.

"At harvest I measu
of each, and had it rea

36 trusses 4 lb. per acre; 8
wt. of soda per acre, 2 bushels
ts, or 47 bushels 1 gall. 4 pints
veight, 60½ lb. per bushel;
, or 86 trusses, 24 lb. per acre.

er piece of land, soil very thin
sown with Talavera wheat in
I applied one cwt. per acre in
k in May, and the result was
actory, the produce good, and
. per bushel.

ljoining field of precisely the
tion of soil, but which had
for eleven years previously,
anured every year, I sowed on
the end of one of the lands
to 1½ cwt. per acre, which had
dicial effect; the part with
la being much mildewed and
for bread, while the straw on
r of the field was very bright
d the grain full and handsome.

nitrate of soda on a meadow,
cre, applied the last week in
ce very trifling.

my experience goes, and from
nitrate of soda on my neigh-
I am of opinion that it is a
manure for their light soils,
repeated croppings, particu-
ricts where the arable lands
peatedly manured with lime;
eat doubts whether it would
heat on newly broken up or
a high state of cultivation and
e. In my experiment on the
nd, although the straw was
with a blade broad and flaggy,
miserably deficient, both in
quality, compared with the
ld.

t to its effect on the second
nly observe, that a very thin
of eighteen acres, with wheat
which 1 cwt. per acre was
d of which had a double quan-
n this year half with oats and
ds, that both oats and seeds
ual to any I ever grew on that
at the land where the 2 cwt.
own produced fully as many
onger straw and more grains,
ar as I could judge from ap-
did not keep it separate),
to the other."

botany, the knots or swelled
f stems; the place where one
lated with another.

-PRETTY. One of the
London-pride Saxifrage. See

CH, or BLACK MEDICK. See

NOONINGS. A term provincially used to signify working during dinner hours.

NORFOLK PLOUGH. See PLOUGHS.

NORTHERN LIGHTS, or AURORA BOREALIS. See LIGHTS, NORTHERN.

NOSE-BAND. That part of the head-stall of a bridle which comes over a horse's nose. It is sometimes termed maserole.

NOTICE TO QUIT. A notice to quit of six months, in the case of a yearly tenant, is in all cases necessary, in the absence of any special agreement or custom to the contrary, and the corresponding period of quitting must in all cases be directed by the notice being the same as when the tenant entered upon the premises. There are several cases, however, where notice is unnecessary, as when a pauper has left a parish house for a time, in which he has been on sufferance (*Wildbore* v. *Rainsforth*, 2 M. & R. 185.), or where a lease is to end on a precise day (*Cobb* v. *Stokes*, 8 East, 358.), or under an agreement for a lease where the party occupies for the whole term specified in the agreement. (*Doe* v. *Stratton*, 4 Bingham, 446.) But if, after the lessee's term is expired, he continue in possession for a year, or rent is received of him, then it is necessary to give him notice, for he has become a yearly tenant. (*Hollingsworth* v. *Stennett*, 2 Espinasse, 217.) And the executor or administrator of a yearly tenant is entitled to the same notice. (*Doe* v. *Porter*, 3 T. R. 16.)

Form of Notice.—Parol notice is sufficient if the tenant holds under a parol lease. (*Timmins* v. *Rawlinson*, 3 Burroughs, 1603.) But in all cases the notice should be in writing, and an examined copy kept. The rent being paid quarterly makes no difference; the tenant is still entitled to six months' notice to quit. (*Spirley* v. *Newman*, 1 Espinasse, 266.) The notice may be given to end the tenancy on one of two days, if there is any doubt as to the day on which the term ends, if served six months before either (*Doe* v. *Wightman*, 4 Espinasse, 5.); or if no day is known, then it will do to say "at the end and expiration of the current year of your tenancy, which shall expire next after the end of one half year from the date hereof." (*Doe* v. *Butler*, 2 Espinasse, 589.)

The following is the form given in *Harrison's Woodfall* of a notice to quit by the landlord to a yearly tenant.

"Mr. C. D.

"I hereby give you notice to quit and deliver up the premises which you now hold of me, situate at ———, in the county of ———, on —— day of —— next, or at the expiration of the current year of your tenancy. A. B."

should be especially watched; for on most farms, after very heavy rain, some water-courses will be sure to be filled up, and water will be found lying somewhere on the farmer's land. The cattle, too, require an attention to their warmth, and regular feeding. The flail should be therefore kept *steadily* at work for the use of the straw-fed stock, and the littering of their yards carefully attended to. The manure of the stables should be mixed with that of the farm-yard, regularly and evenly, and on no account allowed to collect and ferment in heaps around the doors. In the leisure time of this month, and during the other winter months, the farmer will do well to consider what heavy manures are to be procured and carted, and what are the covenants of his lease in this respect.

This is a leisure month for erecting dry walls for fences, for hedging and ditching. The leaves are pretty completely fallen. Water-meadows may now be flooded, and under-draining carried on, especially in the heavy soils. Wood cutting commences this month. Plantations of trees may be formed in open weather: to this end do not be content with the old fashion of digging a hole, and thrusting the roots in; but if you would have good thriving, early productive plantations, plough the land as deep as you can; if you subsoil it, it will be beneficial; and if you give the land a dressing with any kind of earth in which the soil is naturally deficient, such as lime, chalk, or marl, that will be better still. Do not plant Scotch firs, they are only fit to burn; the larch will grow well wherever the Scotch fir can

of the plants, but als
ture, not only from t
atmospheric air,—wh
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thers as incessantly a
it is universally contai
abounding most in t
periods when it is most
that is, in the warme
This property possess
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the importance of inc
pulverizing the soil,
understood as is desir
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in which I have often
And this absorbent p
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perty which is increas
by their pulverization
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assigned value. Use
This instrument, by
soil under old turf, w
crease its produce.
to whom we are ind
ment, tells us (*Journ.*
p. 253.), "It is used t
ten inches and a half
without turning over
no marks left by whic
the land has been so

all plants the better they grow;
the real explanation of the be-
ved from the horse-hoe hus-

r's Calendar. *Kitchen Gar-
hokes*, winter, dress. *Asparagus*
, plant to force, attend to that
Beans, plant *e*. *Beet*, red, dig
ring, leave or plant out seed.
lant, plant out for seed. *Car-*
h up *b*. *Carrots*, dig up and
ve or plant out for seed. *Cauli-*
k out *b*., attend to under glasses,
y, earth up, plant. *Coleworts*,
cumbers, attend to in forcing.
repare. *Dung*, prepare for hot-
n vacant ground. *Earthing* up,
Endive, blanch, &c. *Horse-*
up and store. *Hot-beds*, make,
c. *Jerusalem artichokes*, dig up
Lettuces, plant in frames, attend
vancing; leaves, &c. continually
. *Mint*, plant, force in hot-bed.
beds, make, attend to those in
Onions, in store, look over;
ding thin, plant for seed *b*. *Po-*
t. *Parsley*, cut down *b*. *Pars-*
and store *b*., leave or plant out
Peas, sow *b*. *Potatoes*, dig up *e*.
ow *e*., sow in hot-bed. *Shallots*,
alsafy, dig up and store. *Scor-*
up and store. *Savoys*, plant for
mall salading, sow in hotbeds.
in, &c. Seeds, dress and store.
ge, &c. vacant ground. *Thin-*
d to. Weeds, destroy con-

Garden. — Prepare compost for
r, by raking dead leaves, soil,
a heap, to turn over occasion-
the brine, soap-suds, &c. from
nto it. Transplant still all hardy
flowering shrubs, suckers, &c.
orders from dead annuals, leaves,
.; shelter the choice bulbs and
ering plants.

Monthly Notices. — The
n inhabitants of England called
Monath, or slaughter month; be-
hose primitive days, winter feed
ce in England, that it was usual
salt the greatest part of their
t in this month: they called it
Monath, or wind month, from the
s weather with which it is com-
mpanied. Its name is derived
atin *Novem*, nine, and *Imber*, a
t was so called in the Alban
and has preserved its name both
d and on the Continent.

mmonly wet and gloomy month,
ers continue to open upon us:
ds its close, the sweet coltsfoot (*Tussilago fragrans*) comes into flower, as do some of the verlthemia. The birds now begin to come nearer to our dwellings: the goldfinch locates himself in our gardens; the Royston crow is seen nearer to towns; the woodcocks arrive in numbers; the field-fare comes over about the 12th of this month. (*Farmer's Almanac.*)

NOWT. A provincial word sometimes applied to neat cattle.

NUCLEUS. (Lat.) Literally, any thing round which matter has accumulated, or to which it is affixed. In botany, it is used in various significations: — 1. The central fleshy pulpy mass of an ovule. 2. That part of a seed contained within the testa, and consisting of either the embryo and albumen or of the embryo only. 3. In lichens, the disk of the shield, which contains the sporules and their cases. 4. In the language of the older botanists, what is now termed by gardeners a *clove;* that is, the secondary bulb of a bulbous plant.

NUISANCES, in law, are of two kinds: public or common, which annoy the king's subjects in general; and private, which are defined "any thing done to the hurt or annoyance of the lands, tenements, or hereditaments of another." A nuisance may be defined to be any act done which renders the lives of the neighbours less comfortable than they were before. The remedies allowed by the law are in some cases summary, as when a gate is erected across a public highway, or cattle trespass on the land; and in which cases the passenger or owner of the land is justified in removing the nuisance: or in other cases, the general legal remedies are, indictment or presentment, for public nuisances; or by an action on the case for damages, for private nuisances.

Indictable Nuisances. — Of the number of public nuisances which are punishable by indictment are setting spring-guns and man-traps, which, by the 7 & 8 G. 4. c. 18., is declared to be a misdemeanour; but the act allows such to be set "from sun-set to sun-rise in dwelling-houses for the protection thereof." Other indictable nuisances are for erecting a privy or placing putrid carrion near a highway, or keeping hogs, and feeding them with offal near to a street; for keeping a dangerous bull in a field through which there is a public pathway (if the bull or other dangerous animal is *purposely* placed there to stop a disputed path, and death ensues, it is a murder); for keeping unmuzzled a ferocious dog; for baiting on the Queen's highway a bull, &c. The punishment in any case of nuisance is fine or imprisonment, or both; and the court may order the defendant to pay the prosecutor his costs. It is no defence to prove that the

427.) The non-repair of a road or a bridge are also well-known nuisances, which are indictable.

Nuisances on which an Action on the Case is maintainable. — Accidents from the negligent use of loaded guns (*Dixon* v. *Bell*, 5 M. & S. 198.); placing baited traps so near to the premises of another, or the highway, that dogs are attracted into them and injured. (*Townsend* v. *Wathen*, 9 East, 277.) For an injury by a vicious bull; and it is no defence by the owner of an animal that he has had notice of having done an injury, and has taken every precaution to prevent it doing so again. (*Blackman* v. *Simmons*, 3 C. & P. 138.) No action, however, lies for an injury by a dog let loose on the owner's closed premises at night for their protection (*Brock* v. *Copeland*, 1 Espinasse, 203.); or on land on which the injured party has no right to go. (*Larch* v. *Blackburn*, M. & M. 505.) If a person harbour a dog, or allows it to resort to his premises, he is liable for any damage it may cause. (*M. Kone* v. *Wood*, 5 C. & P. 1.) And the owner of a dog that destroys or injures sheep is, of course, liable to their owner. (*Hartley* v. *Harrimen*, 1 B. & A. 620.) If the owner catch the dog in the act of worrying his fowls or sheep, he is justified in shooting him. (*Janson* v. *Brown*, 1 Campbell, 41.); but he must not follow the dog some distance, and then shoot him (*Wells* v. *Head*, 4 C. & P. 568.); nor may he shoot a dog merely trespassing (*Corner* v. *Champneys*, 2 Marshall, 584.); but he may if the dog is chasing deer in a park. (*Protheral* v. *Matthews*, 5 C. & P. 581.) And if any man do any thing on his own soil which is a nuisance to another, as by stopping a rivulet, and so diminishing the water used by him for his

not easily germinated o
ground and in the ord
beds, frames, and hand-
quisite. Every private
requires a nursery to
ward young plants, as a
failures by disease or ac
garden; and in every co
gardens or plantations
public or commercial
by persons who adopt
a business.

NUSHED. A pro
to young animals, to
stinted or starved in br

NUT, BLADDER.
Nut.

NUT, THE EAR
Nut.

NUTHATCH. (*Sit*
well-known bird inha
tions, and parks, partic
tain old oaks, and other
It is resident here all
ing orchards and garde
not equally numerous
The names of nutha
have been given to this
of feeding on the kern
however thick or hard
pen to be, are broken
dexterity. Besides nu
on caterpillars, insects,
and bush-nuts or ma
makes a slight nest, of
of dead leaves, moss, bit
and lays from five to
are nine lines in length
breadth, white, with som
general colour of the p
and wings, &c., is slate

vered with hard shells; but in the general ceptation of the word, signifies the fruit different species of hazel (*Coryli*). The nel consists of two cotyledons, between ich the embryo lies. It has a mild, naceous, oily taste, agreeable to most ates; a kind of chocolate has been pre-ed from them, and they have sometimes n made into bread. The expressed oil hazel nuts is little inferior to that of onds. Besides those raised at home, s are imported from different parts of nce, Portugal, and Spain; but chiefly n the latter. The Spanish nuts in est estimation, though sold by the name Barcelona nuts, are shipped from Tarra-a, whence the average annual export is mated at from 25,000 to 30,000 bags, teen to the ton. The annual entries uts for home consumption amount to a 100,000 to 125,000 bushels; the duty s. a bushel yielding from 10,000*l.* to 00*l.* nett. (*M'Culloch's Com. Dict.*; *'s Spain*, vol. ii. p. 362.)

YMPH. See Pupa.

O.

AK. (Germ. *eiche*; Dut. *eik*; Dan. *eeg*; *ek*; Lat. *Quercus*; from the Celtic *quer*, and *cuez*, a tree; others derive it from Greek word *choiros*, a pig, because animals feed on the acorns.) There are ral species of this valuable genus, but common British oak (*Q. Robur*, Linn.; *edunculata*, Willd.) claims precedence very other. It is a large, umbrageous, handsome tree, with round, smooth, , more or less wavy, horizontal branches. es deciduous, bright green, on short s, oblong, broadest towards the apex; sinuses rather acute; lobes obtuse. ren flowers in numerous pendulous, ed, yellowish, downy, deciduous catkins, to three inches long, from lateral scaly s. Fertile flowers on axillary simple s, few, scattered, sessile or stalked, nish, tinged with brown; their outer x subsequently much enlarged and ened, constituting the well-known per-ent cup of the smooth finally decidu-nut, or acorn, which last is crowned by small, chaffy, converging inner calyx.

he sessile-fruited bay oak (*Q. sessiliflora*) en an indigenous species, abundant in ral parts of England, particularly in the th. The wood of this species being far rior to the true *Q. Robur* in quality, it highly important to distinguish them, gh long considered as varieties. The es of the present species have longer, e slender footstalks, and are more equally and regularly pinnatifid. The most clear and indisputable specific character, noticed by the older writers, consists in the fertile flowers having no stalks, which difference exists likewise in the acorns. Those writers, however, do not appear to have been aware of the inferior value of the timber. Professor Martyn, in his *Flora Rustica*, has given some remarks on this subject highly worthy of notice.

The wood of this species is said by Tredgold to be darker, heavier, harder, and more elastic than the common oak; tough, and difficult to work; and very subject to warp and split in seasoning. Mr. Tredgold seems disposed to regard this species as superior to the common oak for ship-building. But other, and also very high authorities, are opposed to him on this point; and, on the whole, it is sufficiently well established, that, for all the great practical purposes to which oak timber is applied, and especially for ship-building, the wood of the common oak deserves to be preferred to every other species. A well-informed writer in the *Quarterly Review* remarks, on the point in question, "The *Quercus Robur* affords a close-grained, firm, solid timber, rarely subject to rot; the *Q. sessiliflora*, more loose and sappy, very liable to rot, and not half so durable. It may be thus discriminated from the true old English oak:— The acorn stalks of the *Robur* are *long*, and its leaves *short*; whereas the *sessiliflora* has the acorn stalks *short*, and the leaves *long*: the acorns of the former grow singly, or seldom two on the same footstalk; those of the latter in clusters of two or three, close to the stem of the branch." Although, as is well observed by Mr. Selby, "Of this numerous and most important genus, the various species of which are distributed throughout the temperate regions of the globe, Britain can only claim two as truly indigenous to her soil, these two are by far the most important of their kind, surpassing all other known species, not only in grandeur of form, bulk, and duration of life, but in the strength, durability, and general excellence of their timber; which, for all purposes where these two qualities are essentially requisite, if equalled, at all events is not surpassed, by that of any other European tree. Our navy attests its superiority in the construction of ships; while the sound and uncorrupted state in which it is found in buildings and other works of ancient date is a proof of its general utility and fitness for every purpose where durability and strength are required. The rest of the oaks, evergreen as well as deciduous, amounting, we believe, to upwards of 150 botanical species, are all of exotic origin, and in former ages, before the clearing away of the forests had commenced, appears to have covered a very large portion of its surface; for, even in districts where the natural or self-sown oak is now rarely seen, the remains of noble and gigantic trees are frequently met with, sometimes in the alluvial deposits on the margins of our rivers, or in boggy places covered with a layer of peat moss, which has been generated around them by the stagnation of the water caused by their fall.

To give a detailed account, or even to enumerate all the various oaks remarkable for their size and other peculiarities, which have existed, or do still exist, would occupy more space than the limits of this work will allow; this circumstance, however, we regret the less, as it may induce the reader to turn to the interesting pages of the *Amœnitates Quernæ* of the late Professor Burnet, in which work the historical facts, legends, &c., connected with the history of individual oaks of ancient date, are amply discussed; to the magnificent *Sylva Britannica* of Strutt; or to the *Arboretum Britannicum*, in which work the counties being ranged alphabetically, an account is given of all the most celebrated oaks that have existed, or are now living in each of them. All the species of this very important genus have a highly ornamental appearance, either on the lawn or in the forest. A fine oak is one of the most stately and picturesque of trees; it conveys to the mind associations of strength and duration, which are very impressive. The oak stands up against the blast, and does not take, like other trees, a twisted form from the action of the winds. Except the cedar of Lebanon, no tree is so remarkable for the stoutness of its limbs;

and tortuous irregula
branches admirably co
neral richness and de
foliage."

The knotty oak of E
speare calls it, the
gnarled oak," when cut
(from fifty to seventy y
timber known. There
which is harder, more
less capable of being
none contains all the
great and equal propo
at once supporting a
strain, and not splint
shot, the timber of th
every other. The col
fine brown, and is fami
is of different shades, t
the most inferior kind
transverse septa are in
producing beautiful f
liquely. Where the
not very distinct, the
strongest. The textur
pact and porous; the
annual ring being of
and in irregular dots,
pores, producing bea
some kinds, particularl
timber has a peculiar s
slightly astringent. It
and is consequently b
with iron when it is
wood of English oak
cross-grained, and diffic
wood, and that of old
and workable. Oak w
in drying, and in sea
$\frac{1}{32}$nd of its width.
durable than any other

d is more easily separated,
her season: hence oaks are
in May, June, and the be-
ly. When separated, the
by being set up in ranges,
d loftes. See Oak Bark.
very valuable, on account of
nly tree which produces in
hat very important article,
k succeeds best in a deep,
d in a somewhat low situa-
rious species are generally
seed; and it is only when
eties are to be perpetuated,
is resorted to. The seeds
sown when they drop from
ey may be thoroughly dried
till the following March.
wing the soil should be well
after the drills are opened
awn off the beds, the acorns
red along the drills or over
ing them about two inches
overing, the acorns must, if
be patted down with the
e, or the back of a wooden-
sown in drills. They should
m half an inch to an inch
ep, according to the size of
th finely broken soil. The
f the oak does not in any
rom that of the fir, and other
(*Smith's Eng. Flor.* vol. iv.
Paxton's Bot. Dict.; Tred-
of Carp.; Timber Trees and
Brit. For. Trees, p. 238—
Arb. Brit.; Phillips's Fruits;
om. Dict.) See Acorns,
Plantations.

E. This is not to be con-
those beautiful little ex-
ommon upon the under side
f the oak, and known by the
nd spangles; they are the nidi
ecies of Cynips, produced by
f the ovipositor of the female,
rent parts where they are
ak-apple is also formed by
f a cynips, upon the twigs of
. It rises rapidly, is usually
size about one to two inches
Its texture is spongy. It has
nce to the *Bedeyuar* of the
is not so rough and fibrous
. The oak-apples are very
ntaining tannic acid, and
in dyeing, making ink, and

. The cortical layer stripped
ree. Oak bark is preferred
stances in the tanning of lea-
gs a high price afterwards as
he exhausted bark is used by gardeners to produce a slight equable heat by its fermentation, and may be advantageously used as a manure. The tan balls, or muddy sediments of tan pits, are used for summer fuel. The bark contains different quantities of tannic acid, according as it is near to or distant from the wood. Thus, the inner part, or *liber*, according to Sir H. Davy's experiments, yields about 77 per cent. of tannic acid; the cellular layer, lying upon the *liber*, yields only 56 per cent.; and the cuticle little or none. Dr. Higgins obtained 108 parts of tannic acid from the bark of an oak felled in the spring, and only 30 from an oak felled in winter. When the bark is set up to dry, the air, aided by moisture, acting upon the tannic acid, converts a portion of it into gallic acid, which is not originally a constituent of oak bark. See Bark and Tan.

OAK-WEBB. A local name for the May bug. See Cockchafer.

OAMY. A provincial term applied to such ploughed lands as are light, porous, and floury.

OAT. (Russ. *owes;* Pol. *owies;* Dutch, *haver;* Fr. *Avoine*; Lat. *avena.*) A very valuable cereal grass, of which several varieties are cultivated for their seeds: the chief of these are — 1. The *Avena sativa*, or common oat. 2. The *A. orientalis*, or Tartarian oat. 3. *A. strigosa*, or bristle-pointed oat. 4. *A. brevis*, or short oat. 5. *A. nuda*, or naked oat.

The common oat is far the most important of these species. Its spikelets contain two or three seeds. Its florets are sometimes furnished with awns, and at other times are awnless. The oat is a native of cold climates: it flourishes in the temperate latitudes, but it degenerates, and at last refuses to yield profitable crops as it approaches the equator. It is, however, cultivated with success in Bengal, as low as the 25° of latitude. It flourishes remarkably well in Ireland and in Scotland, and constitutes the principal food of the inhabitants. In England it is cultivated to a very considerable extent in the fen districts of the eastern counties, as well as in the northern border districts, in which last the oats are considered to be very superior. By cultivation, difference of soil and climate, and other causes, the common oat (*A. sativa*) has produced several varieties, which have been divided by some authors into three classes, the black, the grey, and the white. Those of the first class are commonly hardy, have small seeds, become early ripe, and are hence well adapted for cold hungry soils, such as those which are usually found on considerable elevations.

The grey, or dun-coloured oats, although it is cultivated. It is not so well suited to inferior soils as some of the other white and darker-coloured kinds: it is also less productive of straw, though the grain is more plump, weighs heavier, and yields a greater weight of meal. The hardier kinds, however, are better suited to certain situations than the finer, just as the hardier red wheats are better suited to certain situations than the thin-chaffed and white varieties. The potato oat was the discovery of accident, and the produce of a single plant. It has, in many cases, shown a tendency to degenerate, by the husks becoming thicker and the body less plump, and by the partial appearance of awns."

The *Poland oat* is another valuable cultivated variety of the white oat. It comes early to maturity, and is a prolific bearer. Its defects are a tendency to be deficient in straw, and a liability to shed its seeds.

Besides these, there are several other varieties of the white oat, as the Dutch, or Friesland oat, the Hopetoun oat of East Lothian, &c.

The *Hopetoun oat* was produced in 1824, by Mr. P. Sherriff of Mongewell, in the way he thus describes. "Having frequently had occasion to pass the gateway of a crop of potato oats, in the summer of 1824, a stalk of remarkable height attracted my attention. When the crop was reaped, the grains supported by this stalk, and those upon a short one proceeding from the same root, were gathered and sown in the following spring. The crop from the grains of the gigantic stalk was again conspicuously tall, and after the crop of 1827 the new variety established its superiority." (*Trans. High. Soc.* vol. ii. p. 352.) In some comparative trials by Mr. Boswell (*Ibid*, p.

son, and some attain
as the Polish and Ge
which are stunted.
and are later in arrivin
such as the potato, Flem
oats, which are also sh
to grow through the
later in arriving at the
Hopetoun and late A
taller than the others.
of the summer proves
by drought, the Polish
have an advantage ove
attain their full height
commences. When t
summer is very dry, an
the Hopetoun and Ang
moisture, while the o
not. When the season
out, and the different
reach an extreme hei
cies have frequently a
larger in grain produc
the straw of the latter
uriant." (*Ibid.* p. 358.

The *Cumberland earl*
being raised from a si
berland gentleman, is
more like the early An
potato; colour dark an
earlier than the potato
earlier than the Hopeto
a fortnight sooner t
(*Quart. Jour. Agr.* vol.

Red Oat. — There is
of oat (classed with th
the red oat, which is
districts, and is thus
lebrated William Daw
1791; — "Happening
Tweeddale, which is ab

ral respects; they were not so apt to e, even as the common oat, they suited y sort of soil if in good condition, and yielded well in meal; that they had sown in that country for fifty years, no one knew where they came from. n this information I commissioned a for a trial, and found them answer so that I have sown no other sort for ral years. They do not produce much w, but what they do produce is very I saw a second crop of these oats the same land last year, which was I have found that they answer the acter given of them at Linton fully. they answer best upon land in good ition, but that they produce very little upon poor land; yet the produce of is not even in these situations inferior y other oats. These properties give a great superiority over every other known in this country, and grown in situations, and cold climates and soils." *to Board of Agr.* vol. vi. p. 136.) are a kind of oat much relished by s, who if used to them do not readily to other, even richer kinds. Carters stomed to them give them a decided rence.

e Georgian Oat was introduced about ear 1824, but it has not made much ress. In 1826, Mr. Wilson of Pres- reported the following comparative between it and the potato oat *s. High. Soc.* vol. i. p. 153.), "upon English acres of equal land. The tity sown upon an acre was six bushels, of the potato four bushels. The gian was reaped ten days earlier than otato, but they might have been four- days. The appearance of the Georgian by far the most luxuriant during the ner, till the end of July, when the po- shot out considerably longer in the . They were carefully cut down, ed, and thrashed in March 1826; the t was in

	Stones.	lb.
ht of straw of the potato oats acre	317	6
ht of straw of the Georgian oats acre	238	12

e produce of the potato oats per acre ixty-nine Winchester bushels, and the gian sixty-eight.

	Stones.	lb.
ht of meal from six bushels of tato oats	11	5
of meal from six bushels of ian oats	10	6

Tartarian Oat is cultivated to some in England, but much more extensively in some portions of the Continent. "Its fasciele is contracted, and nods to one side, which distinguishes it from the common oat. The colour of its corolla is generally dark, but the plant improves by culture in a good soil, losing its awns, and that darkness of colour which appears to distinguish the oat in its less improved state." (*Low's Pract. Agr.* 256.) The breadth of this oat annually cultivated in England has much increased within the last few years. It is the best description for the poorest exhausted soils, producing the most straw on those sorts of any other variety. The oat can be profitably cultivated upon, perhaps, a greater variety of soils than any other of the cereal grasses. It may be grown, too, successfully with less preparation of the soil, and less manure. The oat plant, however, succeeds best in fresh soils, in newly broken up old pastures, and in those abounding in organic matters.

The organic manures by which the oat crop is best nourished appear to be green manures; fish, especially those, like sprats, abounding in oil, and, in fact, all those of a readily decomposable description. Recently drained marshes, peaty soils after being dressed with lime, newly enclosed commons after being chalked, all usually yield large crops of oats.

The land intended for oats should be ploughed, if possible, especially on clay soils, in the previous winter, or at least as early in the spring as possible: this is a practice almost always adopted by the best farmers of our island. A still more common course of cropping is to sow oats after turnips, or other green crops, and especially on the four-shift system with grass seeds.

A miserable custom still prevails in some parts of England, of taking two crops of oats in succession, or an oat crop after wheat or barley. Arthur Young long since denounced this as bad husbandry. After observing, that white oats should be sown in March in preference to any other season, he remarked that "in the general conduct of them the farmer should by all means avoid the common error of sowing after other corn crops, by which they exhaust the land. They should always receive the same preparation as barley, nor ought a good husbandman to think of their not paying him as well for such attention as that crop. It is a very mistaken idea to suppose it more profitable to sow barley on land in good order than oats. He was, from divers experiments, inclined to think that oats will equal, and in many cases exceed, barley. The superior quantity of the produce will ever be found to more than counterbalance the inferiority of the price;

common oat crops, among bad farmers, are but so much loss), an object that ever ought to influence good husbandmen. Why should a good farmer be at all solicitous to gain 10*s.* an acre profit by oats after barley? Suppose," he continues, "his course to be, 1. turnips; 2. barley; 3. oats: or, 1. fallow; 2. wheat; 3. oats: in either of these courses, or in any other, where the oats follow another crop of corn, the profit of them must be small. What comparison with sowing clover with the barley, which will pay far more profit, and at the same time prepare, in the best manner, for that most beneficial crop, wheat! What but a fallow, or a fallow crop, can succeed the oats? How unprofitable, compared to the clover system! For these reasons I cannot but recommend that oats should be considered in the same light as barley, and never sown unless the land be in proper order for barley, or to sow them after a fallow crop, and clover with them, in the same manner as barley."

And to the practice of sowing them after turnips the same "observations which have been made on barley are equally applicable. The farmer should," he says, "in the distribution of his farm, consider which of these two crops is likely to pay him best. This will very much depend on his soil. Warm forward sands yield as many quarters of barley, perhaps, as of oats; but upon various other soils, the produce of oats, compared with that of barley, will be as four to three, and on some as five to three. He should also take into consideration," he adds, "the greater steadiness of price which oats have generally yielded, in comparison of the price of barley; circumstances which may rasonably induce him to sow them in

had produced inferio
oats again the next
largely, which prove
tilth. Pease or bean
than exhaust land w
layers, whereas two
scourge the land too
ever, be well rememb
these observations are
relate to old grass) on
the farmer will not
pare and burn, a me
and which ought to b
where it is practicable
dar.)

Oats are commonly
April, but it is very
might be advantageou
in many situations, an
generally broadcast:
bushels per acre of
quantity. By the d
much less quantity
have known from te
per acre grown year
two bushels of seed.

They are usually cu
scythe, in the north
of Britain by the sick
never be allowed to b
before they are cut.
varies from twenty-fiv
acre. In the fens of
Essex and Suffolk on la
with thirty-five or fo
per acre, the yield is
considerable.

The weight of a b
from thirty-five to fo
fourteen pounds of
about eight pounds of

Produce in Meal.		Produce of Husk.	
25 lb.	2 oz.	16 lb.	14 oz.
23	6	16	10
21	12	16	4
20	3	15	13
18	11	15	5
17	5	14	11
16	1	13	5

s a well known article of food;
ur from which, in the northern
ir island, the bread of the work-
s procured. The oat seed was
y Sir H. Davy; he found in
f Scotch oats 743 of soluble or
tter, composed of 641 mucilage
saccharine matter, and 87 glu-
nen. In 100 parts of oats from
arts of starch, 6 of gluten, and
ne matter, 33 husk. (*Elem. of*
3.)

ipal demand for oats in Great
r horses. Its use for bread is
ined to the northern districts.
loyed also for various domestic
eding pigs, dogs, &c.; and it
ed in brewing ale, and in the
ries; but for this purpose its
h inferior to that of barley.

were analysed by Schraeder;
227·8 grains of ashes, obtained
of oats (*Gehlen's Jour.* p. 3.

	Grains.
- -	- 144·2
te of lime (chalk)	- 33·75
te of magnesia	- 33·9
a (clay) -	- 4·5
f manganese -	- 6·95
f iron -	- 4·5
	227·8

lysis of M. Vauquelin rather
this; he found in 100 parts of
the oat —

	Parts.
- -	- 60·7
ate of lime -	- 39·3
	100·

burning the whole plant, stalk
gether, he obtained a residuum
f —

	Parts.
- - -	- 55
ate of lime -	- 15
- -	- 20
ate of lime -	- 5

me oxide of iron.

ure obtained from 100 parts of
f the seeds of the oat —

	Parts.
salts -	- 1
phosphates -	- 24

	Parts.
Silica - -	- 60
Metallic oxide -	- 0·25
Loss - -	- 14·75
	100·

Average price of oats in England, per Winchester quarter. (*M'Culloch's Com. Dict.*)

	£	s.	d.		£	s.	d.
1771 - -	0	16	8	1810 - -	1	9	4
1775 - -	0	16	6	1815 - -	1	3	6
1780 - -	0	12	10	*Per Imperial Quarter.*			
1785 - -	0	17	2	1820 - -	1	4	9
1790 - -	0	18	10	1825 - -	1	5	8
1795 - -	1	4	9	1830 - -	1	4	5
1800 - -	1	19	10	1835 - -	1	2	0
1805 - -	1	8	0	1840 - -			

The account, in imperial quarters, of the foreign oats and oatmeal entered for home consumption every five years since 1815 was —

	Qrs.		Qrs.
1815 -	- 214,000	1830 -	- 900,319
1820 -	- 726,848	1835 -	- 176,142
1825 -	- 15,000	1840 -	- 510,836

The annual average of oats, in Winchester quarters, imported into England from 1801 to 1825 was, from

	Qrs.
Russia - -	- 46,652
Sweden and Norway -	- 2,446
Denmark - -	- 30,672
Prussia - -	- 39,209
Germany - -	- 75,828
Netherlands - -	- 84,269
France and Southern Europe	- 1,953
America - -	- 4

From Ireland were imported into this country, of oats and oatmeal, in Winchester quarters, —

	Qrs.		Qrs.
1810 -	- 493,231	1825 -	- 1,629,856
1815 -	- 597,537	1830 -	- 1,471,252
1820 -	- 916,250	1835 -	- 1,822,766

OAT CAKE. See Oatmeal.

OAT GRASS. See Avena.

OATMEAL. The meal or flour of the oat is used to make porridge, gruel, bread, and poultices. In the mealing process, the oats, after being previously dried in a kiln, are made to pass through the mill-stone to divest them of their coarser husks or "shealings" before being ground. The kernels are then named "grits" or "groats;" and are next ground over again into a coarse rough meal, varying in its fineness according to the custom of different districts. This is afterwards either baked upon a heated iron, called a *gridle* in Scotland, into thin flat cakes, or made up with water into loaves, and baked. When gradually stirred into boiling water, and boiled into

OCTOBER. The tenth month of the year. *Farmer's Calendar.* Most of the business of the last month may be continued in October. Seed wheat, winter beans, and tares for a second crop, may be sown, corn thrashed, and lands ploughed for wheat, but this operation should be concluded by the last days of this month. Plough or fork up potatoes; protect these from frosts. Look now carefully to your water-courses. Do not consider wheat sowing completed until your land drains and ditches are thoroughly scoured. Look to your fences. Finish dressing your meadows. Collect stubble, and plough your winter fallows. Begin to feed your fatting sheep on turnips; do not omit to give them salt; they will be all the better with some dry food, such as hay, or oil-cake; your land will also benefit materially, by their dung being considerably enriched by the latter food. Keep the sheep as much as possible on your wettest land, that your dry soils may be kept back for the rainy season. Many difficulties attend these animals, from the unnatural food on which we feed them, and the stranger soils on which they are often folded. Natives of the high sandy districts, browsing on the heath, and its hard, dry, vegetation, tenants of the highest table lands, we force them down into the rich alluvial bottoms, feed them upon the most succulent, rapid-growing food, enclose them on wet lands, and in yards full of wet fermenting dung, and then are surprised at their becoming diseased; the instinct of the animal points this out to the cultivator; suffered to range abroad, they are sure to locate themselves on the highest portions of the field. We have no doubt that the system of shed feeding, even in moveable

and mangol wurzel
plough your land i
peas towards the en
weather is open, it w
fitable for the oper
early; and if a wet
will be in a better si
your work forward
when apples and pe
stacks formed for t
last—not least—th
brewed, the Christm
ers' beer. All the ge
the farm should be
now. Reserve what
labour you can, to
in the wet fogs of N
of the close of the
liquid manure tanks.

GARDENER'S CAL
den. — *Angelica*, so
dress *e*. *Beet*, red,
Borecole, plant *b*., ea
plant *b*., earth up, &c
net, plant. *Cabbage*
for seed. *Cardoon*
take up, to store, *e*.,
seed, thin young cro
up. *Coleworts*, plan
out in borders, to sta
way of precaution i
Cucumbers, plant *b*.
water, plant. *Dill*, s
hot-beds. *Endive*,
earthing up attend t
lic, plant *e*. *Hebary*,
plant. *Hyssop*, plant
store *e*. *Leeks*, plant
crops. *Lettuces*, p
Leaves, fallen, remo

d *salading*, sow. *Sage*, plant. *Sorrel*,
Savory, plant. *Savoys*, plant for
Salsafy is in perfection, take up for
ag. *Scorzonera* is in perfection, take
r storing. *Spinach*, thin, &c., seeds
r as they ripen, stir between rows of
s. *Tansey*, plant. *Tarragon*, plant.
tos, gather. *Thyme*, plant. *Thinning*,
d to. *Turnips*, plant for seed, hoe
g crops. Vacant ground, trench, drain,

OWER GARDEN.—This is a very busy
h; for the garden should now be
d and arranged for season. Trans-
all sorts of fibrous-rooted perennial
iennial plants now where they are in-
d to remain; put the bulbs into the
d again, and remove the different
d plants into their respective places.
flowering shrubs of all sorts. Plant
ransplant all hardy deciduous shrubs
heir suckers. Dig up and part the
of all flowers which require so doing,
plant them. Plant cuttings of honey-
s, laurels, &c. Take up the roots of
s, and put them carefully away till
Trim evergreens. Plant box-edg-
cut away the long sticky roots, and
he tops even. Mow grass walks and
and weed gravel walks.

NERAL MONTHLY NOTICES. — October
alled by our Saxon forefathers *Wyn*
th, or Wine Month; and sometimes
r fylleth, from the approach of winter.
s the eighth month of the Alban
dar, in which it had thirty-nine days.
me is derived from the Latin *octo*,
and *imber*, a shower of rain. Romulus
d it to thirty-one days; Numa to
y-nine; Julius and Augustus each
one, and this number has not since
altered.

ober lets loose the harriers and the
ound. The foxhound now begins to
ht earnestly busy. The flowers now
to arrive in rapidly diminishing num-
The long-leafed starwort blossoms
the first week of this month. The
old leaves us about the fifth, the swal-
a the eighth or ninth. The golden rod
out of bloom near the tenth. Wood-
begin to "drop in" from the thirteenth.
eaves of the lime tree fall in the first
ght; those of the elm speedily follow.
oak changes its colour towards the
(*Johnson and Shaw's Farmer's Al-*
.)

ES. See FARM BUILDINGS.

TS. In gardening, young radical
en separated or taken off from the
ots, are so called. One of the chief
of propagating plants is by offsets.

AKE. The marc which remains after the oil has been expressed from the seeds of flax and rape. See LINSEED CAKE.

OILS (Ger. *oel;* Lat. *oleum*). This term comprehends two substances that have very distinct properties, namely, volatile and fixed oils; but, in general language, the term oil is indicative of the latter. Fixed oils are unctuous fluid bodies, which, when dropped upon paper, sink into it, and make it seem semitransparent, or give it what is called a *greasy* stain. (*Thomson's Chem.* vol. ii. p. 363.) They are composed of carbon, oxygen, and hydrogen. Train oil has been sometimes used as a manure, and is a powerful fertiliser. See FISH. Linseed oil is a common food for live stock. See LINSEED OIL.

The following is the result of analysis of 100 parts of

	Hydrogen.		Oxygen.		Carbon.		
Olive oil	13·36	+	9·437	+	77·213	=	100
Train oil	16·1	+	15·03	+	68·87	=	100

Olive oil is chiefly imported into this country from the Mediterranean. It is the produce of the *Olea europæa*, a native of Greece, Africa, and the South of Europe. The oil is expressed from the ripe fruit, which resembles a small purple plum in size and appearance. The fruit is first bruised in a mill, and then pressed: the first which flows is termed virgin oil; after obtaining which the marc is broken up, moistened with hot water, and again submitted to the press to procure an inferior oil. The oil is left for a considerable time, to enable it to deposit the feculencies, before it is ready for exportation or for use. Good olive oil is of a pale straw-yellow colour, perfectly inodorous and tasteless. There are several kinds in the market: that which comes from Provence is the best, next to it that from Florence; it is imported in flasks. Lucca and Genoa oils are also good; but the greatest part of the olive oil brought into England is the production of Naples and Sicily, and known by the name Gallipoli oil. Olive oil is used both dietetically and medicinally. It is superior to butter for many purposes of cookery for which the latter is employed.

OLD RED SANDSTONE. See GEOLOGY.

OLEANDER. (*Nerium* from *neros*, humid; alluding to the habitat of the plants.) This is a genus of noble evergreen shrubs, of easy culture, and flowering freely the greater part of the year. *N. Oleander* and its varieties bear forcing remarkably well; and although treated as green-house plants, yet they will not flower well unless they are kept in the stove. They grow well in any rich light soils, and young cuttings root in any soil if kept moist. The leaves of *N.*

portant genus of plants, on account of the oil, &c., which is obtained chiefly from the *O. europæa.* It is an evergreen small tree, with lanceolate leaves, of a deep green on the upper, and nearly white or hoary on the under surface. The flowers are small and white. The fruit is an elliptical drupe, of a bluish-purple colour when ripe. The tree lives to an extreme old age, and continues to bear good olives. It is also much admired for the fragrance of its flowers, which render it worthy a place in every green-house collection. They grow well in loam and peat; ripened cuttings root readily in sand, under a glass. They may also be increased by grafting on the common privet. The unripe fruit of the olive, preserved in salt and water, is a well-known article for the dessert. (*Paxton's Bot. Dict.*; *Phillips's Fruits*, p. 259.) See Oils.

OMY. A provincial term employed to signify mellow, when spoken of land. It is often written *oamy*.

ONIONS. (*Allium cepa.* Derivation uncertain; probably from αγλιθες, a head of garlic, and *cepa* from *caput*, a head, on account of the form of the bulb.) Of this genus, there are eight indviduals that demand the gardener's care.

They all require a rich friable soil on a dry substratum; a situation enjoying the full influence of the sun, and entirely free from trees, which are very inimical to them, especially to those which have to stand the winter. If the soil be poor, or exhausted, abundance of dung should be applied in the preceding autumn or winter, and the ground thrown into ridges. By these means it becomes well decomposed and incorporated with the soil; for rank unreduced dung is

when as much as
and, without diggi
in, and covered wit
By this managemen
crops which before
by the maggot. (
vol. ii. p. 292.) On
as those to stand
grown on light poo
first to be small in
not growing so lux
winter better.

There are fourt
this vegetable, as a
tion given by Mr
to the Horticultu
(*Trans. Hort. Soc.*
376.)

1. Silver-skinne
skinned. 3. True
5. Strasburg. 6.
James's keeping o
Yellow. 11. Bloo
Two-bladed. 14.

The onion is rais
be sown for the firs
close of February,
otherwise only a s
dry situation. The
must be sown duri
in mind that the cl
preferred, for the e
the finer will be the
even be inserted as
April, and, at its
draw young in sum
to pickle; again in
gust for salads in
the last week of A
tember, to stand th

o compensate. The beds should
by narrow alleys into portions
feet wide, for the convenience of
In about six weeks after sow-
nts will be of sufficient size to
st thinning and small hoeing, by
are to be set out about two
t: if this is performed in dry
will keep the beds free of weeds
ks longer, when they must be
ond time, and thinned to four
; and now, where they have failed,
ies may be filled up by trans-
ne of those thinned out into the
best time for doing this is in the
l water must be given for several
ights. In transplanting, the root
be inserted, and no part of the
; for there is very good reason
that naturally the bulb grows
n the surface, and that growing
mould is a great cause of their
well. After the lapse of an-
they must be thoroughly gone
last time, the weeds eradicated,
ts thinned to six inches asunder:
ey in general only require to be
asionally by hand; they must,
e kept completely free from
the stirring of the surface which
cts is very beneficial. In order
heir running too much to blade,
practice early in July, before the
to a yellow hue, to bend the
flat upon the bed, which not
nts the rapid growth of the
auses the bulbs to become much
they otherwise would be. The
l be made about two inches up

e close of August the onions will
l at their full growth, which may
by the withering of the foliage,
nking of the necks, and by the
hich they may be pulled up. As
e changes appear, they must be
e bed being frequently looked
f the whole crop is waited for,
lest, especially in moist seasons,
n to strike root. They should
on mats, &c., in the sun, fre-
ned, and removed under shelter
n two or three weeks, when the
lades are perfectly withered and
isture, and the bulbs become
re fit for storing, being housed
ther, and carefully preserved
ng: previous to doing this, all
refuse must be removed from
ese are apt to induce decay, and
gion to all near them; to pre-
much as possible, all faulty ones
jected: in the store-house they
must be laid as thin as may be, and looked over at least once a month. Notwithstanding every precaution, many will decay, and more sprout, especially in mild winters; therefore, to preserve some for late use, it is useful to sear the roots and the summits with a hot iron, care being taken not to scorch the bulb.

For the winter standing crop the only additional directions necessary are, to tread in the seed regularly before raking, if the soil, as it ought to be, is dry and light. They must be kept constantly clear of weeds, as well as of the fallen leaves of trees, which cause them to spindle and become weak, but they need not be thinned, as they serve as protections for each other. Early in spring they are to be weeded, and, as may be necessary, transplanted for bulbing. There are several modes of cultivation lately introduced or revived, which produce onions of superior size and goodness. The great obstacle to the production of fine onions in this country is the want of a sufficient continuance of warm weather; or, at least, the inclemency of the early part of the year prevents the insertion of the seed until so late, that the most genial season to vegetation passes away whilst the plants are in their infancy; it is the obviating this unfavourable circumstance that causes the superiority of the several plans hereafter detailed.

It is a practice that originated in America, and which has met with the decided approval of Mr. Knight and others (*Trans. Hort. Soc. Lond.* vol. i. p. 157., vol. iii. p. 404.), to sow in May, to cultivate the plants as in the other crops; and, in October, the bulbs, being of the size of nuts, are to be taken up, dried, and housed, as directed for the full-grown bulbs. About the middle of the following March, they must be planted out in rows six inches apart each way, and afterwards cultivated in the same manner as the other crops. If sown earlier than May, they run to seed when transplanted. Another mode nearly as efficacious, and which, I understand, has been practised for a great length of time in the south of Essex, is to sow in the latter part of August, to stand the winter, and in March, early or late, according to the forward growth of the seedlings, to be planted out in rows at the before directed distance, and cultivated as usual.

In Portugal they sow in a moderate hotbed during November or December, in a warm situation, with a few inches of mould upon it; and the plants are protected from frost by hoops and mats; in April or May, when of the size of a swan's quill, they are transplanted into a light rich loam, well dipping the root into a puddle, consisting of one part soot and three parts earth, mixed with water; the work being performed in moist weather." (*Mem. Caled. Hort. Soc.* vol. i. p. 112.) The puddle, as is observed by Mr. Sinclair, can be of no other use than to assist the rooting of the plants.

To obtain seed, some old onions must be planted during February, or early in March. The finest and firmest bulbs being selected, and planted in rows ten inches apart each way, either in drills or by a blunt-ended dibble, the soil to be rather poorer, if it differs at all from that in which they are cultivated for bulbing. They must be buried so deep that the mould just covers the crown. Early in spring their leaves will appear. If grown in large quantities a path must be left two feet wide between every three or four rows, to allow the necessary cultivation. They must be kept thoroughly clear of weeds, and when in flower have stakes driven at intervals of five or six feet on each side of every two rows, to which a string is to be fastened throughout the whole length, a few inches below the heads, to serve as a support, and prevent their being broken down. The seeds are ripe in August, which is intimated by the husks becoming brownish: the heads must then be immediately cut, otherwise the receptacles will open and shed their contents. Being spread on cloths in the sun, during the day, and taken under cover every night and during inclement weather, they soon become perfectly dry, when the seed may be rubbed out, cleaned of the chaff, and, after remaining another day or two, finally stored. It is of the utmost consequence to employ seed of not more

vol iii. p. 305.) One va
than the other, and thi
soon as ripe.
Both varieties are
offsets of the root, of
those are employed wh
produces on the summ
seldom do more than
first year, but are pr
also occurs if very sm
are employed. (*Mem*
vol. iii. p. 216.)
They may be plante
November, or as early
season will allow, but
In the west of Engla
genial climate, they pl
and take up on the lo
Hort. Soc. Lond. vol. iii
either to be inserted in
dibble eight inches a
buried entirely, but t
just level with the s
gardener at Arundel C
the sets on the surface,
leaf mould, rotten dung
post. The beds they
better not more than fo
convenience of cultivati
The only cultivation
them clear of weeds. T
ing the mould over th
have grown up is un
doing the bulbs are blan
ripening perfectly, on
depends. So far from
Mr. Wedgewood of Bet
earth always to be cle
the ring whence the fi
as the leaves have att
and begin to be brown

e before they attain perfect ma-
ch is demonstrated by the same
as were mentioned in speaking of
(*Mem. Caled. Hort. Soc.* vol. i.

, THE WELSH, or CIBOULE.
rennial, which never forms a bulb,
n annually to be drawn young
, &c.; on account of its strong
greatly inferior to the common
his purpose, but from its extreme
n withstanding the severest frost,
cultivated with advantage as a
nding crop for spring use. In
varieties are in cultivation, the
he red; the first of which is the one
se here. As it may be sown at all
ommon with the onion, and is
ultivated, except that it may be
er and only thinned as wanted,
ns given for that vegetable will
he blade usually dies away com-
inter, but fresh ones are thrown
n February or March.

n seed, some of the roots must be
in March, six or eight inches
The first autumn they will pro-
ittle seed; in the second and
ver, it will be produced abun-
care is taken to part and trans-
oots every two or three years,
be multiplied, and will remain
for many years, and afford much
than that from one year old
ere is good reason for conclud-
T. Milne, of Fulham, ingeniously
at by a confusion of names, aris-
imilarity of appearance, this ve-
the true scallion of Miller and
lst the hollow leek of Wales is
elsh onion; for the description
as given by Miller accords ex-
hat of the Welsh onion; and as
it as a distinct variety, we are
the dilemma of receiving this
or considering the variety as
m Miller's known accuracy it is
to consider that he was deceived.
all onions that have refused to
formed lengthened necks and
les in spring and summer, are
ons.

, THE TREE, or CANADA.
nadense.) This, which is a very
nnial species, like the ciboule, is
bulbous root, but throws out
ffsets. Its top bulbs are greatly
pickling, being considered of
vour to the common onion for
e, as well as others in which that
nployed.

agated both by the root offsets,
be planted during March and April, or in September and October, and from the top bulbs, which are best planted in spring, and not before the latter end of April. The old roots are best to plant again for a crop of bulbs, as they are most certain to run to stems. If the bulbs be planted earlier than as above directed, they are apt to push up the same season, and exhaust themselves without producing either good offsets or bulbs; but on the other hand, by planting the old roots in the previous autumn, or early in the spring, they will produce good bulbs the same year. (*Mem. Caled. Hort. Soc.* vol. i. p. 350.) They must be inserted in rows twelve inches asunder, in holes six inches apart and two deep, a single offset or bulb being put in each. Those planted in autumn will shoot forth leaves early in the spring, and have their bulbs fit for gathering in June or the beginning of July; those inserted in the spring will make their appearance later, and will be in production at the close of July or early in August; they must not, however, be gathered for keeping or planting until the stalks decay, at which time, or in the spring also, if only of one year's growth, the roots may be taken up and parted if required for planting; but when of two or three years' continuance, they must at all events be reduced in size, otherwise they grow in too large and sprindling bunches; but the best plan is to make a fresh plantation annually with single offsets. The only cultivation necessary is to keep them clear of weeds; and when the stems run up, to give them the support of stakes.

The bulbs, when gathered, must be gradually and carefully dried in a shady place; and if kept perfectly free from moisture, will continue in good state until the following May. (*G. W. Johnson.*)

ON-STAND. A provincial term applied to the rent paid by the out-going to the in-coming tenant, for such portions of ground as the former has rightly cropped before his leaving the farm. See Custom.

OOLITE. A granular variety of carbonate of lime, frequently called *roe-stone.* The frequency of the occurrence of this particular form of limestone, in a great series of deposits, lying between the subcretaceous formations and the red sandstone, has caused English geologists to give the whole series the name of oolite. It is largely developed in England and France.

OPEN. A term frequently applied to cows or heifers, signifying that they are not in calf.

OPEN CUTS. Such drains or gutters as are made in land by the spade, and left without being covered in. They are used in draining lands in particular cases. Open and in the occupation of different individuals, or under different crops. In former times only those parts of a farm which lay around the farm-yard were inclosed, while the more distant parts were open, and called open fields, or out fields. See COMMONS.

OPHTHALMIA. See SHEEP, DISEASES OF.

ORACHE. (*Atriplex;* from *atir*, black.) A genus of herbaceous or shrubby straggling plants of little beauty, and the simplest culture and propagation. There are several native species, viz.: 1. Shrubby orache, or sea purslane (*A. portulacoides*); 2. Frosted sea orache (*A. laciniata*); 3. Spreading halberd-leaved orache (*A. patula*); 4. Spreading narrow-leaved orache (*A. angustifolia*); 5. Upright spear-leaved orache (*A. erecta*); 6. Grass-leaved sea orache (*A. littoralis*); 7. Stalked sea orache (*A. pedunculata*). The first is a shrub growing very common on the muddy sea-coast, bearing spikes of reddish-green mealy flowers. The whole plant abounds with fossil alkali, carbonate of soda. Its silvery glaucous hue is remarkable, and not inelegant. The other species are annuals, with herbaceous, mostly upright, stems. (*Smith's Eng. Flor.* vol. iv. p. 255.)

A. hortensis is cooked and eaten in the same manner as spinach, to which it is much preferred by many persons, although it belongs to a tribe whose wholesomeness is very suspicious. It flourishes best in a rich moist soil, and in an open compartment. Those, however, of the autumn sowing, require a rather drier soil. It is propagated by seed, which may be sown about the end of September, soon after it is ripe, and again in the spring, for succession; the sowing to be

August, when the pla
and when perfectly d
(*G. W. Johnson's Kit*

ORANGE-TREE
to which the orange
of ornamental species
from three to fifteen
are on more or les
footstalks; the flower
odoriferous, existing
the fruit, which is to
quire description. O
in a good loamy soil,
of rotten dung. They
room, nor too much
ing state. The differ
by budding or grafti
which, as soon as ope
placed in some close
dung heat. Stocks
raised from any oran
are sometimes raised
case they produce f
plants. (*Paxton's*
Fruits, p. 266.) The
tree yield, by distillat
oil, known by the n
The fruit of the bign
makes one of the be
be eaten, namely, Sc
unripe fruit is use
liquor called curaço
wholesome, and a
fevers.

ORCHARD. (Gr.)
inclosure devoted to
trees. The most pr
generally such as are
open to the south or
tered from the north,

ediately under the surface, by
are sooner called into action by
ring, and sooner thrown into a
e by cold in autumn. The prin-
s grown in orchards of this de-
n Great Britain are the apple,
the plum, and the cherry; and
wheat can be ripened in the
se fruits will arrive at perfection
ies such as we have mentioned.

DACEÆ. (*Orchis* one of the
A natural order of herbaceous
inhabiting all parts of the world,
those climates situated upon the
e frozen zone, or remarkable for
eding dryness. They are well
the singular form of their flowers.
em grow in the earth, others in-
s and the branches of trees, and a
to be true parasites. They all
the class *Gynandria* of Linnæus,
very agreeably scented, and
produce an aromatic fleshy fruit,
case of vanilla, which contains a
tity of benzoic acid. The nutri-
stance called *salep* is prepared
amylaceous tubers of the male
merely drying them in ovens.
me semi-pellucid, and when pul-
rm a mucilage with boiling water.
usually grown in the frame or
and thrive best in a mixture of
, and chalk broken small. They
e increased from seeds.

be quite impossible to describe
ters of each species. I must,
content myself with a bare enu-
f the different indigenous species.
rfly orchis (*O. bifolia*). 2. Py-
chis (*O. pyramidalis*). 3. Green-
eadow orchis (*O. Moris*). 4.
le orchis (*O. mascula*). 5. Dwarf
ed orchis (*O. ustulata*). 6. Great
ged orchis (*O. fusca*). 7. Mili-
(*O. militaris*). 8. Monkey or-
ephrosantos). 9. Lizard orchis
). 10. White cluster-rooted or-
bida). 11. Frog orchis (*O. vi-*
. Marsh palmate orchis (*O. lati-*
3. Spotted palmate orchis (*O.*
14. Aromatic palmate orchis
ia). Most of the native species
inhabit meadows and pastures,
chalky downs. The roots are
erous, fleshy; leaves chiefly ra-
wers numerous, spiked, purple,
whitish, in some highly fra-
mith's Eng. Flor. vol. iv. pp. 8—

S, THE BOG. See Bog-Or-

S, THE INSECT. See Insect-

ORCHIS, THE MAN. See Man-Orchis.

ORCHIS, THE MUSK. See Musk-Orchis.

ORE WEED. See Kelp; Sea Weed; Green Manures, &c.

ORGANIC CHEMISTRY, is that portion of the science of chemistry which relates to animal and vegetable substances. "The object of organic chemistry," says M. Liebig, in the able work on this subject translated by Mr. Playfair, "is to discover the chemical conditions which are essential to the life and perfect development of animals and vegetables, and generally to investigate all those processes of organic nature which are due to the operation of chemical laws." In this article I shall confine myself principally to the results obtained by the analysis of vegetable and animal substances. Under the heads Atmosphere, Earths, Gases, Temperature, Water, &c. will be found an account of their respective uses to vegetation.

There is no branch of chemistry more difficult, and yet more interesting, than that of organic chemistry; for in this the chemist finds, added to his ordinary difficulties, and to his many sources of uncertainty, the presence, and very often the controlling influence, of a living principle, which in some instances seem to neutralise and overcome even the most powerful chemical affinities. "I would warn, therefore, the reader," to use the words of Dr. Thomson, (*Chem.* vol. iv. p. 303.), "not to expect complete information in this branch of science: the wonders of the vegetable creation are still but very imperfectly explored; many of the organs of plants are too minute for our senses, and scarcely a single process can be completely traced. The multiplicity of operations continually going on in vegetables at the same time, and the variety of different and even opposite substances formed out of the same ingredients, and almost at the same time, astonish and confound us; the order, too, and the skill with which every thing is conducted, are no less surprising; no two operations clash; there is no discord, no irregularity, no disturbance; every object is gained, and every thing is ready for its intended purpose. This is too wonderful to escape our observation, and of too much importance not to claim our attention. Many philosophers, accordingly, distinguished equally by their industry and sagacity, have dedicated a great part of their lives to the study of vegetation. But hitherto their success has not been equal to their exertions. No person has been able to detect the formative *agent* in plants, nor even the principle matter. He will remember, for instance, that the *living* substance flourishes in the very same position, and under the very same circumstances, where, when *dead*, it rapidly putrefies. Every plant growing on the soil, or on a dunghill, testifies to the fact. The living plants which *flourish* in the same solution of a salt in which they are *dissolved*, when dead, prove the same thing in another way; and these proofs may be multiplied very easily on very slight reflection. And as regards animal life, the very same results are obtained; the very gastric juice which the living stomach holds for an age, dissolves that stomach when dead. Animals can sustain a temperature considerably greater than that where the putrefaction of animal substances rapidly proceeds; and men even can exist for a considerable period in an atmosphere heated considerably above the boiling point of water.

In this sketch of organic chemistry I shall principally confine myself to the vegetable branch of it, and briefly follow the progress of a plant through its several stages of germination, its growth, and its decay, leaving the reader to refer to other heads of this work for the information he may need.

Germination. That all plants arise from seeds is now, I believe, undisputed by every person, notwithstanding the very many puzzling phenomena which occasionally occur; such as the profusion of some of the grasses, occasioned by the application of certain manures. Thus, "by dressing certain soils with bones and wood ashes, the

is known to every on
no moisture, there can
This, however, varies acc
of the plant. Some of
stance, will germinate
places where the supp
others, such as the water
immersed in water. Th
is grown in swamps ab
which would be destruc
crops of the English fa
meadow grasses of our ov
the same position. Th
power of decomposing
ing its hydrogen in the
substances. Water is co
and oxygen, and these
ways essential ingredien

Heat is also necessary
few plants will vegetate
point of water; neverth
perature does not destr
every farmer is aware th
vegetate after they hav
however, there is a
moisture on which eve
with the greatest adva
temperature peculiarly
growth of every plant.
and the honey-suckle,
ably produce their leav
other English plant has
viving influence of sprin

And again, if the s
with oxygen gas, the m
plies of moisture and h
it to germinate. Ray
vacuum of an air-pum

getate. Seeds have been buried
earth for centuries, and when,
they have been accidentally
n the surface, have vegetated.
son for believing that it is not the
spheric air, but only its oxygen,
sential to germination. In the
s of M. Saussure, the quantity of
sumed by various plants during
nation varied very considerably
Wheat and barley, weight for
sumed less oxygen than peas;
ss than beans and kidney beans.
consumed by wheat and barley
between $\frac{1}{1000}$th and $\frac{1}{2000}$th of
, while that consumed by beans
beans may amount to $\frac{1}{100}$th part
ght. (*Recherches*, 13.; *Thom-*
vol. iv. p. 308.) The oxygen
the seed is in all probability
ith the carbon of the plant, and
ing its germination, in the state
acid gas. This gas is composed
carbon and oxygen, in the pro-
6·12 parts of the former and
atter; and the quantity of it
exactly equal in amount to the
oxygen absorbed by the seed,
unite with the carbon of the
rm the carbonic acid gas, and a
ntity of carbon is always lost
during vegetation.

ce a plant has vegetated, its
eeds with more or less rapidity;
am aware of remain station-
, it cannot remain stationary,
hey increase in size, require a
arious substances as food, and
ation of the nature of this nu-
stitutes one of the most valuable
organic chemistry; for under
re included the assistance af-
lants by the *gases*, the *earths*,
er. In the examination of the
nts will also be illustrated the
questions of rotation, of fer-
of various other important
hich in this work will be found
under their respective heads;
e useless to repeat what I have
e length endeavoured to illus-
t the atmosphere yields its car-
s oxygen; the soil its silica,
d magnesia, with various saline
nd that water yields both hy-
oxygen for the service of the
ty well established by many valu-
ments which I have there given:
ossible to observe the results of
of a perfect plant without being
the number of its ingredients,
ing at once the probable sources
e it drew its supply. Take, for
instance, the analysis by M. Cadet of the solid matters or ashes of the common garlic. From 172 parts of these he obtained of

	Parts.
Potash	33·
Sulphate and muriate of potash	58·
Alumina	2·
Phosphate of lime	15·6
Oxide of iron	1·5
Magnesia	9·
Lime	14·
Silica	8·
	141·1

All these substances, there is little doubt, were absorbed by the plant from the soil in which it grew; but in the fresh or unburnt garlic these are combined with about eight times their weight of mucilage, albumen, sulphur, vegetable fibre, and water. Now the three first of these must have been formed during the growth of the plant, from either the atmosphere or from water: the first (the atmosphere) being composed of oxygen, nitrogen, and carbonic acid; and the latter (water) of hydrogen and oxygen. Mucilage was found by M. Berzelius to be composed of

	Parts.
Oxygen	51·306
Carbon	41·906
Hydrogen	6·788
	100·

Albumen contains, according to the analysis of MM. Gay Lussac and Thenard,

	Parts.
Carbon	52·883
Oxygen	28·872
Hydrogen	7·540
Nitrogen	15·705
	100·

The same excellent chemists have shown woody fibre to be composed of

	Parts.
Oxygen	42·25
Carbon	52·
Hydrogen	5·75
	100·

The chief vegetable matters of the garlic, therefore, the student will remark (and the same conclusion applies to other vegetables), are composed entirely of two or three chief ingredients. The composition of all plants is, in fact, much more similar than is commonly supposed. For instance, all the vegetable acids, such as vinegar (acetic acid), sugar, gum, starch, woody fibre, &c., are composed of three substances, viz., carbon, oxygen, and hydrogen, arranged in differ-

— All dead vegetable substances, when left to themselves, under favourable circumstances, speedily decay, or decompose, and are resolved into their constituents. This is commonly effected in two ways, either by fermentation or by putrefaction: to this last phenomenon several requisites are necessary; moisture must be present, and the temperature must not be below 32° of Fahrenheit: in fact, it proceeds with extreme slowness at a temperature below 45°. It is retarded in its progress by the absence of the atmospheric air, but its presence is not essential: when water, however, is entirely absent, putrefaction cannot proceed.

The disagreeable odour which is emitted during putrefaction is owing to the gaseous substances which are generated. Those plants which contain nitrogen emit ammonia: onions produce phosphuretted hydrogen. By all of them carbonic acid gas and carburetted hydrogen gas are emitted in considerable quantities. These gases, being, when presented to the roots and leaves of plants, exceedingly invigorating, are one of the causes of the increased luxuriance of all crops manured with green vegetable matters. When the putrefaction of the vegetable substance is at an end, the carbon, hydrogen, and oxygen, of which it is composed, are gone, and nothing remains but the earths and salts with which the purely vegetable matters were once combined in the plant. The ashes which are left when putrefaction ceases, are in fact nearly the same as those left after combustion. See Putrefaction.

Animal Substances. — The analysis of animal substances is attended with all the difficulties to which I have alluded as attendant

These are the chief
which most others are
the principal solid mat
is fibrin. The outer s
mals is composed of fr
of albumen. The soli
is chiefly composed of
Under the heads Ani
Bones, Gelatin, &c.
all the animal chemistr
ing and rural affairs,
quainted.

ORIOLE, THE
galbula.) This bird
visiter to Britain, an
being now and then obt
is known of its habits
general colour of the
neck, and body is bri
the wings, and portion
black; legs and toes, le
length of the bird is n
(*Yarroll's Brit. Birds*

ORLEANS PLU
some but an indiffere
its name from a distr
more cultivated than
which is not only the
also the most wholeso
See Plum.

ORNITHOLOGY.
which teaches the na
rangement of birds.
tish birds, under their

ORPINE, or LIVE-
phium, from *sedere*, to
are found growing upo
and roofs of houses.)
plant, with smooth her

summer visiter to this country.
food is grain and seeds when
h insects during the early part
n. When fattened, these birds
teemed by epicures, and fetch a
the market. The whole length
is six inches and one quarter.
ale in summer has the head and
iish grey; chin, throat, and up-
the breast yellowish green; the
acter of the other part of the
rufous brown. (*Yarrell's Brit.*
. p. 455.) See BLACK-HEADED
IRL BUNTING, LAPLAND BUNT-
UNTING, &c.

The name given to various
illow or *salix*, chiefly employed
aking. Although, under the
v and willow, I shall notice
species of this genus, it may be
ibe in this place, a few of those
more generally known under
ier. Osiers differ from sallows
g, straight, flexible and mostly
thin, generally sessile germens,
d styles and stigmas. The osier
ly and useful hedge for exclud-
us winds; and as it flourishes
ions, is frequently planted with
event the banks of rivers being
y by the force of the current.
ivided into two classes, the first
y their blunt and downy or
, which in the other are more
oth, and green, resembling the

non osier (*S. viminalis*) is one
abundant species. This tree is
ng in wet meadows, osier-holts,
rivers, and other moist situ-
e branches are straight, erect,
very long and slender, round,
wny when young, with fine
Leaves on short foot-stalks,
ght about a span long, and half
, linear, inclining to lanceolate,
per-pointed, entire, wavy; the
reen, smooth, even; the under
and silky. Catkins numerous,
drical, full an inch long, with
l lanceolate bractes. The value
non osier for various kinds of
is universally known. There
much esteemed, called the vel-
which no external difference is
but the twigs are said to be
There are also various species
varieties comprehended under
osiers, some of which, having
es, are noticed under the articles
WILLOW.
-leaved osier (*S. Smithiana*) is
and growing in meadows and
osier grounds, the branches of which are brittle and unfit for basket-work. It is therefore important for cultivators of osiers to distinguish carefully between this and the velvet osier; for while the latter is, for some kinds of work, greatly esteemed, the silky-leaved osier proves of no utility.

In *S. Smithiana* the leaves are lanceolate, pointed, slightly wavy, minutely toothed, delicately soft, and scarce visibly downy above; whitish and silky beneath. Stipules crescent-shaped, minute; catkins ovate; germen stalked; style shorter than the linear, deeply divided stigmas.

The auricled osier (*S. stipularis*) is a common species in osier-holts, hedges, and woods, and is easily known at first sight by its coarse tall habit, and conspicuous stipules, but not worthy of cultivation for any economical purpose. The twigs are upright, tall, soft, and downy, of a pale reddish-brown, brittle, and of little or no use as an osier. Leaves almost upright, numerous, about a span long, lanceolate, pointed, slightly wavy, obscurely crenate; soft and nearly naked above, white and downy beneath. Footstalks stout, half or three quarters of an inch long. Stipules half heart-shaped, stalked, very large. Nectary cylindrical. Germen ovate, nearly sessile, as well as the linear, undivided stigmas. Catkins much earlier than the foliage.

The fine basket osier (*S. Forbiana*) is a shrub grown in the meadows and osier-holts of the eastern part of England. The stem is erect, bushy, with upright, slender, smooth twigs, very flexible and tough, of a greyish yellow, not purple hue, highly esteemed and much cultivated for the finer kinds of basket-work. Leaves all alternate, with small stipules, lanceolate-oblong with shallow serratures, smooth; rounded at the base; upper surface of a deep grass green, glaucous beneath. Stamen one. Style nearly as long as the linear, divided stigmas.

Green-leaved osier (*S. rubra*). This is a small tree, with long, upright, smooth, greyish or purplish, more frequently tawny branches, very tough and pliant, this being one of the most valuable osiers when cut down annually. The very long and narrow leaves of this rather rare species agree in shape with the common osier (*S. viminalis*), but wants its dense white pubescence. The stamens are combined below. Leaves linear-lanceolate, acute, smooth, with shallow serratures, of a fine grass green and smooth on both sides, being downy when young only. Style short, with two ovate, thick, undivided stigmas.

In the fens of the east of England many holts (as they are provincially called), or most common, or with hedges. The proper season for making them (they seldom fail of growing at any time), is from the fall of the leaf till very late in the spring. (*Smith's Eng. Flor.* vol. iv. pp. 191. 228—230.; *Loudon's Arb. Brit.* p. 1490.)

OSIER, GOLDEN, or YELLOW WILLOW. See Willow.

OSKIN. A provincial word used to signify an ox-gang; or a quantity or share of common field land, proportioned probably to the size of the fields and number of messuages in the given township, at the time the fields were set out or appropriated among the houses.

OSMUND-ROYAL. (*Osmunda regalis;* from *Osmunda*, one of the names of Thor, a Celtic deity.) This is an ornamental species of fern, growing wild in deep watery bogs, woods, and meadows, but not very common. The root is tuberous, hard, scaly, beset with numerous fibres, and having in the centre a whitish core, which some persons, according to Gerarde, have named the heart of Osmund the waterman. The fronds are several, erect, two or three feet high, doubly pinnate, smooth, bright green; the primary divisions from six to ten, nearly opposite, hardly a span long; leaflets more numerous, oblong, nearly entire, with one rib and numerous transverse veins; dilated and somewhat auricled at the base. Clusters panicled, terminal, of several light-brown veins. Capsules appearing in June and July. (*Smith's Eng. Flor.* vol. iv. p. 357.)

OSPREY. (*Pandion haliæëtus.*) The osprey or fishing-hawk, from its habit of feeding almost exclusively on fish, must be looked for near the sea-shore, or about rivers and large lakes, which may be ex-

OTTER. An an
well adapted for its
strong, flexible, palm
as oars to propel it th
by its long and stron
powerful rudder, and
change its course wi
pidity. The otter us
most of the British
the increase of pop
intermitting hostility
of the valuable fish
have called down u
thinned its numbers,
it from many of the
formerly common.

The otter selects fo
venient excavation, c
hanging roots of the t
the banks of rivers, or
The female goes wi
and produces from
March or April. The
grown male is from
pounds. The fur of t
fine and close. It co
hair; the longer and
which are greyish at
brown at the point, co
fine and soft fur of a
brown at the tip. T
under part of the bod
inner parts of the legs
throughout.

OURTS. A provi
the fodder left by ca
written *oughts*.

OUSEL. A name
blackbird. The prope
torquata) is a summer

brown; the length one inch two lines,
ten lines in breadth. Its food consists
ails, insects, fruit, and strawberries,
e the birds leave us for the winter,
ivy berries when they return in the
g. The length of an adult male is
eleven inches. The general colour
e plumage is nearly uniform brown-
lack, except across the chest, where
is a broad crescentic stripe of pure
. (*Yarrell's Brit. Birds*, vol. i. p. 206.)

T-HOLLING. A term provincially
d to the shovelling out a ditch for
e of the manure it contains.

T-HOUSE. Strictly any building
belongs to, or adjoins the dwelling-
. But barns, sheds, stables, and other
ng offices are frequently called out-
s.

ZE. A deposit made by the sea.

EN. A domestic furnace used for
bread, pies, tarts, &c. Ovens are
lly constructed of brick-work in a
rcular form, with a very low roof,
e bottom of which is laid with stone:
front is a small aperture and door,
shutting of which the heat is con-
vhile the bread is baking. They are
heated by means of dry faggots,
&c. As these ovens, however, are
lculated for small families, on account
quantity of fuel they consume, others
een contrived, on a more diminutive
these are usually formed of cast or
red iron, and may be heated by the
fire which serves for the cooking of
provisions; but for baking bread these
are inferior to the brick ovens.

ERLAND FARM. A provincial
usually applied to a parcel of land
t any building or house attached

ER-REACH. See CLICKING.

ER-YEARS. A country term ap-
to such bullocks as are not finished
ing at three years old when home-
, or the first winter after buying in;
ept through the following summer to
ished the next winter.

IPOSITOR. (Lat. *ovum*, an egg;
ono, I place.) In entomology, is the
ment by which an insect conducts its
to their appropriate nidus, and often
a way to it; the same instrument is
ne genera used as a weapon of offence,
ce it is called the "aculeus." In the
nsect, and some others, the ovipositor
nished at its root with a sac contain-
n acrid secretion, which is deposited
wound made by the ovipositor at the
time as the eggs.

VCE. A provincial name for the ox,
ne places.

OWER-GATE. A local phrase signifying a stile place, or imperfect gap in a hedge; and also a stepping-place over a brook.

OWLING. In law, so called from its being generally committed during the night. An offence consisting in conveying sheep or wool to the sea side, in order to export them clandestinely. This offence was formerly capital, particularly if the offender neglected to surrender after proclamation made for that purpose.

OWLS. A tribe of raptorial birds, including those which fly by night, and have the eyes directed forwards. The owl, although frequently held in disrepute, should never be destroyed by the farmer, to whom he is a great friend; for his diet consists chiefly of field mice, of which he consumes large numbers. The owls are usually arranged into two principal groups: one in which all the species exhibit two tufts of feathers on the head, which have been called horns, ears, and egrets; in the second group, the heads are smooth and round, without tufts. The principal species of British owls are: the eagle owl (*Bubo maximus*), the scops-eared owl (*Scops aldrovandi*), the long-eared owl (*Otus vulgaris*), the short-eared owl (*Otus brachyotus*), the white or barn owl (*Strix flammea*), the tawny owl (*Syrnium aluco*), the snowy owl (*Surnia nyctea*), the hawk owl (*Surnia funerea*), the little owl (*Noctua passerina*), and Tengmalm's owl (*Noctua Tengmalmi*). The last two can only be considered occasional visiters to this country.

As I have already noticed under the head BARN OWL the most common species of owl, it is not necessary to go into any lengthened description of the habits and appearance of these well known birds. Those who wish to study the specific and generic distinctions of the different kinds of owls may consult *Yarrell's British Birds*, vol. i.

OX. Synonymous with the generic name *Bos*; in a more restricted sense, it signifies the castrated male of the domestic variety. See CATTLE.

OXALIC ACID. See ACIDS.

OX-BOOSE. Provincially, a stall or place where oxen stand in the winter to be fed or fattened.

OX-EYE. (*Chrysanthemum*, from *chrysos*, gold, and *anthemum*, a flower; alluding to the colour of some of the flowers.) The great white ox-eye maudlin-wort, or moor daisy (*C. Leucanthemum*), is very common in our pastures, fields, and by way-sides. The flavour of the whole plant is herbaceous, slightly, not pleasantly, aromatic. Its properties are not important; like many noticed under the head Corn Marigold.

OX-FEET. A term applied to the feet of horses when the horn of the hind feet cleaves just in the middle of the fore part of the hoof, from the coronet to the shoe: they are not common, but very troublesome.

OX-GANG. (Germ. *ochs*, an ox, and *gang*, a walk.) A quantity of land measuring fifteen acres, being as much as a single ox was supposed to be capable of ploughing in a year or season. It is sometimes written *Ox-gate*. The ox-gang was contracted or expanded, according to the quality of the land; forty acres constituting the maximum and six the minimum of the measure.

OX-HARROW. A term applied to a very large sort of harrow, called in some counties a drag.

OX-LIP. See Cowslip.

OX-TONGUE. (*Picris.*) Of this genus of plants there are two indigenous species.

1. Bristly ox-tongue (*P. echioides*), an annual, growing about hedges, the borders of fields, and ground newly cleared, on a clay soil. The root is tapering, and, like the whole of the plant, abounds with a somewhat milky, extremely bitter juice. The herbage is shining green, beset with rigid very pungent bristles, each springing from a white tubercle, or wart. The stem is round, furrowed, solid, branched, leafy, two or three feet high. The lower leaves lanceolate; upper heart-shaped, clasping the stem. Flowers an inch broad, of a bright golden yellow. Outer calyx of five broad prickly scales.

2. Hawkweed ox-tongue (*P. hieracioides*). This is a biennial species, of which the herbage is dark green, rough, with short, coarse, not bristly or pungent hairs. Stem three

inches of this gas w
(*Davy's Elem. of*
Gases, their Uses to

OYSTER. (Lat.
belonging to a num
terized by an inequ
of two irregular lame
the convex or under
piles, or to the shell
Vast beds of oysters
and attended to wi
estuary of the Tham
calities, where the ter
is somewhat raised b
fresh water, in whi
Certain restrictions a
forced in reference t
the metropolis, in ord
tiplication and rearin
valve. Oysters diffe
ing to the nature of
best British oysters
the worst near Live
Stealing of.

OYSTER-CATCH
(*Hæmatopus ostraleg*
well known on the sh
is also common and i
it appears to prefer
inlets, bounded with
favourable localities
the various mollusca
cipally subsists; the
truncated wedge-like
bly adapted for inser
portions of a bivalve
said to be able to de
surface of a rock wit
Its food appears to b
rally, worms, and m
posits its eggs usuall

:. The beak is three inches long.
British Birds, vol. ii. p. 432.)

R SHELLS. As a manure, the
hed oyster shells has never been
'e in this country as in Ireland;
neglect several causes have con-
They are composed principally
te of lime, chalk, and a mem-
bstance; are in consequence not
aluable as crushed bones, which
: phosphate of lime; are not to
d but at particular seasons of
and, unless pulverised, are not
quick in their effects to en-
e farmer to use them unbroken.
intry they have been, therefore,
oyed; even in those districts,
clay and sand formation, where,
sence of carbonate of lime in the
lcareous matters of the oyster
d be a very valuable addition.
, which is almost entirely de-
ialk, the use of the broken oys-
is been more considerable than
try; and in Dublin, the parish
in hard seasons, are glad to set
s to work to collect and break
hich are thrown away as rub-
I am informed that the money
: the powdered shells affords a
ble remuneration for the labour
their preparation. The mother-
th which the oyster shells are
ilar in composition to the outer
ist. This has been analysed by
uillot, who found in 100 parts
f-pearl, —

		Parts.
ate of lime (chalk)	-	66
ane - -	-	34
		100

1 oyster shells should always, if
: drilled in with the seed; for
oming into close contact with
all the volatile and earthy con-
' the decomposing shell are ab-
its roots and leaves with the
diness, from being placed more
y in contact with them. In this
ave been found to answer very
e light sandy soils of Norfolk,
ed in with the turnip seed; as
en from the following account
ikie, in a letter to Sir John
ited Sept. 18, 1818: — " Oyster
ded or bruised (without having
ed) were first used upon Mr.
as a manure in the year 1816.
ner of that year, the experiment
pon a hungry, light, sandy soil,
been cleaned for turnips. The
dust, or powder, was drilled in the usual way, upon twenty-seven inch ridges, at the rate of forty bushels per acre (without any other manure), was slightly covered with earth, and the turnip seed sown upon it. Another part of the same field, quality of land equal, was manured with farm-yard dung, at the rate of eight tons per acre, put into the same sized ridges, and sown with turnip seed as before described, no other manure having been applied. The turnips proved a good crop on both pieces; nor was there any perceptible difference in the bulk, but the produce was not weighed. The turnips were all eaten upon the ground by sheep; and the succeeding crop, barley, was good on both, and apparently equal, but the produce was not thrashed separate. The seeds or layer crop of clover, in the present season, 1818, is a good plant, and appears equally so. In this experiment, so far as it goes, it appears that forty bushels of oyster shell powder are equal in virtue, as a manure, to eight tons of farm-yard dung; at least for the purpose for which it was applied.

" In the autumn of 1816, powdered oyster shells were tried as a manure for wheat, in competition with rape cake powdered. The experiment was upon a one year's clover layer; the wheat sown after one ploughing; the soil a kind, light, gravelly loam. Oyster shell powder, at the rate of four cwt. per acre, was drilled with the wheat seed on one part of the field; and on another part of the same quality, rape cake dust was drilled with the wheat at the same rate per acre as the shell powder; no other manure was applied to either part. The crop of wheat was good, nor was there any perceptible difference *upon the ground*; but the produce was not thrashed separate. A similar experiment was tried upon the same wheat field; the manure applied at spring; the operation as follows: the wheat seed was sown without any manure, in the autumn of 1816, and in the spring of 1817 rape cake dust, at the rate of four cwt. per acre, was drilled between the rows of wheat; at the same time an equal weight of shell powder was applied in like manner to another part of the field. The result of this was similar to the autumn experiment, viz. there did not appear to be any difference in the crop produced upon the shell manure from that on the rape cake. The field on which these experiments were tried is now in turnips, a good crop, and exhibits no difference where the manure, as before stated, had been applied for the wheat crop. These experiments are satisfactory, so far as they go, but certainly not conclusive; because the produce was in no one instance either weighed or measured. This I very ing a heavy iron roller over them when spread upon a stone, or hard-burned brick, or edge floor. I give it as an opinion, that oyster shell manure is likely to answer for gardens, particularly to rake in with onions and other small seed. I also think it may prove beneficial as a top-dressing for grass plants, to destroy moss, and prevent worms from casting. If these ideas are well founded, there will be no difficulty in disposing of any quantity of this manure amongst the gardeners and the citizens, for their grass plats, in the vicinity of London." (*From the Edinburgh Farmer's Magazine*, vol. xix. p. 404.)

Mr. Livingston of New York says (*Annals of Agr.* vol. xx. p. 87.), "In April, 1791, I strewed seven bushels of ground oyster shells over half an acre of rye, growing on a very poor soil; and three bushels of gypsum on another half acre adjoining; sowed ten pounds of red clover seed over both. The rye was not better than the rest of the field; the clover seed being bad, came up but thinly; that, however, dressed with oyster shells, much better than that manured with gypsum."

It is certain, therefore, that oyster shells, when powdered or crushed, are an excellent manure; and, in many parts of England, where they can be obtained in considerable quantities, I have every reason to believe that they will be found very useful to the farmer. (*Johnson on the Fertilisers*, p. 368.)

P.

PACE. In horsemanship, the peculiar

colours used for co
wood and other subst
coats of paint for his
of husbandry, his out
&c., are very requisi
their preservation fr
of the atmosphere an

PAIT. A provinci

PALATE. (Lat.
the roof of the mout
convex base of the l
corolla.

PALE-FENCES.

PALM. An anci
taken from the exte
English palm is un
inches.

PALMATE. In
resemble a hand spre

PALMS. A natur
endogens, chiefly in
distinguished by thei
parted flowers, enclos
minute embryo, lyin
men, and remote fro
plaited or pinnate ina
times called fronds.

Palms is also a c
male flowers of the w

PALSY. In the h
ease is usually confin
Old carriage horses,
of every kind, alth
paralysed, have oft
their gait, and difficu
are evident injuries o
physicking, antimoni
mulating embrocatio

nicled; the seeds in some instances or food. There are three indigenous ; the rough, the green, and the loose -grass (*P. verticillatum*, *viride*, and *galli*). (*Smith's Eng. Flor.* vol. i. See Millet Grass.

NICLE. In botany, a form of in- ence in which the primary axis de- s secondary axes, which themselves e tertiary; or, in other words, a ra- bearing branches of flowers, in place ple ones.

NNAGE. An old manorial term ap- to the food which swine consume in as acorns, and the mast of beech. signifies the money taking by the gistors, for the privilege of feeding the king's forest.

SY. A term applied chiefly to the varieties of *Viola tricolor*, and others are usually cultivated under the f *heart's-ease*. See Violet.

ASITICAL PLANTS are those grow into the tissue of other species, d upon their juices. Of this kind are seltoe, the broom-rape (*Orobanche*), *thræa*, &c. Such species have no roots. The term *parasitical* is, how- often applied to mosses, Orchid- plants, Tillandsias and the like, are mostly epiphytes, growing upon rk of trees, but deriving their food e air, by means of their own roots.

CHMENT. (Fr. *parchemin.*) A al formed of the prepared skins of goats and sheep, when intended written upon. A similar preparation es', kids', and lambs' skins is called The skins are first prepared as for g; then stowed down and pumiced; stly stretched and carefully dried. archment of drums is made from the of asses, calves, and wolves; ass-skin d for battledores, and goat-skin is pre- d for sieves. (*Ure's Dict. of Arts.*)

RING AND BURNING. This well n operation of agriculture, once much extensively practised in this country at present, consists in paring off the to a depth of two or three inches, ge- lly with a breast plough worked by a rer, or by a turf-paring plough drawn horse; allowing it to dry, and then burn- it in heaps. It is commonly best per- ed in the months of April and May. a practice now rarely adopted on sandy alcareous soils, although productive of sults on peat, and some kind of but even there it is very doubtful it is the best mode of treating the

he practice is certainly as old as the of Virgil, who mentions it in the first book of the Georgics. Endless have been the theories brought forward to account for its operation. Dr. Home thought it dispelled "a sour juice" from the land. (*Prin. of Agr.*) Dr. Darwin considered it produced "a nitrous salt," in the ashes. "Many such obscure causes," says Davy, "have been referred to for the purpose of explaining the effects of paring and burning, but I believe they may be referred entirely to the diminution of the coherence and tenacity of clays, and to the destruction of inert and useless vegetable matter, and its conversion into a manure. All soils that contain too much dead vegetable fibre, and which consequently lose from one third to one half of their weight by incineration, and all such as contain their earthy constituents in an impalpable state of division, such as the stiff clays and marls, are improved by burning; but in coarse sands, or rich soils, containing a great mixture of the earths, and in all cases in which the texture is already sufficiently loose, or the organizable matter sufficiently soluble, the process of torrifaction cannot be useful. All pure silicious sands," adds Davy, "must be injured by it;" and here practice is found to accord with theory. Arthur Young found "burning injured sand;" and an intelligent farmer in Mount's Bay told me that he had pared and burned a small field, several years ago, which he had not been able to bring again into good condition. I examined the spot; the grass was very poor and scanty, and the soil a silicious sand.

The process of paring and burning, therefore, seems to be most adapted for peaty or clay lands; for, as Davy continues, "The process of burning renders the soil less compact, less tenacious and retentive of moisture; and when properly applied may convert a matter that was stiff, damp, and in consequence cold, into one powdery, dry, and warm, and much more proper as a bed for vegetable life."

Davy examined three specimens of the ashes from different lands that had undergone paring and burning. (See Ashes, *antè*, p. 136.) "The great objection," he adds, "to this operation is that it destroys vegetable and animal matter, or the manure in the soil: but in cases in which the texture of its earthy ingredients is permanently improved, there is more than a compensation for this temporary disadvantage. And in some soils where there is an excess of inert vegetable matter, the destruction of it must be beneficial; and the carbonaceous matter remaining in the ashes may be more useful to the crop than the vegetable fibre from which it was produced." (*Agr. Chem.* p. 344.)

but surpasses all other substances in the power which it possesses of condensing ammonia within its pores, particularly when it has been previously heated to redness. Charcoal absorbs ninety times its volume of ammoniacal gas, which may be again separated by simply moistening it with water." (*Organic Chem.* p. 90.)

And it is evident, from the experiments which Liebig gives at p. 207., that charcoal powder is a very fertilising application to some plants. The practice, however, of paring and burning is evidently one whose advantages the farmer and the chemist admit with reluctance. And it is very probable, that by other means, such as the use of lime, &c., that most soils may be cultivated with more advantage to the farmer by the avoidance of this expensive and destructive process. "My practice," remarks Mr. Pearson, "in the use of turf for various purposes, convinces me that all lands must be injured by paring and burning, save those lands, which are few and far between, that possess too much inert vegetable matter; or, in other words, lands that grow their crops to such a state of luxuriance, as to prevent the desired intent of the cultivator. Those lands which possess too much inert vegetable matter might also be improved by having part of their subsoils burned; but not by burning the turf even here, for that is the only thing that can be commended on the spot that will cause fermentation in the soil when it is ploughed in." (*Quart. Jour. Agr.* vol. x. p. 552.) There is also a paper by Mr. Rennie (*ibid.* vol. v. p. 17.), on Paring and Burning. See Peat Soils.

PARIS, HERB. (*Paris*, from *par*,

trict of which a pr
well known divisio
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1379. Camden tho
bishop Honorius, i
mother churches a
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or two manors are
parish. As to extra-
lands," says Blacks
they were in the h
careless owners, or
and desert places,
searchable reasons,
any parish, and the
day extra-parochial
now by immemorial
king." (*Com.* vol. i

PARK. A consi
ture and woodland,

ark are as indications of wealth and of territory, and as grazing ground mesticated animals.

RKINSON, JOHN, born in 1567, y profession an apothecary, and so it as to act in that capacity to James I. s also a distinguished horticulturist tanist, his *Theatre of Plants* obtain- r him, from Charles I., the title of nicus Regius Primarius." He spent forty years in travelling. (*Cara-* p. 63.) He was proprietor of a gar- ell stocked with scarce plants. The f his death is not ascertained, but it ed between 1640 and 1656. His ablication was,

si in sole Parradisus Terrestris; or a Garden of of Pleasant Flowers which our English Ayre aitt to be noursed up, with a Kitchen Garden of er of Herbes, Rootes, and Fruites for Meate or sed with us, and an Orchard of all Sorte of Fruit- Trees and Shrubbes fit for our Land; together right Orderinge, Planting, and Preserving of d their Uses and Vertues. 1629. folio. With ved title-page representing the Garden of Eden, t of the Author, and 109 wood-cuts of Fruits vers. The dedication to the Queen. A second ppeared, corrected and enlarged, after his death, In 1640 appeared his "Theatrum Botannicum tre of Plants, or an Herbal of large extent, &c." t extensive botanical work then extant.

RK LEAVES, or TUTSAN. See
an's Wort.

RNASSUS, GRASS OF. (*Parnas-* om Mount Parnassus, the fabulous of poesy, grace, and beauty: these on account of their elegance, are l to have first sprung up there.) mmon grass of Parnassus (*P. palus-* s one of our most elegant marsh The plants do best in a moist peat d a shady situation, and may be in- l by divisions or by seeds, which plentifully. It is found wild on bogs and commons, especially in ainous countries. The stems are about high, angular and twisted. Leaves shaped, more or less acute, with se- longitudinal ribs. Footstalks three r times the length of the leaves. rs white, about half an inch wide, ess, each petal marked with greenish id ribs. Filaments awl-shaped, each in rn incumbent over the pistil. Nec- ve fleshy scales attached to the petals, d with a row of bristles, each bearing ll transparent ball: these, in *P. pa-*, are yellow. It is common in Nor- nd in the Scotch glens, and flowers in mber and October. (*Smith's Eng.* vol. ii. p. 114.)

RSLEY, THE BUR. See Bur-
ley.

RSLEY BEAKED. See Beaked
ley.

RSLEY, CULTIVATED. (*Apium* *dinum.*) There are two varieties of this well known plant, the common plain-leaved, and the curly-leaved. It is somewhat singular that the first should be most cultivated, notwithstanding the superior beauty of the latter, as well as by reason of its curled leaves rendering it more easily to be distinguished from the *Æthusa*, or fool's parsley, a variety of the hemlock, often occurring in gardens: it requires much care in saving the seed, otherwise it degenerates into the plain-leaved. Parsley is raised from seed, which is recommended usually to be sown annually; but if never permitted to run to seed, and the stalks are cut down as often as they rise, it will last for several years. It may be sown from the close of February until the middle of June, and this is repeated about the middle of September, for the supply of winter and spring; but this is unnecessary if the plants are not allowed to seed. The seed is to be inserted moderately thick, in narrow drills barely an inch deep, twelve inches apart if in a bed by itself, or in a single one round the edge of a bed; the mould being raked level, and the stones immediately over them gathered off. The plants will not make their appearance in less than three or four, and sometimes six, weeks. When two or three inches high, it may be gathered from as required. In early June, when the plants make a show for seed, the stems should be cut down close to the bottom, and again in September if it has acquired a straggling rank growth; this will cause it to shoot afresh, and acquire a strong growth before the arrival of severe weather. On the approach of frost, if protection is afforded to the plants by means of haulm or reed pannels, so supported as not to touch them, it will preserve them in much better state for use in winter and spring. To save seed, nothing more is necessary than to allow some of the plants to run up in June; they should not, however, be allowed to stand nearer than eighteen inches to each other. The seed ripens in early autumn, and, when perfectly dry, may be beaten out, and stored.

PARSLEY, THE COW. For rough cow-parsley, see Cicely. Smooth cow-parsley, see Chervil.

PARSLEY, THE FOOL'S. See Fool's Parsley.

PARSLEY, THE HEDGE. See Hedge-Parsley.

PARSLEY, HAMBURGH. (*Apium latifolium.*) This esculent is likewise known by the name broad-leaved and large-rooted parsley. It is cultivated for its root, which attains the size of a middling parsnip, boiling exceedingly tender and palatable. It is eaten both as a sauce to flesh meat and in have acquired a sufficient size for occasional use; but they seldom attain their full growth until Michaelmas; and the latest crops not until the following year. On the arrival of frost some of them must be taken up, and after the removal of the superfluous fibres, decayed leaves, &c., buried in sand, in a dry situation, under cover.

To obtain seed some plants must be left where grown, and allowed to run in May; their produce will ripen in July or August, when it must be cut, and, when perfectly dry, beat out and stored. (*G. W. Johnson's Kitch. Gard.*)

PARSLEY, THE MILK. See Milk-Parsley.

PARSLEY-PIERT. See Ladies' Mantle.

PARSLEY, SMALLAGE, or WILD CELERY. (*Apium graveolens.*) This wild plant, the seeds and herbage of which in its native ditches are acrid and dangerous, with a peculiar strong taste and smell, by culture becomes the mild and grateful garden celery, for which and its name we are indebted to the Italians, and which has now supplanted our native Alexanders. It is biennial, and flowers in August and September. The root is tap-shaped, and the herbage smooth and shining. The plant grows in ditches and marshy ground, especially towards the sea. The stems are widely spreading or floating, long, branched, furrowed. Leaves bright green, pinnate, or ternate; leaflets wedge-shaped, entire at their base, but variously notched above. Flowers in terminal and lateral umbels, small, numerous, greenish-white. Fruit almost globular, with permanent wide-spreading straight styles. (*Smith's Eng.*

The Field Culture of
Le Couteur describes
crop as thriving in an
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mirably on soil resting
or argillaceous schistu
a gravelly bottom; on
mixed with a light coa
soils derived from puc
and red felspar. This
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it on poor black heath
or eight inches deep, a
dressings of manure
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An old grass lay is
persons in September,
the parsnip seed is
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a large trench plough,
and, in many cases, wit
which turns a foot or
upon the manure and
has been recently sh
soil is then harrowed,
which should be new, i

rising effect on the cream, and produce yellow butter which will keep admir- if properly salted and prepared, pre- ng an excellent and superior flavour.

ey are taken up with a fork, or ploughed October or November. The average ace, per statute acre, is nine to eleven The *dry* leaves of the parsnip are given ws. The parsnip will fatten pigs (or ry if boiled) in an extraordinary man- and it is certainly one of the best prepa- y crops for wheat. It will keep in store April, and it is advisable to remove aves before the roots are stored. The ip being a very hardy vegetable, the does not injure the seed or the young ; and, if thought desirable, the former be sown as soon as they are ripe in mn. There are only one or two varieties rsnips, of which the common species is est for field culture. 1000 parts of the ip yielded Davy 90 parts of saccha- matter, and 9 parts of mucilage. n. *Roy. Agr. Soc.* vol. ii. p. 419.; *Brit.* vol. ii. p. 228.; *Trans. Hort. Soc.* . p. 6.; *Malcolm's Surrey*, vol. ii. 3.)

rden Culture. The soil in which the ip succeeds best is a rich, dry, sandy and the deeper the better. The most al to it are gravel or clay. It is al- beneficial to trench the ground two s deep, a little manure being turned h the bottom spit. If the soil is suit- o them, they are not much benefited e general application of manure at ime of sowing, but often injured, in quence of numerous fibres being in- t. Dr. Macculloch says, that in the l of Guernsey, which has long been rated for the fineness of its parsnips, eed is the manure chiefly employed. *d. Hort. Mem.*) Of excrementitious re, that of pigeons is the best. De- l leaves are also very favourable to its th. The situation cannot be too open. is propagated by seed. The usual time wing is from the end of February to eginning of April, but the earlier the r. It has been recommended in field vation to sow them in September; in garden, when sown at this season, they obtain a finer flavour, but many of in general run to seed. In the isle of rnsey, they regulate their time of sow- ccording to the soil; in the most fa- able soils they sow in January; or if oil is wet or stiff, they do not insert the until the latter end of March.

he seed is sown broadcast, rather thin, well raked in. The compartment being out in beds, not more than four feet , for the convenience of weeding, &c. When the seedlings are two or three inches high, they are carefully thinned to ten inches apart, and the weeds removed both by hand and small-hoeing. The beds require to be frequently looked over to remove all seedlings that may spring up afresh, as well as to be frequently hoed, until the plants so cover the ground as to render it impracticable. The roots may be taken up as wanted, in September, but they do not attain maturity till October, and which is intimated by the decay of the leaves. In November, part of the crop may be taken up, and the tops being cut close off, laid in alternate layers, with sand, for use in frosty weather. The remainder may be left in the ground, and taken up as required, as they are never injured by the most intense frost, but, on the contrary, rendered sweeter. In February or March, however, any remaining must be extracted, otherwise they will vegetate. Being preserved in sand, they continue good until the end of April or May.

For the production of seed, some of the finest roots are best allowed to remain where grown; or else, being raised in February, planted in a situation, open but sheltered from violent winds. Seed should never be employed that is more than a twelvemonth old, as it has generally lost its vegetative power when of a greater age. (*G. W. Johnson's Kitchen Garden.*)

PARSNIP, THE COW. See Cow-Parsnip.

PARSNIP, THE SEA. See Prickly Samphire.

PARSNIP, THE WATER. See Water-Parsnip.

PARTERRE. (Fr.) In gardening a system of beds of different shapes and sizes, in which flowers are cultivated, with intervening spaces of gravel or turf for walking on.

PARTRIDGE. (*Perdix.*) The enlarged demands (observes Mr. Yarrell) of an increasing population, the tempting prices of seasons of scarcity, or the progress of science unfolding the nature of soils, have each in turn induced the cultivation of various tracts of ground unploughed before; and as the labours of the agriculturist encroach upon the boundaries of the moor, the grouse retires, and the partridge takes its place upon the land. The districts best cultivated, and producing the most corn, frequently also producing the greatest number of partridges. Of a bird so universally known, little that is new can be said; with its appearance and its habits almost all are familiar. These birds pair in February, but seldom begin to lay eggs till towards the end of April or the beginning of May. A slight depression in the ground, with a few stronger on the wing than the common partridge, usually more wild, and accordingly much more difficult to get shots at. The eggs are from fifteen to eighteen in number, of a reddish yellow white, spotted, and speckled with reddish brown, one inch seven lines and a half long, by one inch three lines broad. They feed, like other partridges, on seeds, grain, and insects; they frequent turnip fields, but appear to prefer heaths, commons, and other waste land, interspersed with bushes. The whole length of the red-legged partridge is thirteen inches and a half. (*Yarrell's Brit Birds*, vol. ii. p. 333—347.)

PARTURITION. See CALVING OF COWS, ABORTION, GESTATION, PREGNANCY, &c.

PAR-YARD. A provincial name for the straw or fold-yard.

PASQUE-FLOWER ANEMONE. See ANEMONE.

PASSION-FLOWER. (*Passiflora*, from *passio*, passion; and *flos*, a flower; in allusion to the filamentous appendages or rays bearing a resemblance to the cross; the emblem of the passion of Christ.) The species of this interesting and elegant genus are admirably adapted for stove and greenhouse climbers, being of easy culture, free growers, and, if allowed plenty of room, producing abundance of beautiful flowers. Many of the kinds produce fruit freely, from which, through impregnation, several fine hybrids have been raised. The fruit of some, as *P. edulis*, *P. laurifolia*, and *P. quadrangularis*, or *granadilla*, are eaten: the succulent pulp which surrounds the seeds is found to be fragrant, cooling, and pleasant, agreeably acid, and admirably adapted

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poor thin soil, whic
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Mr. Magillivray, on
Scotland (*Quart. Jou*
in which he traces th
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summits of these m
"exposed to the de
low temperature, b
abundant rains, cove
the year with snow,
bare rock or a shallo
few plants of any de
dozen of those which
as their food. These
or four carices or h
junci or rushes, som
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and one or two other
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are also eaten by sheep; by the stream-
re several species of Alpine plants.
er down the mountains, *Aira flexuosa*
s in tufts, and of a large size. Several
s form a tolerable sward in many
s; the *Agrostis vulgaris*, &c. occasi-
y occurs. *Calluna vulgaris*, or common
, first makes its appearance. As we
d downwards, and arrive at the places
the mountains begin to expand, we
upon a region, the predominant fea-
f which is the *Calluna vulgaris*, min-
with *Erica cinerea* (the grey-leaved
); the vegetation becomes more vi-
; various grasses present themselves.
allies of this region, in which flow the
lets, are generally more verdant than
pen ground. The heaths are less
ant, and the pasturage consists chiefly
ces and gramineæ, intermingled with
of the plants of ordinary pasture
l, such as *Lotus corniculatus, Polygala*
s, &c. The general aspect of the
tion, however, is healthy, and con-
so until we reach the vicinity of the
(See TEMPERATURE.) There is a
on the conversion of clay land into
nent pasture, by Mr. G. Sinclair
Jour. of Agr. vol. iii. p. 974.); "On the
ages of permanent Pasture over ara-
sbandry, on the inferior Soils of Scot-
(*Ibid.* vol. viii. p. 409.); "On laying
o permanent Pasture a Field of Moor-
nd," by Mr. Ferguson; "Of Stiff Clay
by Mr. Abercrombie; "Of Swampy
by Mr. Ball (*Trans. High. Soc.*
p. 205.); "Of dry Soil upon a porous
or Gravel," by Mr. Belsher (*Ibid.*
p. 266.); "On the Grasses, and other
best suited for Pasture during the
r," by Mr. George Sinclair (*Ibid.*
p. 32.); and by Mr. Hogg, p. 117.
ying down Land to permanent Pas-
by Mr. Menzies, p. 131. "On the
ement of Pasture, with regard to the
ction of Musci (mosses)," by Mr. Bi-
Ibid. vol. vi. p. 282.). The mode he
on a heavy red loam is, drainage,
the best natural grass seeds, and
essings, such as bone dust twenty
s per acre in the spring (these should
led in when the ground is soft from
weather); lime and soot; salt (found
ficient); and liquid manure. "The last
ost efficient remedy for the preven-
nd destruction of musci, and the easiest
e recourse to when the ground has
come altogether exhausted, or in an
damp state, is to allow a great portion
summer's grass to remain unconsumed
ound until the following winter,
barer it is eaten before the new
of spring, the finer will be the following summer's grass. But should the repetition of this treatment fail to extirpate the musci, it will be more profitable to put the grass lands under a rotation of crops, and sow them anew with a mixture of grass seeds, suited to the soil and climate. For every information, however, relating to the formation of pastures, and the cultivation of the grasses, the farmer cannot consult a better authority than the *Hortus Gram. Woburnensis* of the late Mr. George Sinclair.

In feeding pastures it is usual with those fields which are shut up from stock, at Candlemas, to graze them in the succeeding May. Those which are fed until April may, after being shut up, be grazed again at Midsummer. If it is intended to feed a pasture during the winter, it should be allowed to rest in the months of October and November. See MEADOW and GRASSES.

PATH, PUBLIC. See HIGHWAY, and WAY, RIGHT OF

PAUPERISM. See POOR LAWS, SETTLEMENT, POPULATION, &c.

PEA, THE. (*Pisum sativum*, Fr. *pois*, Span. *pesoles*. The English is evidently a corruption of the Latin name.) This valuable plant is supposed to be a native of the south of Europe, and was cultivated by the Greeks and Romans. It is said by Acton to have been brought to this country in 1548. There are only one or two kinds of pea; the grey pea (*P. arvense*), and the pea cultivated as a vegetable in our gardens (*P. sativum*). Of the last, however, the varieties are endless.

Of field peas, the varieties are distinguished as the early, and the late, ripening. The common early are small, and dark-coloured. The grey pea of this class is the most common.

The later sown varieties are generally similar in their characters to garden peas; they differ, however, from them in having usually purple flowers. The most common kinds are the white, the early Charlton, and the pearl. Field peas, especially where there is a considerable demand for them, as in the neighbourhood of large towns, are a very profitable crop to be gathered green; since there is time after the peas are gathered, in the month of June, to prepare the land for a crop of turnips.

Where they are grown for their seeds, the white peas are those generally cultivated for the purpose of boiling, the grey as food for animals.

The pea will succeed pretty well on both heavy and light soils; but it certainly does best on the latter, especially if the land abounds with carbonate of lime. It is an excellent crop to interpose between corn crops, for it affords considerable facilities acre, and the rows are usually from nine to twenty-seven inches apart. There is every facility afforded for the use of the horse hoe. This inducement, with the early and occasional use of the hand hoe, will cleanse the land; to which end the crop of peas will, as they approach maturity, materially assist, by overpowering and stifling the weeds.

Peas are usually one of the most uncertain of the farmer's crops. They are subject to many casualties—to blight or mildew; to the attacks of a variety of insects, such as the grub, which devours the roots; lice, aphides, &c., which haunt the leaves; and a small beetle, the *Bruchus granarius*, lays its eggs in the green pods, which produce a grub, that devours its seeds. Then, again, it is frequently injured by the weather, in very dry, or in continued wet, or late harvests; and hence in the east of England it is often designated by the farmers as "a gentleman farmer's crop." This crop, however, is too often mismanaged in the way to which Arthur Young so well alluded when he told the careless farmers of his day that they were "too apt to sow this pulse when the land would yield nothing else. They have a proverb among them," he adds, "which signifies that the season does as much for peas as good husbandry; and they from thence take care that good crops shall be owing to season alone. Hence arises the general idea of peas being the most uncertain crop of all others. This is owing to their being scarcely ever sown on land that is in good order. Let," he continues, "the good husbandman lay it down as a maxim, that he should sow no crop on land that is

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are sufficiently dry t
Pract. Agr. p. 278.)
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charine matter, 35 c
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143.) The ashes obt
pea plant in flower a
amined by M. Sauss
parts of these ashe
Pisum sativum in fl
49·8 parts, of cart
earthy carbonates 6
oxides 1, and loss 24

Per Imperial Quarter.

	£ s. d.			£ s. d.
-	2 5 11	1835	-	1 16 6
-	2 5 5	1840	-	
-	1 19 2			

e amount of the imperial quarters of and beans entered for home consump- in England every five years, from to 1835, was according to Mr. M'Cul- —

	Qrs.			Qrs.
-	523	1830	-	63,664
-	761,125	1835	-	94,540
-	30,767			

e annual average of peas and beans, rted into England from 1801 to 1825 inchester quarters was from

	Qrs.
ssia - - - - -	785
eden and Norway - -	428
nmark - - - - -	823
ssia - - - -	7,609
rmany - - - -	7,144
therlands - - -	5,802
ance and South of Europe	9,124
erica - - - - -	898
land - - - -	4,922
her countries - - -	151

ulloch's Com. Dict.; Low's Prac. Agr.; ps's Cultivated Veg.)

arden Culture of the Pea. — Of the rous varieties which differ much in hardiness, yield, height, &c., we may erate the following; — Cormack's dwarf-pea, early Charlton, early gol- harlton, early Nichols's golden Charl- common Charlton, Reading hotspur, single-blossomed, early Warwick, early frame, early double-blossomed frame, marrowfat, tall marrowfat, green tagonia marrowfat, early green non- , Knight's marrowfat or wrinkled pea, sh moratto, imperial blue, Prussian egg, white Rouncival, grey Rounci- green Rouncival, blue Rouncival, tall (the sugar peas are eaten like kid- beans), crown or rose, Leadman's f, dwarf sugar, dwarf Spanish, sickle

soil moderately rich and mouldy is suited to this vegetable; rather in- g to aluminous for the lofty growers main crops, but for the early and late light and dry; if naturally otherwise, ered so by the admixture of drift sand the earth of the drills. Dwarf varie- will grow on poorer and lighter soils others. In an extremely rich soil grow luxuriant but unproductive. are rather injured than benefited by dication of unreduced dung at the sowing. Road dirt and rotted orm the best compost for them. For ly and late crops, that is, from October until the close of January, and during June and July, the sowings must be performed in sheltered situations, as south borders. In December, the rows are best drawn parallel with and within a foot of the fence. At other seasons their site cannot be too open.

They are propagated by seed, the sowing of which commences with the year. In January they may be inserted in sheltered borders, and large supplies in an open compartment, and thence continued throughout February and until July, once every two or three weeks. During this last month, and in the first week of August, the last sowings must be made for production the same year. For the first production in the following year, a small sowing may be performed at the close of October, and repeated about the middle of November and December, though it often happens that these are scarcely a week forwarder than those inserted in the following February. The necessary extent of the various sowings may be determined with tolerable exactness from the experiments of Bradley; he found on the average that three rods of ground, containing eighteen double rows, afforded thirty-six quarts of shelled peas. (*Treat. on Husb. and Garden.* vol. iii. p. 19.)

The seed must be inserted in drills, or by the dibble in rows at a distance proportionate to the height to which the variety grows, as well as according to the season.

When the plants have advanced to a height of two or three inches, they are to be hoed, the weeds cleared away, and earth drawn round the stems. This should be performed twice or three times gradually as they ascend, previous to the sticks being placed. It should be performed in dry weather, and the leaves never covered, or in wet weather they decay. For the winter standing crops it should be especially attended to, as it protects them greatly from frost. Peas are always best supported by sticks; if it is neglected, even for the dwarf varieties, they not only produce less, but sooner decay, are inconvenient to cultivate and gather from, and never so fine. Sticking is not required until the plants are six inches in height, or show their tendrils. If, during the time of blossoming, or swelling of the fruit, continued drought should occur, water may be very beneficially applied, it being poured between the rows, if they are in pairs, or otherwise in a shallow trench on one side of each. Watering the leaves is rather injurious. Failures in the rows of the earliest crops, whether from mice or other causes, may be rectified by transplanting. This is best performed in March; the plants thus removed must be watered until they have taken root, and also shaded, if the weather is hot. It is a good practice to nip off the top of the leading shoots of the early and late crops as soon as they are in blossom, as it greatly accelerates the setting and maturity of the fruit. Too much care cannot be taken when the pods are gathered, not to injure the stems. I have heard it stated from lengthened experience, that if the pods are cut off with scissors, the plants produced one-fourth more than when roughly gathered from. Bradley makes nearly a similar observation. (*Gen. Treat. on Husb. and Garden.* vol. iii. p. 21.) From the main crops, or where there is no necessity for precipitation on account of bringing them to table early, the pods should not be gathered until the peas have become plump and moderately firm, yet green and tender. The more regularly the plants are gathered from, the longer they continue in production, as the later pods never attain maturity if the earlier ones are allowed to grow old before they are gathered.

In very severe weather the winter standing crops require the shelter of litter or other light covering, supported as much as possible from the plants by means of branches laid between the rows. Mr. J. Laird, gardener, at Portmore, N. B., employs straw ropes or twisted bands for this purpose, which he fixes along each side of the rows with wooden pins, driven into the ground. (*Mem. Caled. Hort. Soc.* vol. ii. p. 93.) Which ever mode of shelter is adopted, it must be always removed in mild weather, otherwise the plants will be spindled, and rendered weaker. For the imperial blue, frame, and other dwarf varieties, the sticks need not be more than three feet high; for the Prussian blue, hotspur, and other middle-sized varieties, about five; for the Knight's marrowfat, and other tall ones, at least seven; and for the Patagonian, not less than eight. The best wood for this purpose is the brush, or fan-shaped branches of the hazel, &c. Before they are employed, the ends that are thrust into the ground should be charred, or moderately burnt, which effectually preserves them from decay. If this is attended to, and when no longer required, the sticks, if thoroughly dry, on a fine day, are stored in a dry shed, they will last for three or more years.

For the production of seed, leave some rows that are in production during July, or sow purposely in March. Care must be taken, however, that no two varieties are in blossom near each other at the same time, but a lapse of at least three weeks should occur, otherwise no perfect variety
can be obtained. We are much i
observations on this point. If bot
marrowfats are sown on the sam
latter will not bloom for nearly t
after the first. If the frame v
the moratto are similarly inserted
will succeed the first in about
The plants intended for seed o
to be gathered from. When i
all plants which do not appear t
the variety among which they a
should be removed. They are fit
ing as soon as the pods becom
and dry. When perfectly free
ture they should be beaten out
if hot showery weather occur
open and shed their seed. Se
serve their power of germinati
or ten years.

Forcing commences in Dece
early part of which month t
sown in a hotbed to remain,
transplant during the succee
into others for production. T
repeated in January, and the t
take place in February. It is
mon practice to sow in a v
during October, and the plan
tivated as a natural ground c
moved into a hot-bed during J

The temperature employe
may be either progressive, begi
and 50°, for the extremes, at
sowing, rising to 52° and 66° v
som, and to 55° and 70° while
swelling; or the temperature
formly kept up throughout t
having 50° for the minimum
their maximum. (*G. W. Joh
Gard.*)

PEA, EVERLASTING.
LASTING PEA.

PEACH. (Fr. *pèche*; Lat.
derived from *amysso*, to lacerat
to the fissured shell.) The ta
portion of the ornamental ear
plants, of which the peach for
may be advantageously dispose
plantations, and the dwarf ki
shrubberies at the front of th
The common way of increasing
budding on the plum stock or t
mond. Rich mould is a proper
them. They are most valued f
their showy pink blossoms early
son, sooner than almost any o
The peach is now one of our m
fruits: nearly two hundred varie
merated in the Horticultural So
logue. (*Phillips's Fruits*, p. 27
Bot. Dict.; *Loudon's Encycl.*
See NECTARINE AND APRICOT.

PEACOCK. (*Pavo cristatus*

aeed scarcely be mentioned as a bird
pnomical use. Pea-hens and pea-
ns, indeed, are occasionally used for
but this splendid creature is, and
to be, regarded solely as an object of
r. The advantages to be derived for
g it for food are not to be thought of.
's *Prac. Agr.* p. 619.) See Fowl, the

ARL-BARLEY. See Barley.

ARL-WORT. (*Sagina*; from *sagina*,
s; in allusion to its presumed nourish-
ualities for sheep.) These are hardy
l weeds growing in any soil. There
ree indigenous species:—

Procumbent pearl-wort (*S. procum-*
This is a perennial flowering in
till August. The root is fibrous;
ems are from two to four inches long,
ling on the ground in every direction,
round, taking root at their lower
and, if not disturbed, remaining
gh the winter. Leaves evergreen,
ned by their membranous bases, about
n inch long, minutely bristle-pointed.
rs drooping, with white roundish
. Seeds extremely minute.

ea pearl-wort (*S. maritima*). An an-
pecies, flowering from May to August,
growing on the sea-coast, with a
ng root; which is fibrous below. The
are nearly upright, divaricated, smooth.
s obtuse, without bristles; flowers with
; capsule longer than the calyx.

Annual small-flowered pearl-wort (*S.*
r). This is a very common species on
andy, barren ground. The whole
s more slender than either of the fore-
The stems are nearly upright, hairy.
s bristle-pointed, fringed. The petals
metimes present, white, not half the
of the calyx. Seeds bordered with a
line. (*Smith's Eng. Flor.* vol. i. p. 238.)

AR-TREE. (*Pyrus*, from *piren*, the
word for pear.) Like other species
tivated fruits, there are now a very
number of varieties; more than 600
enumerated in the Horticultural
ty's catalogue. A deep rich loam is
ary for pear-trees. They are in-
d by seeds, or by budding and graft-
which is the more common method,
stocks of their own kind, or upon the
. The established kinds are multiplied
fting the choicer on the common kinds.
t the same treatment is required in
g and training the pear as the apple.
we reflect on the labours of the hor-
rists, who have by cultivation made
ar-tree forget its natural thorns, and
l of an acerb berry produce us a
s fair and nectareous, we find our
st gratitude an insufficient return.

The wild pear-tree (*P. communis*) is a tall handsome tree, growing in woods and hedges, with thorny branches, and simple ovate serrated leaves; downy beneath, and fringed with soft white hairs. The flowers are copious, terminal, in corymbs, snow-white, with pink anthers. Fruit obovate, generally hard and austere, but liable, even in a wild state, to many varieties, and sometimes eatable. The wood is light, of a fine grain and tolerably hard. It is used by turners to make joiner's tools and picture frames to be dyed black, and is also frequently stained and substituted for ebony. The white wild pear-tree (*P. Aria*), we have already noticed under the head Beam-Tree. The expressed juice of the pear when fermented in the manner of cider constitutes the well-known beverage, *perry*. (*Smith's Eng. Flor.* vol. ii. p. 361.; *Phillips's Fruits*, p. 281.)

PEASANT. A rustic or country person; one who lives by rural labour. At the time of the Norman Conquest the condition of the lower classes was wretched; their huts contained neither beds nor moveables of any kind, except the few common utensils requisite to the preparation of their food: the peasant reposed on straw, spread upon the floor with a log of wood for his pillow, or stretched himself in the stable with his cattle; and even the upper sort of husbandman fared very little better. The peasantry of England of the present day are however far advanced in the necessaries and comforts of life; though in many instances they may have their difficulties to contend with; yet there are very few hard-working, honest, sober, and industrious labourers, who have not their neatly-furnished cottage garnished with all the means and appliances of domestic life; and frequently a pig in the sty, and a small hoard in the savings bank for a rainy day. See Labourer, Farm Servant, &c.

PEAT. A collection of vegetable remains, commonly collected together in considerable masses, either on the surface of the earth, or in strata, at various depths. Owing to the changes which the plants composing it have undergone, it contains much tannic acid, which preserves the vegetable matter from farther decomposition. It contains elements for the formation of the richest manure when substances are added to it to decompose the tannic acid, and hasten the decomposition of the vegetable matters, such as lime or marl. Peat has been found, when used alone as manure, not to possess any fertilising qualities, as might be expected from its nature; but it has been advantageously employed as a mixture with compost. See Farm-Yard Manure.

turally the most difficult to bring into cultivation. These often extend to a depth of many feet, contain but little earth, are usually tolerably level, and consist of a mass of light vegetable fibres. This peat, even in the midst of summer, is commonly saturated with water; at other periods semi-fluid, and very often a trembling dangerous quagmire. Its soil, if I may call it such, is usually of a dark brown, changing to a blackish colour when thoroughly dried by a gentle heat. In this state the peat is easily inflammable, is commonly used for fuel, and has been occasionally employed by the gas-manufacturer, the lime-burner, the charcoal-maker, and even the iron-smelter.

The directions which I am enabled to give, and the suggestions I venture to offer, are of necessity general in their nature. It is in vain to hope that any can be given which will not require modifications according to the many circumstances under which the possessor of the bogs is placed. Peat soils abound in almost all those situations where stagnant waters are for a long-continued period allowed to rest, and where the vegetable matters produced and very slowly decaying on the surface are not carried off.

The common masses of peat existing on the earth's surface in England, with which I have had most experience, are the products of the decay of the mosses, common heath-plants, coarse grasses, and the sedges which often accompany them. But the varieties of peat are numerous, according to their age and situation. There are some of the peats which are found *beneath* the soil, in the lower portions of the valley of

only periodically floo
rapid; but when it
mersed in the water
ations, there it increa
It is true that this pl
it sheds an abundanc
ducing seedlings, whi
support themselves
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their preceding gener
like stems remain
water till the seed is
to the bottom and forn
in some specimens of
traced. The bog-m
gradually gets mixe
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add to the depth of t
and as the moss becor
gradually establish th
veral varieties of th
It is only when the p
the gradually-accumu
peats from beneath th
nant waters that the
the bilberry, and t
their appearance. T
commonly tenant pea
of the most worthless
stock commonly refu
mon heath plants the
(*Juncus*), sedges (
(*Schœnus*), club-rush
rushes (*Typha*), bur-
&c.

Amongst the few s
mon grasses which ar
struggling as it were
marsh-bent (*Agrostis*
brown-bent (*Agrosti*

ng-leaved cotton-grass (*Erio-*
stachion), and the sheathed cot-
E. vaginatum).
primary importance that the
ld clearly understand the che-
osition of the peat with which
ontend, and that of the watery
h which it is usually saturated.
n varieties of peat, when dried
ate heat, lose a very consider-
of their weight, and are mate-
d in bulk. The dry mass con-
of woody fibrous remains of a
colour, of which a very incon-
rtion is soluble in water; and
osure to the unassisted action
nd air, under the most favour-
tances, it decomposes with ex-
ess. When burnt to an ash,
duct thus obtained, varies com-
composition with the nature of
of earth on which the mass of
If this is of a gravelly or argil-
re, the ashes are generally com-
of silex, and a small portion of
de of iron, with some carbon-
and sulphate of iron: if, how-
ubstratum immediately under
calcareous, then the ashes com-
a considerably larger propor-
onate of lime, the sulphate of
vitriol) is absent, and the sul-
ne (gypsum) abounds in its
celebrated Dutch ashes, which
ve of such large crops of clover,
d of—

	Parts.
rth	32
f lime (gypsum)	12
nd muriate of soda (Glauber common salt)	6
of lime	40
ron	3
	7
	100

id with which peat is usually
lso equally varying in its com-
t almost always contains a very
n of brown vegetable extract,
of the red oxide of iron, and
es (sulphur and iron) are con-
he gravelly or other substrata,
radually, by the action of the
the oxygen of the atmosphere,
o sulphate of iron, which dis-
is found in the water. When,
his solution comes in contact
or other calcareous matter, the
poses the green vitriol, the iron
ed, and sulphate of lime, so en-
some of the artificial grasses, is very commonly found with red oxide of iron, dissolved in the peat water.

The chemical composition of peat soils of course varies in the proportions of their constituents. The following analysis of a specimen of an entirely barren peat moss, in a perfectly dry state, will give the farmer a tolerable idea of their general composition:—

	Parts.
Fine silicious sand	29
Inert vegetable matter	289
Alumina	14
Oxide of iron	30
Soluble vegetable matter, with some sulphate of potash	11
Sulphate of lime (gypsum)	12
Loss	15
	400

Such is the composition of a barren peat moss. The analysis of an active or fertile peat moss, with which it will be well to compare it, gave the following results, after being also dried in a gentle heat:—

	Parts.
Fine silicious sand	156
Unaltered vegetable fibre	2
Decomposing vegetable matter	110
Silica (flint)	102
Alumina (clay)	16
Oxide of iron	4
Soluble vegetable and saline matter	4
Muriate of lime	4
Loss	2
	400

Such is the usual chemical composition of peat. This, however, is occasionally varied by the presence of other substances, but the above sketch will afford a tolerably correct view of its ordinary properties; and this kind of knowledge will very materially aid the farmer in proceeding to examine the mode in which the composition of such soils may be altered so as to be rendered tenantable by useful varieties of plants.

The most common delusion in which the possessors of peat soils are apt to indulge is the belief in the possibility of rendering them permanently productive without either previous drainage or the application of earth. The melancholy attempts of this kind which I have witnessed on the peat land of various parts of England, especially in timber planting, can only excite the pity of those who witness the effects of such misspent time and money. The young trees too, which are most commonly employed in these ill-judged attempts, are usually of the fir tribe, precisely the kind the least adapted to prosper in a bog of water and peat. Common reflection would suggest that, if any kind of trees could be expected to vegetate with traverse a single line of railway, driven as their constructors have too often been to take for their line of country the most trembling, dangerous bogs, the most worthless heaths, without being struck with the ludicrous appearance of bright yellow-topped Larches and ragged sickly-looking Scotch firs, soaking in bog-water—and that too not in mere patches, but over hundreds of acres. I do not confine these observations to the north of England—to Lancashire and Yorkshire—but the remark applies to many of the southern counties: for instance, by the road-side between Wareham and Poole, in Dorsetshire, may be seen similar wet peaty heath plantations of Scotch firs.

The peat soils with which I have had the chief experience have been either those on upland slopes or in the hollows of low grounds, such as near the rivers Kennett and Itchen, and in all cases placed in situations where it was possible to drain them by open or under-drains previous to commencing ulterior proceedings. The underdrainage of peats is usually, especially on high moorish grounds, conducted on very erroneous principles, and with little regard to the after-effects to be produced by it on the peat. The first error to be carefully avoided is placing the drains too near the surface. I have invariably found in deep peats, that, where the drains cannot be placed beneath the peat, they should be constructed at least at a depth of from four to six feet or even more; and this is not adding materially to the expense, for the peat-owner will find that one drain at the depth of five or six feet will produce more powerful and far more permanent good

is not the mere prese
which renders the pea
noxious, astringent, i
water. Some of the r
of the valleys of the K
in Berkshire and Han
a deep stratum of peat
a shallow dressing of c
earth; and these are
and kept for many
bright rapid waters of
Itchen; but then the
those prolific meadow
that no stagnant mi
allowed to corrode t
their grasses; deep dr
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the surface soil clear
iron and green vitriol,
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with iron-pyrites exi
neighbourhood. It is
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brated meads to be co
of the mineral substan
skilful owners are so
cessfully guarding.

In the construction
some peat-mosses requ
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more capacious must b
and the greater the fa
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as to make the curre
too rapid; for the so
able to bear even a m
of water.

e of the peat is below the ad-
, or in hollows, then the well
stem of Elkington, or even me-
er, as windmills or steam-en-
e successfully followed. And
ny situations where peat-bogs
distant from copious rivers, I
hat great things are to be ef-
ly by draining the bog-waters,
g those of the river on to the
he peat. In those localities
ind of water is to be readily
specially if it abounds with
rs), the possessors of the peat-
quire hardly any thing else for
ement. The steam-engine, I
l, has not yet been employed
e of the farmer to one half the
ich it is capable. Its gigantic
hitherto been confined to drain-
, but little has been done with
ion; and yet, when the land-
nbers how laboriously even by
r this is done in Oriental coun-
at in the fens of Lincolnshire
orse power steam-engine raises
gh 51,230 tons of water every
by the combustion of only two
d a half of coals; and that, al-
ns per acre, this mass of water
o irrigate more than 340 acres
en, I repeat, the landowner is
these gigantic powers, he will
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ains to be done in the perma-
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gine than many persons have
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ct is to furnish the soil with a
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ion, and this may be done in
: that by paring and burning,
in various parts of Cambridge-
colnshire, I consider the worst
; for it merely furnishes the soil
sively rapid progress with the
of the peat, which its gradual
n would by other modes more
d steadily effect.
operation after the water has
off is to break up as deeply as
the common and the subsoil-
surface of the peat; and then,
-burnt lime can be procured,
rthy addition so rapid and so
issolving and rendering pliable
is. A few ploughings, assisting
operations of the atmosphere
will in a few weeks bring the
a state as to enable it to bear
The quantity of lime should be about 250 or 300 bushels per acre; but the quantity of necessity must vary with the readiness with which the lime is procurable; where it is very expensive, the cultivator is obliged either to reduce the quantity, or mix it thoroughly with a proportion of clay or marl before he spreads it over the surface of the peat. Where limestone is to be obtained in the immediate neighbourhood, and other fuel is not to be readily procured, peat may be employed in many cases in the process of lime-burning without much difficulty, it chiefly requiring that the peat should be thoroughly dried previous to its being used. For a first crop on the thus so far reclaimed peat soils I have found no other crop equal to potatoes. These are best planted in ridges; the horse, hoe plough can then be easily kept at work, which not only considerably promotes the decomposition of the peat, by facilitating the introduction of the moisture and gases of the atmosphere, but this very operation adds very materially to the vigour and produce of this valuable root, than which no other plant more delights in fresh soils, such as that produced by well-drained fresh earth-dressed peaty lands.

It is well to avoid for a year or two all attempts to produce corn crops on land like that I am describing. The course of cropping which the farmer will almost always find the most profitable, is to follow the potatoes with peas, then turnips, oats, grass-seeds, peas, wheat. In all cases, too, he must remember in what small proportions some of the essential ingredients of his crops are at first existing in this peaty soil, and how valuable even a slight dressing of clay or marl will be found in supplying such deficiencies.

And, again, it is here that the services of the manure-drill are available to an invaluable extent in applying bone-dust, or any kind of organic or even earthy manure, especially to the young land's earliest crops. For the natural results of the progress of cultivation, the gradual decomposition of the soil and tough vegetable remains, the accumulation of more easily decomposable vegetable matters, the application of the ordinary farm-yard compost, finally sufficiently enrich the ground with those salts of lime and of potash which form the essential ingredients of all fertile land.

To expedite the accumulation of decomposing soluble matters in the soil, several expedients may be adopted. For instance, if the farmer has access to night-soil, an admirable compost may be made by mixing this seven or eight weeks previous to its employment with the peat itself. I know of no other compost so powerful on peat

Agricultural Society of England.

The farmer must, to derive the maximum benefit from this plan, avoid certain errors, which will else materially deteriorate the richness of the compost. He must be careful to have the peat he intends to use dug for some time previously, and exposed in spits to the drying influence of the sun and winds. The peat, in fact, can hardly be employed too dry; and the farmer will find that, if he makes the compost in the dry warm weather of summer, he may then use more peat in proportion to his farm-yard dung or night-soil, than if he makes the mixture when the temperature of the air is less. In the warm weather of the spring and summer months, the cultivator will find one cubic yard of fresh good farm-yard compost sufficient for three or four cubic yards of peat; but in colder weather the proportion of peat must be decreased. The farmer will find that the fresher and richer the animal manure, the larger will be the proportion of peat with which it may be successfully mixed. Thus, with the rich semi-fluid mixture from the slaughter-houses of London, with one cubic yard of this six or seven cubic yards of peat may be mixed; and I have found, on several occasions, every reason to agree with Lord Meadowbank and others who have employed peat in this way, that it is very desirable not to mix more than half the intended proportion of peat at first, but to wait until the fermentation of the mass is somewhat advanced, and the temperature of the heat increased, before the last half is added to the heap. Some persons recommend the addition of a portion of lime to this compost; but this is a plan I do not

furnish his soil with a
mixing hot lime and
rate of one cubic yar
three or four cubic yar
this case it is not neces
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portion of common salt
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plan for the farmer's a

When once the pea
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the great Irish bogs, i
trates the same fact:
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of gravel to make an e
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horses, but they bear t
with perfect safety, ev
the bog of peat is of a d
to forty feet.

Peat-moss lands are
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they are drained. If h
there is some difficulty
quick, or any of the
plants, until the peat

birch, the larch, the Spanish chest-
ith a very slight dressing with lime,
arl, or clay, will do well on well-
ed peat; and if the earthy additions
iberally bestowed, such plantations
arely fail to abundantly reward, in
ways than one, the possessor of the
for all the expense he has bestowed
ir formation.

se I have found to be the chief points to
ended to in the improvement of peat
description of barren waste which
s abounds more in these islands than
other European kingdom of equal
. Their improvement, either by con-
g them into cultivated fields, or for
rmation of timber plantations, is a
on of national importance; for every
at is thus added to the farmer's pos-
ns not only enlarges, as regards a
y of food, the internal resources of the
but increases the demand for agri-
al labour, banishes unwholesome stag-
waters, purifies the atmosphere, and
renders the climate of the district
ptibly milder. (*Journ. Roy. Agr. Soc.*
. p. 390.)

valuable account of the practice of
sh farmers in the improvement of
ground, by Ph. Pusey, Esq., more
ially those of Lincolnshire, is contained
same volume (p. 400.). He observes:
e first step of improvement is of
e to acquire command of the water,
btain an outfall by digging a straight
about eight feet wide and five deep,
the middle of the hollow: this takes
lace of the winding stagnant rivulet
is frequently found there. In wider
more of these ditches should be dug,
ne may be placed on each side, so as
ide the peat from the sound land, and
cut off the springs which ooze from
igher ground. However slight the
ent fall of the ground, it is generally
icable, by carrying along the new
course to a sufficient length, to reduce
evel of the water three or four feet
anently below the surface: this, then,
first and indispensable step, the open
age; the next is the under or close
age: it has been done on the Dean-
principle, thorough-draining. The
lel drains have been cut to a depth of
y inches in the gravel underlying the
the materials being tiles and broken
s over the tiles, covered with a sod
n inches below the surface; the dis-
between the parallel drains varying
twenty to about eighty feet. The
are so flat that tiles have been often
sary. It is essential that these drains
ld be formed before the surface is broken up, that the work may be clean for the labourers: winter and early spring will be the most convenient seasons. In Lincolnshire, however, the heavy expense of under-draining has not been required. Deep open ditches, dividing the peat into fields of twelve or fifteen acres, have been found to lay it sufficiently dry.

When the draining, of whatever kind, is completed, the question next arises how the coarse and rushy swamp is to be brought into cultivation. I must say that the practice of paring and burning the surface employed by our farmers has been justified by its effects. As soon as the harsh easterly winds of spring have set in, the breast-ploughs are put to work, the surface is pared and turned over, and, when dry, piled in heaps and burnt to ashes. The proceeding may be defended I think on these grounds: — If the coarse sward filled with the roots of rushes were merely ploughed over, it would not decay during the whole summer, and would be far too tough and hollow for any crop that might be sown on it. Again, when a fertile well-dressed surface is burnt, the volatile parts of manure which it contains may be dissipated by fire, but on the land we are dealing with there is no fertility to be destroyed. Lastly, the ashes which are produced are a manure peculiarly adapted for the crop which experience has taught the Lincolnshire farmers to make their first crop on such land; that crop is rape, a plant not generally grown in this country. On such ground, so prepared, it shoots up with unfailing luxuriance, resembling the tops of strongly growing Swedes, but forming a dense mass of dark leaves, about a yard high, through which it is difficult to make one's way. Although peat may be well suited to the growth of rape, it is to the peat-ashes I believe that the chief strength of its vegetation is due. In fields where the soil is moory but not a pure peat, when they have been pared and burnt in the same manner, a singular appearance presents itself which proves this point. On the spots were the heaps have been burnt, may be seen dark tufts of rape growing in the vigorous manner already described. On the rest of the ground you can hardly distinguish the pale blue or purple dwindled plants of rape, scarcely raising themselves from the surface, and choked with grass. The rape which has been sown in May, is fed by sheep penned on the ground from the middle of July or from August. As it shoots up again from the root it may be penned twice over, or even three times, before winter. On the best managed field of this kind which I have seen, a flock so ground; hares will not touch them while other Swedes are to be found. If sown early they are apt to decay on the ground, and they do not keep well in store; still they must be sown early as well as other turnips, because their growth is slow on such land when the days have shortened; and sheep are said not to thrive if penned upon it in winter.

Rape or Swedes being established as the first crop, after the breaking up of peaty land, in the system I am describing, the next crop is usually oats: they are drilled in upon a very shallow furrow, with plenty of seed, and well pressed with a press-roll as well before they are come up as afterwards, in order to guard against the wireworm, the enemy to be feared on such land. It is remarkable that by very late sowing, as late as the end of April or beginning of May, you may be almost certain to escape the wireworm — it is supposed, because the oats grow more rapidly out of their reach; but on the other hand it will be harvested late; and there is this further disadvantage, that the grain which is always light on such land, will become so much lighter that you perhaps lose in weight as much as you gain in quantity. I may observe that the oats do not ripen together upon this ground: the farmers cut them while they are partially green, because they find that, if they wait until the whole crop has changed its colour, the best grains, which are those that first ripen, shed in the mowing and carrying, whereas these are preserved by early cutting, while the unripe grains and green stalks improve the straw as fodder for cattle. This first crop of oats is generally beaten down by

years in grass is that i
before it is again plou
a poor rotation which
of corn in four years.
if the ground were
grass, there is reason
few years the fine gra
the coarse herbage ret
no better for the e
drainage. Nay, one
observed it become
aquatic grasses natur
obtained the moisture
and the better grasse
In order to meet thi
rubble which has been
main drains is spread
the winter before the
however sterile and hu
thus used as a manur
that it produces a stro
grass is much thicker
this has been done: th
weighting the land; it
goes, but the staple of
weak. When wheat
that is at all peaty, it
lose plant in large patc
land has been dunged,
has been trodden in by
times done in the sprin
some principle defectiv
of the soil: that princi
can only be supplied
farmers of Lincolnshir
clay to peat-land by
been carried on largely
years. The operation
detailed in the followi
Cooke of Digby: —

trench is four feet wide. We ut four feet in depth of clay, out on both sides, so that the y thrown out is two feet deep eet wide throughout the whole he trench. The expense is *54s.*

	£	*s.*	*d.*
—In the original state of he produce is 5 qrs. of one gross, at 20*s.* per qr.	5	0	0
.—Seeds (herbage there- ep per acre, at 3*d.* per n the 1st of April to the tober - - -	1	4	0
—20 bushels of very at, say 16 stone gross, if ugh for seed 50*s.* per qr.	6	5	0
	12	9	0
—After trenching it pro- qrs. of oats per acre, ett, at 24*s.* per qr. -	7	4	0
—Seeds (herbage there- ep per acre, at 3*d.* per n the 1st of April to the ober - - -	2	2	0
—30 bushels of wheat at 58*s.* per qr., 17½ stone - - -	10	17	6
	20	3	6

hout the fen the soil is a vege- e, upon a clay or gravel bed; if the land is of but little value for y to give it solidity. The cal- have made are applicable to the the following parishes:—Dig- ton, Ruskington, and Anwick." colnshire method appears, there- he cheapest of all improvements, clay is found under the soil, n so deep as four feet, and its pposed by Mr. Cooke to last fif- It has also the strong recom- of being not an experiment, but The great extent to which it rried, and its efficacy, are thus y Mr. Morton, in answer to an ich I addressed to him:—

s of Lincolnshire have been in- productiveness at least 100 per y by applying to the surface of the y which is found at depths varying five feet below it. This applica- e thus: trenches, parallel to one e made, eleven yards apart and ide, down to the clay; and then depth of the clay is thrown out, each side. The effect of this, cond year, is greatly to increase tiveness of the soil; in many uble it. This mode of improving peaty soils extends over a very large district; indeed it is equal in extent to the extent of the fens, for although the whole of the fen land in Lincolnshire, Northamptonshire, Huntingdonshire, and Cambridgeshire, has not been so treated, yet there is scarcely a farmer who has not practised, or is not now proceeding with, this most important improvement. I have witnessed this operation for the last fifteen years; and I believe it was begun long before. Mr. Wingate's estate at Leake has thus been clayed once every six years, and each repetition has the effect of adding to the permanent productiveness of the peaty soil."

This operation of claying peat is one of the methods by which English farmers have for many years been silently changing the face of the country, which now constantly come to our knowledge, but for which they have not hitherto received the credit due to them; its effect is so wonderful that I ought not to withhold a further account of it, which I have obtained from Mr. Wingate himself, whose farm at Leake is mentioned by Mr. Morton.

"I will endeavour to describe to you what we have done in our east fen since its great improvement by drainage, confining myself to that land which I consider decayed vegetable matter on a clay or silty subsoil at various depths, and which had been under water generally for ages in the winter season, and getting partially dry in the summer. A great deal of wood in the first instance was taken out of it; nay, in fact, is still in many parts where the plough goes a little deep, chiefly oak, I believe, but in some instances maple, poplar, and aspens, all lying in one direction. At the time of the first enclosure, from what I hear, the land was brought into cultivation by paring and burning, sowing with cole (rape), then afterwards oats and rye, which oats it grew of very bad quality, being very light, say seven or eight stones the sack of four bushels; and I believe it nearly ruined the first class of occupiers. I did not myself begin to occupy land there before the system of claying was found out, and wheat had begun to be partially grown. Since that time it has been managed with very great success in various ways, until the late unfortunate attack of the wireworm, which has materially decreased its productive qualities. We have the four-field, and in some instances the five-field course, which I consider a sharp dose for any land, namely, 1. turnips; 2. oats; 3. wheat; 4. seeds mown or grazed; 5. wheat. With regard to the management of my own farm, concerning which you inquire, I have occupied a small farm nearly in the centre of the east fen for some acre. After that it was sown with, 1st year, oats; 2d, wheat; 3d, cole with manure; 4th, oats; 5th, wheat; 6th, cole or turnips well manured, and then clayed over a third time the same as before; and most certainly I had very productive crops, that is, as much as five quarters of wheat per acre, and from eight to nine quarters of oats, all of very fair quality. I began again to clay the fourth time, but not with the same favourable results, and have only done some little over again, thinking the lands have got quite sufficient solidity. Perhaps I ought to add, I have generally consumed six or eight tons of oil-cake, with about twelve acres of meadow land hay, to assist in converting my straw into manure. The size of that farm is about 100 acres. I ridged some peat land for turnips one season, with but indifferent success; and I always find the corn much better and much less infected with the wireworm in the clay dykes, where the land has been turned over perhaps from three to four feet in depth. We attempt very heavy rolling; tread the wheat land with men or women in the spring; but if we have cold, backward weather, all we can do appears of but little avail against the destructive insect. I might also add, that there is a great deal of silt, or clay of a silty nature, lying under the peat in many parts of the fen lands, and the wireworm appears there to be much more destructive if the lands are not very well manured, so that the crops, particularly the spring crops, may grow right away without a check."

A most important improvement has been made with clay only, and lime has been often tried without any advantage. It is

greatest part of the
composed of new red s
and granite, and ther
which forms a very co
every fertile soil; ind
the soil in Dumfriess
well filled barley crop
ployed lime, which th
extent, and find it e
tatoes and turnip cr
testified by the farme
the amount of 3000*l*. a
quarry at Close Farm.

"You are correct
siderable part of my p
have been made by
been productive of v
hay. I have always
suitable for crops of
addition to the lime I
ployed fifty or sixty t
the imperial acre of p

"I have improved
peat bogs, the avera
acre in their natural s
3*l*. A considerable p
pensive to accomplish
to fill up large holes
been dug for fuel; n
me upwards of 30*l*. th
ground remunerates n
of so large a sum, besi
object in the middle o
the neighbourhood of
hollow, of which ther
mile of the house, w
useless, black peat bog

"I do not recolle
out to you some grass
improved from black

it in a compact state; as I have
hat soil of this kind, after bearing
corn and being frequently ploughed,
so loose and pulverised that the
cattle completely destroy the pas-
d that the roots of the grass are
by the loose state of the ground.
ass land has given me upon the
from 12*s*. to 14*s*. per acre annually,
iginal state not worth 1*s*. 6*d*. The
ound upon grauwacke, after this
ment, is much more valuable than
e subsoil is sandstone. I have em-
me as it is practised in Derbyshire
advantage upon the surface of moor
t as it requires a very large dose
it can only be done where lime is
it requires from 200 to 300 bushels
er acre to destroy the great quan-
getable matter in moor soils, which
accomplishes, as is shown by the
g soon filled with moles, which are
it by the decayed vegetable mat-
ucing worms, the food of moles.
n, in Yorkshire, lime is employed
ensively as a top-dressing, even
limestone soil. I have found that
ed upon pasture well top-dressed
e much quicker, and that the meat
richer and better mixed, than upon
apparently equally productive of
" (*Jour. of Roy. Agr. Soc.* vol. ii.
There is a paper on the Dutch
roduced by burning peat), by Mr.
(*Trans. High. Soc.* vol. iv. p. 107.)
, Ashes, p. 136. Peat is much em-
a fuel in some parts of our island,
y in Scotland; and it is much im-
or this purpose by compression.
e papers with drawings of com-
machines in the *Transactions of*
land Society, vol. iii. p. 372.; vol. iv.
vol. v. p. 458.; vol. vi. p. 327.; and
our. of Agr. vol. xii. p. 138.

LES. A term applied to rounded
especially of silicious minerals, such
rystals, agates, &c. Among farmers
common pebbles are frequently
wlders.

. A measure of capacity contain-
gallons, or the fourth of a bushel.
erial peck contains 554·55 cubic
Besides the standard peck, there
pecks, which are extremely vari-
s the Lancashire peck contains six
but in other counties it is much

CLE. One of the ramifications of
t of a flower-stalk called the pe-

VIT. See Lapwing.

ITORY OF THE WALL. See
ellitory.

PELT. A term applied to the skin or hide of sheep, &c.

PELT-ROT. See Rot.

PENK. One of the names of the minnow.

PENNY CRESS. See Mithridate Mustard.

PENNY EARTH. A term used by some farmers to signify a hard, loamy, or sandy soil, with a large quantity of sea-shells intermixed in it; portions of which being round and flat, and in some measure resembling pieces of money, have occasioned its being called by this name. It is an earth not easily dug through, but it is usually undermined with pickaxes, and then falls into large lumps; which the frosts speedily pulverise.

PENNYROYAL. (*Mentha Pulegium.*) This well-known perennial plant is found growing wild on wet commons, and about the margins of small brooks. It has a strong acid, and very peculiar smell, and is stimulant and tonic, but less grateful than peppermint. The stems are somewhat procumbent, or quite prostrate. Leaves ovate, scarcely half an inch long, full of pellucid dots. Flowers whorled. Flower-stalks purplish, clothed entirely with very short, dense, hoary pubescence.

Pennyroyal is cultivated for its use in culinary and pharmaceutical preparations. There are two varieties—the trailing, which is usually cultivated, and the upright. These plants are best grown on a tenacious soil: even a clay is more suitable to them than a light silicious one. It should be moderately fertile, entirely free of stagnant moisture, and consequently on a dry subsoil, or well drained. A wet soil makes them luxuriant in summer, but ensures decay in winter. A border, or situation that is sheltered from the meridian sun, is always to be allotted them, as in such they are most vigorous and constant in production. A compartment entirely secluded from the influence of the sun is, however, equally unfavourable with one that is too much exposed.

They are propagated by parting the roots in February or March, September or October, and by slips or offsets at the same season. The mints likewise may be increased, by cuttings of the annual shoots in May or June, as well as by cuttings of the roots either in spring or autumn. For production of green tops throughout the winter and early spring, the spearmint is often planted in a hot-bed; and more rarely pennyroyal, every three weeks during October and three following months.

Planting in the open ground, at whatever seasons, or by whatever mode, should if possible be performed in showery weather, or water must be given plentifully, especially to cuttings. If propagated by divisions of the root, they must be inserted in drills two inches deep; if by slips or cuttings, they must be five or six inches in length, and their lower half being divested of leaves, planted to that depth, in every instance being set in rows ten inches apart each way. The only after cultivation required is the constant destruction of weeds, which are peculiarly injurious. After July, the produce of green tops is of little value; they should therefore be allowed then to advance to flower, which they will produce towards the beginning of September, when they are in the fit state for gathering, either for drying or distilling. In either case, the stalks should be cut just previous to the flower opening. At the close of September or beginning of October, the stems must be cut down as close as possible, the weeds cleared entirely away, and a little fine fresh mould spread over them. The beds should never be allowed to continue longer than four years; for by reason of continued gathering, the plants not only become weakened, but the roots becoming matted, and greatly increased, produce only numerous diminutive shoots, or entirely decay. (*Smith's Eng. Flor.* vol. iii. p. 87.; *G. W. Johnson's Kitch. Gard.*)

PENNYWORT, THE MARSH. See WHITE-ROT.

PEONY, or PÆONY. (*Pæonia.*) A genus of beautiful flowering plants, mostly hardy enough to endure our winters. The shrubby kinds are increased from cuttings taken off in August or September, with part of the wood of the preceding year attached, and planted in a sheltered situation where they will root freely. The herbaceous species are increased by dividing the plants at the roots, taking care to leave a bud to each slip; the new varieties are obtained from seeds. (*Paxton's Bot. Dict.*)

PEPPER-GRASS. See PILL-WORT.

PEPPERMINT. (*Mentha piperita.*) This species differs from the common spear or green mint chiefly in the intensity of its taste and dark colour of its foliage. It is only cultivated for distillation; the essential oil or distilled water, enters into various cordial and medical preparations.

PEPPERS. See CAPSICUM.

PEPPER-SAXIFRAGE. (*Cnidum*, the ancient name of orach.) These are worthless herbaceous plants.

The meadow pepper-saxifrage (*C. Silaus*) is an indigenous perennial species, with smooth dark green herbage. The root is spindle-shaped; stem erect, furrowed, solid, tough, from one to two feet high. Leaves
doubly pinnate; leaflets deeply pi
their segments opposite decurrent.
on long stalks, erect, of several me
neral rays. Flowers yellowish or g
white, blowing in August and Sep
The whole plant being fetid when b
supposed in some parts of Norfolk
bad flavour to milk and butter; b
certainly do not eat it, except so
or in small quantities. When it
abounds in pastures, it may be fo
tially cropped, though generally le
entire. (*Smith's Eng. Flor.* vol. ii.

PEPPER, THE WALL. See
CROP.

PEPPERWORT. (*Lepidium*, f
a scale, in allusion to the shape of
which appear like little scales)
these plants are uninteresting, an
them are pretty. *L. sativum* is
known garden cress. There are
digenous species.

1. The broad-leaved pepperwo
tifolium). See DITTANDER.

2. Narrow-leaved pepperwort
rale) is an annual with glauco
herbage, which is fetid and pung
bruised. The stem is from six
inches high, solitary, erect, with m
spreading branches. Lower le
natifid; flowers minute, in dense

3. Common mithridate peppe
campestre), also an annual, comm
tivated fields. Flowers in cor
merous, small, white.

4. Hairy mithridate pepperwo
tum). This species has the root
perennial, and grows in fields
ground. The stem-leaves are arr
slightly toothed. (*Smith's Eng. F*
p. 164.)

PERCH. In land measure
tieth part of a rood, or equal to
yards. Perch is also sometimes
denomination of long measure, w
nifies the same thing as a rod or
5½ yards or 16½ feet.

PERCH. (*Perca fluviatilis.*)
is a very extensively diffused fish
common to the rivers and lake
parts of Europe, as it is to thos
land. The body of this fish is
scales very rough, and the b
arched. The colours of the
beautiful, the back and part of
being of a deep green, marked
black bars pointing downwards;
is white, tinged with red; the v
of a rich scarlet; the anal fin
(which is a little forked) of the
lour, but rather paler. The
perch angling is from February
middle of October. The principa

sects, and small fish, but particu-
nows. (*Blaine's Encyclo. of Rural*
1068.)

NNIALS. (Lat. *perennis*, lasting
it the year.) In botany, those
is plants, the roots of which re-
e more years than two, but whose
wer and perish annually. Gar-
enerally call them herbaceous

VINKLE. (*Vinea*, probably from
a band; in allusion to the suit-
of the shoots for making bands.)
nts are well adapted for covering
ound in shady situations. Any
soil suits them, and they are rea-
eased by separating the rooted
hoots. Two of the species are in-
viz.

lesser periwinkle (*V. minor*),
very smooth herbage. The root
g; the stems, round, trailing; the
branches simple, leafy, erect.
elliptic-lanceolate, dark shining
short footstalks, opposite without
Flowers solitary, an inch wide, of
et blue. There is a white-flowered
gardens, having variegated leaves,
er with double, purple flowers.

ter periwinkle. (*V. major.*) This
common species, found in thickets
s, especially on a wet soil. It is
ice as large in every part as the
The stems are branched, ascending
ower, afterwards procumbent and
ot near the extremity. Leaves
ged. Flowers of a lighter blue,
Smith's Eng. Flor. vol. i. p. 338.)

Y. A pleasant and wholesome
de from the juice of pears, by
fermentation somewhat in the
ner as cider from apples.

st pears for perry, or at least the
ch have been hitherto deemed the
making this liquor, are so ex-
tart and harsh, that no one can
eating them as fruit; for even
vine will not eat them.

bserved by Mr. Knight, that in
his liquor, the pears are ground
ed in exactly the same manner, as
apples in the manufacturing of
t that it is not usual for the re-
lp to be suffered to remain any
time without being pressed.

ter-management is in all respects
similar to that of cider, that no
escription is necessary here.

whole, the pear furnishes a less
out a very superior liquor to that
by the apple. The tree is capable
grown on a greater variety of soil,
ore productive, furnishing in the proportion of 600 gallons of liquor to the acre, where the trees are full grown. (*Brit. Husb.* vol. ii. p. 365.) See CIDER and PEAR.

PERSICARIA. (*Polygonum.*) Of this extensive genus there are several indigenous plants passing under the denomination of persicaria.

1. The amphibious persicaria (*P. amphibium*), a perennial, is common in ponds and ditches about their banks. The root is creeping, with numerous whorls of white or red fibres. Leaves stalked, generally flouting, ovate-lanceolate, more or less acute, single-ribbed, minutely serrated, smooth, bright green. Flowers crimson, in elegant, ovate, dense spikes raised above the water. Water fowl are said by Curtis to be fond of the seeds.

2. Spotted persicaria (*P. persicaria*) is an annual species, with a fibrous root. It is a very common weed in wet fields, watery places, and about ditches. Stem erect, sometimes throwing out radicles from the lowermost joints, one to two feet high, round, smooth, often reddish. Leaves spreading, a little drooping, lanceolate, marked about the centre of the disk with a black crescent-shaped spot. The flowers are in clusters, dense, ovate-oblong, erect, rose-coloured or whitish.

3. Great bistort. (*P. bistorta.*) Is a perennial flowering in June. The roots are attached to an underground caudex, contorted to the shape of an S: hence the specific name of the plant. The roots of bistort contain much tannic acid in combination with fecula, and form an admirable astringent in diarrhœa, and the latter stage of dysentery, when no inflammation is present. A decoction made with one ounce, bruised and boiled in a pint of water and strained, may be given in doses of two table-spoonfuls.

There are three other species of persicaria, the pale-flowered (*P. lapathifolium*), the biting (*P. hydropiper*), and the small creeping (*P. minus*), which are not sufficiently distinct or of importance to call for especial notice. (*Smith's Eng. Flor.* vol. ii. p. 232.) See ARSMART and BISTORT.

PETTY MUGUET. One of the names of the ladies' bedstraw (*Galium verum*).

PEW. See CHURCHWARDEN.

PHEASANT. (*Phasianus Colchicus.*) This is one of the most beautiful birds, on account of the vivid colour and diversity of its plumage; and being held in high estimation at the tables of the wealthy and luxurious, great care and expense are bestowed in preserving and increasing the bird by noblemen and other considerable landed proprietors. In Britain it inhabits woods, brakes, and thickets in the day-

PHLOX. (From *phlox*, a flame; alluding to the appearance of the flowers.) This is an elegant genus of plants. The species are all rendered more valuable from their lively red, purple, or white flowers, being produced at a season of the year when the majority of the plants that flower at the same period are syngenesious, and, for the most part, yellow. All the species root freely by cuttings under glass, or by divisions. (*Paxton's Bot. Dict.*)

PICKLE. See Brining of Grain, Steep, and Salting.

PIE. A provincial term for a raised mound, or pit for preserving potatoes and other roots; and it is also applied to the compost heaps formed when the farm-yard dung is carried into the fields.

PIECE-WORK. That which is done by the job or piece. It is sometimes called task work. See Labour.

PIG. See Swine.

PIG DUNG. See Farm-Yard Dung.

PIG-NUT. See Earth-Nut.

PIG-STY. The name of the place where hogs are kept.

PIG-TAIL. A provincial term sometimes applied to a small slip of ground, generally in the state of grass.

PIGGERY. A collection of small sties where hogs or swine are lodged. See Swine.

PIGEON. (*Columba.*) This bird, with all its numerous varieties of tumblers, carriers, powts, &c., is derived from one common species, denominated the stock dove. Mr. Yarrell, in his *History of British Birds*, describes five species of doves or pigeons, viz. —

1. The ring-dove, or wood pigeon (*C. palumbus*). Our ring-dove, so called from

The whole length o
teen inches. The plu
parts of the body is b
and breast are vinou
belly, &c., ash-grey ; le

2. The stock dove (
cies derives its name
stocks of trees, partic
been headed down,
consequence rugged a
The eggs are not quite
the ring-dove. The fo
very similar to that of
plumage is for the m
the sides of the neck gl
flections; breast pur
length of the female is

3. The rock dove (
implies, is a species
and wild state, inhabit
sea coast, in the cavit
the greater part of the
during summer as fa
necessary to visit the
other places from whi
food. It is distinguished
stock dove by its light
colour; the pure whit
of the back; the two co
across the wings, and t
tion with very opposite
length of the bird is
half. The eggs are
lines long by one inch
broad.

4. The turtle dove
summer visitor here.
England from the Afr
end of April or the be
are rather more num

ge is in general brown, of various
:s and toes yellow-brown. The
;th of the bird is eleven inches

passenger pigeon (*C. Ectopistes*
). This beautiful bird is a na-
th America. Its appearance on
is very rare. The whole length
lt male bird is seventeen inches.
Brit. Birds, vol. ii. p. 249. 276.)

N'S DUNG. See Dove Cote
.

LE. A provincial term applied
nclosure or croft.

A word of various signification
t districts. In some counties it
o a prong, or what is generally
rk used for carrying straw, &c.
barn, cocking of hay, &c. In
gnifies a sort of stacklet or load,
y, &c. In the midland districts
glean.

(*Esox Lucius.*) This is a well-
ligenous fish, whose voracity is
They may be caught with al-
bait. The size of the English
ome instances very great; it has
it weighing ninety pounds. The
long fish, with a very flat head.
olour is a pale olive grey, deepest
ck. They cast their spawn in
April, and are in season from
May to the beginning of Fe-
hey are called jack till they be-
ty-four inches long. (*Walton's*
laine's Rural Sports.)

ARD. A fish which greatly re-
e common herring; and though
somewhat shorter, yet it is con-
thicker, and contains a larger
of oil. Pilchards appear in ex-
als on the coasts of Cornwall and
e in July; and the fishery gives
it to a large number of persons.
ge, refuse salt, and wasted fish,
sively used as a manure in the
stricts. See Fish as a Manure.

A sharpened beam of wood driven
the ground to protect the banks
for other similar purposes. Pile
vincially applied to the breaking
ns of thrashed barley, and to a
rass.

G-IRON. A tool used in break-
awns of barley, and sometimes
f oats, an operation which with
rs is called piling barley. See
er.

ORT CROWFOOT. See Crow-

WORT. (*Pilularia*, from *pilula*,
ape of the heads containing the
ive organs.) The creeping pill wort, or pepper-grass (*P. globulifera*), is an obscure little plant, found in damp meadows among grass, especially where they have been overflowed with water during winter. It is a perennial in habit, putting forth brown flowers in June and July. (*Smith's Eng. Flora.* vol. iv. p. 341.)

PIMPERNEL. (*Anagallis.*) A genus of very pretty interesting plants of easy culture. There are three indigenous species.

1. The common scarlet pimpernel (*A. arvensis*), which is common in fields and gardens. The beautiful bright scarlet flowers close at the approach of rain, as farmers and shepherds in general well know; hence it has been popularly called the "poor man's weather glass." This is an annual species. The root is small; stem branched from the lower part, often dotted with purple; more or less procumbent, square. Leaves ovate, many-ribbed, dotted with purple at the back.

2. Blue pimpernel. (*A. cærulea.*) This is also an annual species, found in corn-fields, but more rare than the last, which it very much resembles in every part, except that the corolla is smaller, of a most vivid blue, paler beneath; its margin strongly, acutely, and unequally notched. Whether a species or variety, the blue pimpernel is reported to be constantly propagated by seed.

3. Bog pimpernel. (*A. tenella.*) This species is perennial, and is not uncommon on wet, spongy, mossy bogs. The root and stems are creeping; the whole plant smooth, except the stamens, depressed, branched, with small roundish leaves, somewhat pointed, stalked, finely dotted underneath. Flowers erect, rose-coloured, on slender stalks, much longer than the leaves, and becoming twisted when in fruit. The bog pimpernel yields to none of our wild plants in elegance. (*Smith's Eng. Flor.* vol. i. p. 280.)

PIMPERNEL, BASTARD. See Chaffweed.

PIMPERNEL, WATER. See Brookweed.

PINE APPLE. (*Ananassa sativa;* from *nanas*, the Guiana name.) A tropical fruit, native of South America and some of the West India Islands, which is now extensively cultivated in hot-houses in this country, and is well known to every one. The plants that yield this very superior fruit, so much esteemed for its luscious aromatic flavour, were first brought to this country in 1699 by the Earl of Portland; but it is said it was first grown in this country by Sir Matthew Dickens, at Richmond, where fruit was produced in 1715. There are now as many as thirty distinct varieties cultivated in this country, but of these only a few merit cultivation, such as the common

This much-esteemed and well-known genus, belonging to the gymnospermous division of exogens, contains some of the trees of most universal use in civilised society, and which form a very important article of commerce, both in Europe and America. The genus *Pinus* is distinguished from the firs, by the leaves being needle-shaped and grouped in pairs, or in three, four, or five together; held, as it were, together by a sheath at their base. Most, if not all of the species, are highly deserving of culture, being very ornamental and beautiful in every stage of their growth. They will succeed on almost any kind of soil, but to bring the timber to its greatest state of perfection, a somewhat loamy surface soil and a cool subsoil are requisite. Young plants may be obtained by a variety of methods. All the species may be propagated by layers, by inarching on nearly allied kinds, and by herbaceous grafting; many may also be increased by cuttings, but the speediest way is by seed, and which process I shall briefly notice. In some of the species the cones attain their full size the first year, but in most not till the end of the second autumn. The cones of *P. sylvestris*, and those allied to it, open of themselves shortly after being gathered from the tree, and spread out in the sun; but the cones of *P. Pinaster*, *P. Pinea*, and similar kinds, do not, though treated in the same manner; and open their scales only after several months. The seed should be sown on a finely-prepared rather sandy soil, in March or April. The seeds of the most common kinds are always sown on beds, and after being gently beaten down are slightly covered with light soil.

There are upwards of fifty species of

colour, of various degr
Scotch fir is the most d
species. Its lightness a
it superior to any other
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wood of the Scotch fir,
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common turpentine are
Scotch fir, and when the
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2. The Norway spru
Abies, Lin.) The white sp
the black spruce (*P. nig*
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in truth firs; and they
termed *Abies excelsa*, *A.*
but as they were not me
they are here describe
spruce is a noble tree,
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leaves are tetragonal an
cones cylindrical, pendulo
rhomboid, flat, jagged, a
at the margin. It is a
Russia, and the north o
springy places. It is
country. It yields the
the name of white fir,
from its being always im
planks. The Norway s
well in Britain, and pro
inferior to the foreign; it
and the knots are extrem

3. White spruce (*Pi*

s of little value, but the bark contains ic acid, which renders it useful in ing.

Black spruce (*Pinus* or *Abies nigra*). leaves resemble those of the Norway ce, but are shorter. The cones are shaped, with rugged, rounded scales. a native of the coldest regions of North rica, where it abounds in swampy situ- s; and rises seventy or eighty feet in ht. The timber is strong, light, and ic, admirably adapted for the spars and s of ships. When tapped, it yields is termed the essence of spruce.

The stone pine (*Pinus Pinea*) is a pine, a native of the South of Europe, he Levant; but it is easily naturalised r climate. It belongs to the class of the scales of whose cones are obtuse at pex. The trunk is erect, the leaves in , stiff, dark green. The cones are dish, very smooth, with truncated s, and contain large oblong seeds with ort wing. The timber is white and ble.

e other pines of this class are—*P. pu-* , *P. unicinata*, *P. resinera*, *P. halepen-* *P. brutia*, *P. Banksiana*, *P. Pallasiana*, *ustriaca*, and *P. Laricio*. Those with s in pairs, and having cones spiny at apex, are—*P. pungens*, *P. mitis*, *P.* , and *P. Pinaster*. Pines with leaves rees, with the scales of the cones ob- are—*P. sinensis*, *P. insignis*, *P. cana-* *s*, *P. Ocote*, and *P. patula*: and among with the scales of the spiny, we find—southern pine (*P. australis*), a native irginia, characterised by an erect, cy- ical trunk, long leaves, three in each h, grass-green. The cones egg-shaped, or eight inches long, with depressed s, armed with a sharp spine. The tree seventy or eighty feet in height; yields llent timber, light, clean, and durable, abundance of tar. It does not succeed ngland. The others are—*P. Tæda*, *gida*, *P. serotina*, *P. ponderosa*, *P. Sa-* *na*, *P. Coulteri*, *P. longifolia*, *P. Ge-* *ana*. The pines with five leaves in a th, and obtuse cones, are—*P. leiophylla*, *ontezumæ*, *P. filifolia*, *P. Apulcensis*, *eudostrobus*, *P. Russelliana*, *P. Devon-* , *P Hartwegii*. With spiny scales of cones—*P. occidentalis*, *P. macrophylla*. h flat scales, compressed at the apex,—*embra*, *P. Strobus*, *P. excelsa*, *P. Lam-* *ana*, and one or two others.

r a great mass of other useful in- ation relative to these fine trees, in- for every thing that is necessary to respecting them, we refer the reader oudon's *Arboretum et Fruticetum Bri-* *icum*, a work which ought to be in the hands of every lover of hardy trees and shrubs. The Norway pine yields Burgundy pitch, and common frankincense, by spontaneous exudation. (*Paxton's Bot. Dict.*; *Phillips's Sylv. Flor.*; *M'Culloch's Com. Dict.*) See Firs and Larch.

PINE, THE GROUND. See Bugle.

PIN-FALLOW. A provincial term applied to winter fallow.

PINK. (*Dianthus*; from *dios*, divine; and *anthos*, a flower, in reference to the fragrance of the blossoms and the unrivalled neatness of the flowers.) A truly beautiful and ornamental genus, containing some of the most prized flowers we possess, on account of the beauty and fragrance of their blossoms, and their foliage, which is as green and vivid in winter as it is in summer. The genus is divided into those with *solitary* and those with *aggregate* flowers. The clove pink or carnation (*D. caryophyllus*) is an indigenous perennial. Smith says it is the origin of all our carnations. (See Carnation.) The other species of this division is the maiden pink (*D. deltoides*); and with it may be classed the mountain pink, which bears single-flowered stems, with hairy, unequally notched petals. The *aggregate* pinks are Deptford pink (*D. Armeria*), a beautiful species, with small inodorous flowers, speckled pink and white. The stems are leafy, forked, corymbose; the leaves linear, lanceolate, keeled, erect; but the lowermost spreading. In the same division is the proliferous pink (*D. prolifera*), an annual. The rarer kinds of pinks should be grown in pots, so that they can be protected in winter; they all delight in loamy soil, mixed with a little rotten dung or decayed leaves and sand. They may be increased by seeds or cuttings; the last method is preferable. The cuttings should be planted out under a glass, about the middle of June, and if they are placed on a gentle hot-bed, they will be ready for planting out in about three weeks. The annual and biennial kinds merely require sowing in the open border, where they will grow and flower freely. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. ii. p. 285.)

PIONY. See Peony.

PIP. A disease among poultry, consisting in a white thin skin, or film, growing upon or under the tip of the tongue, which hinders the feeding. It is supposed to arise from the drinking of foul water, or eating filthy meat; it is usually cured by pulling off the film with the fingers, and washing the part with a solution of common salt.

PIPE CLAY. A species of clay abounding in Devonshire and other parts of England, employed in the manufacture of earthenware. See Mixture of Soils.

tapering gradually from a broadish base to a capillary point, all finely cellular internally. Stalk three or four times as tall, with a tubular sheath at the base, solitary, simple, naked, a little twisted, having about seven angles. Flowers solitary, terminal, almost globular, like a white double daisy, though not half so large, finely downy, tinged with purple. (*Smith's Eng. Flor.* vol. iv. p. 140.)

PIPIT. (*Anthus*). In ornithology, the name of two British birds.

The tree pipit (*A. arboreus*) is a summer visitor to these islands, arriving about the third week in April. Its nest is on the ground in woods and plantations, or under rushes in hedge-rows, formed of moss with fibrous roots and dried grass. Eggs four or five, whose colour is greyish white spotted with purple brown or purple red. This bird feeds on insects and worms. The colour of the beak is dark brown; the neck, head, back, and wings, olive brown; the chin and throat pale brownish white; the whole length of the bird is about six inches and a half.

The meadow pipit (*A. pratensis*) is a resident in the British islands during the year. It tenants the commons, wastes, moors, meadows, and marsh lands. It feeds on worms, insects, and small slugs. It builds its nest on the ground of dried bents, lined with a few hairs. The eggs are four or five, of a reddish brown colour, mottled over with darker brown. The egg of the cuckoo is more frequently deposited and hatched in the nest of the meadow pipit, than in that of any other bird. The beak of this little songster is dark brown. The feathers of the head, neck, back, wing, and upper tail-coverts, dark brown in the middle,

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ported in large quanti
ports of Europe, and
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PLANTAIN. (*Pl*
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the leaves.) A genus
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small, whitish, with r
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food of small birds. Th
and the panicled one
in gardens for the s

aves are ovate, downy, all pressed the ground, hoary, entire, with five n ribs. Flower stalks round, taller e foregoing, five-angled, hoary, nearly d and smooth. Spike an inch long, black imbricated bractes. Corolla with large cream-coloured anthers. shorter and thicker, very dense in part. Seeds solitary. The hoary n, a great and lasting nuisance in ss-plats, is best killed by a drop of acid on the crown of the root, t never long survives. Its medical s are like the former.

bwort plantain, or rib-grass (*P. lan-* is also a very common species in s and pastures. The leaves are us, erect, deep green, acute, each at the base into a broad, flat, foot-stalk, accompanied at its in- with large tufts of soft, white, woolly Flower-stalks taller than the leaves, woolly at the base, five-angled, termediate furrows, nearly smooth, Spike ovate, an inch long, with bricated bractes, occasionally leafy ase. This species makes a part of adow hay, and has been cultivated p, but seems to be now disused. re said not to eat it willingly, at itself. The total absence of rib- marshy lands is a certain criterion indifferent quality; and in propor- such soils are improved by draining, t will flourish and abound.

a plantain (*P. maritima*). This muddy salt marshes, and about the of large rivers. It is perennial, wers in August and September. t is long and cylindrical; herb va- luxuriance. The leaves are all numerous, from four to twelve long, dull-green, linear, channelled, early entire. Flower-stalks round, than the leaves, erect, smooth. cylindrical, slender, many-flowered, with fleshy keeled bractes, not longer e calyx. Sheep appear to be very this species.

uck's-horn plantain, or star of the (*P. Coronopus*). This is an annual which flourishes on dry, sandy, or y ground, flowering from June to The root is tapering; leaves pale, n pinnatifid pointed segments. Spikes ous, dense, cylindrical, varying greatly th, on spreading hairy stalks. (*Smith's Flor.* vol. i. p. 213.)

ANTAIN, THE WATER. See -PLANTAIN.

ANTATION. A piece of ground d with trees, for the purpose of pro- timber or coppice wood; and the term is also applied to a collection of trees or shrubs placed in the ground for their beauty or usefulness. It is a theme highly important to the landholder, and is one too interesting to the cultivator to be passed over slightly in a work of this character.

For the correct consideration of the best mode of forming plantations of timber trees, several circumstances must, of necessity, be taken into the planter's account, of which the principal are — 1st, The composition of the soil; 2dly, The trees to which that soil is best adapted; 3dly, The elevation, or inclination of the land: an inattention to these three primary questions has been the source of much waste of time, of labour, and of capital.

In the examination of this subject, I propose to divide my account of the timber trees best adapted to poor soils, into four classes; viz. those best fitted for, 1st, chalk soils; 2dly, for clay; 3dly, for sandy lands; 4thly, for peat earths; and, in so doing, I shall conclude, that the land is planted in the usual way without any addition of earths to render the soil more permanently fertile, although I am well aware what excellent results attend the efforts of those planters who have thus, by altering as it were the composition of their land, rendered it capable of producing almost any description of timber. And in this, as in all researches where vegetation is concerned, nature is ever our guide and instructor. We find indigenous on the chalks, the beech, the birch, and the ash; the oak tenants the clay formation, the elm delights in rich alluvial bottoms, and in warm sheltered situations. To the sand is left the fir tribe, the ash, and the birch; which last most picturesque tree will endure a climate, and vegetate on soils, far too cold and too barren for any other to exist in. On the warm gravels, and on deep light loams, we find the Spanish chestnut located; and if, on even the peat, we only occasionally meet with a few straggling mountain ash and Scotch firs, it is not because the composition of the soil is too poor to sustain a better description of timber tree, but that the soil is usually saturated with water, too much impregnated with the salts of iron for any plants to be successfully planted till that corrosive moisture is removed.

Then, again, as regards the temperature best adapted to the tree, much too little attention is commonly paid. The fir tribe I have ever found to delight in dry cool elevations. I have generally failed whenever I have attempted to make the larch grow in warm rich bottoms; but there is hardly a dry spot in England too cold or too poor for its successful cultivation. The lays long upon them. They evidently, therefore, prefer a temperature much lower than that in which the oak and the Spanish chestnut flourish best; by far the finest specimens of the first being found in the deep sheltered clays of the south of England, while, in the adjoining rich alluvial deposits, we notice the noblest chestnut trees. Thus Tortworth, in Gloucestershire, for instance, can here produce, perhaps, the finest specimen in England; and on the deep sheltered volcanic matter of Mount Vesuvius, it is found in unrivalled vigour.

These facts should be more carefully attended to by the English planter: he should consider the inequalities of his land and the habits of his trees, and distribute them accordingly. Leaving the natives of a temperate climate to the southern and western slopes, he should devote to the northern declinations the natives of a colder clime; to them consign the larch and the Scotch fir, the ash and the birch.

This last mentioned tree will, in fact, grow at a greater elevation above the sea, and in a more northern latitude, than any other. As we approach the Arctic regions, it is the last tree that remains to us. Long after all others have departed it still flourishes: in Greenland there is no other tree.

Then, again, as in all other questions where plants of any kind are to be made to vegetate, the chemical composition of the soil is a tolerably certain criterion, when compared with that of the wood of trees, to guide us in our selection of the species to which that land is the best adapted: the earths found in them by the chemist are sure to indicate the soils on which they will flourish. Thus, the ashes of the perfect

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Mag. vol. viii. p. 185.)

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l purposes; and it is because all r trees contain phosphate of lime in onsiderable proportions, that crushed are found to be so excellent a fer- for them; and hence one reason why been long a well-known fact, that by g dead animals under trees nearly sted for want of nourishment, those will almost invariably be consider- evived, and send out their shoots usual vigour; and how essential the e of phosphate of lime is to their , may be judged of from the fact, s salt constitutes 4·5 per cent. of the f the oak, 35 in those of the hazel, f the poplar, 23 in the hornbeam, ent. in those of the fir.

e chemical examinations naturally the conclusions to which I have ne in my own experiments, that in ations of timber trees, both on the profit, and of ornament, it is in al- situations desirable to assist the of the young trees by a small addi- manure. On a large scale, this chiefly confined to the use of the ither lime, chalk, or marl, accord- their respective local value; and purpose, a smaller proportion per any kind of manure is of much value than is commonly supposed. ually under every plant merely ap- mall shovelful of tolerably rotted ng, stirring it up with the mould, hese experiments were principally a poor hungry gravelly soil, nearly of carbonate of lime, I have added to the beech plants, instead of -yard manure, a small quantity of The effect has been highly advan- my plantations have been very to those of my neighbours (se- from my own by merely a road); they account for in their way, by "Oh, you took so much pains with es, they were sure to grow." The planters of England have neglected ral this application of manure to ons, not from an ignorance of its nce to their forest trees, but from g aware of the great value of it *very small quantities* to the young Thus, when rich organic ma- n the proportion of two or even per acre, are applied under each the way I have described, they will a very decided advantage, and if rl is rich in carbonate of lime, the eight of that fertiliser will be suffi- A still smaller quantity of chalk is ; and as I have before observed, in d they have found about four bushels an abundant addition, since they merely mix a handful of this earth in the soil under each plant; and in the fine woods produced by Mr. Withers, of Holt, by spreading a poor marl over his hungry black heath soil, and then ploughing them in very deeply, he merely added about twenty cubic yards per acre.

In preparing the land for plantations, the same chemical examination of its composition well illustrates the advantage derived by the plant, from merely previously stirring the soil, since it is evident that when the constituents of the young trees are contained in it, in only very limited proportions, in such case the more easily their roots are enabled to penetrate in search of that necessary nourishment, the more rapid will be their growth. Previous trenching of the soil also conduces to the healthy growth of trees, in more ways than one. It renders them less subject to injury from want of moisture in the heats of summer, the atmosphere more freely finds access to their roots, and not only yields its watery vapour in the warmest weather for their service, but its gases, so essential to their very existence, are also in a similar manner more readily absorbed.

I have had many occasions to notice the advantages of deeply stirring the land for timber trees. In my early plantings, my larch and other timber trees made but little progress, for I merely placed them in holes dug in the soil; I neither manured, nor in any way prepared the soil. An experiment, however, which I made some years since,—in which by merely trenching the soil with the fork in a clump of larch, Scotch firs, and birch to the depth of about twenty inches, the growth of the trees, which had for several years been extremely slow, was in the succeeding years exceedingly vigorous, — convinced me of the truth of the observations made by Sir Henry Steuart, Mr. Withers, and others, of the great advantages of trenching the soil, either by the spade, or by the common or the subsoil plough.

The opinions and explanations given by the labouring woodmen of the cause of the occasional very luxuriant *patches* in extensive young plantations accord with these conclusions. They tell you that those favoured trees are on a *deep tender* piece of land.

The question being determined with regard to the nature of the soil proposed to be planted, we may next examine the kind of trees best adapted to each.

On the clay soils will naturally flourish (under ordinary circumstances) the oak, the ash, and the Scotch fir: clays are not so well adapted to the larch, which loves a dry elevated gravelly or sandy soil, and larches I have ever noticed will flourish better the usual way, neither improved by draining, stirring the soil, or improving its staple by the addition of chalk, marl, or calcareous sand. If the latter modes are adopted, then on such soils almost any kind of trees will flourish — the larch, the beech, and the Spanish chestnut; which last, be it remembered, is not only to be classed amongst the most elegant and valuable of timber trees, but is also the most productive of underwood on soils that are naturally, or made artificially, suitable to its habits and food.

On the chalk soils, the beech, the ash, the larch, the ever life-sustaining birch, and the Scotch fir, are decidedly the best mixture of forest trees; they are best planted together, and not in separate masses. The beech, when planted in groups by itself, does, it is true, very well in some peculiar localities, but, generally speaking, it is best mixed with other trees; and they all, as I have before remarked, flourish in a superior way best on the northern sides of a hill, as in the great southern chalk ridges of Kent, Sussex, and Hampshire, and are benefited very materially by the deep stirring of the most compact chalk soil, as will be readily attested by those who have thus previously improved the soil, or have witnessed the rapid, far superior growth of the trees planted on an avalanche of earth in an old chalk pit.

The cedar tree is much too little cultivated as a forest tree in England, notwithstanding the great value of its wood. This neglect is principally owing to the general erroneous impression that it is a very slow-growing tree. This remark only applies to its early growth; for the first seven or eight years its progress is exceedingly slow; but

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y their roots and leaves, which are noxious to other trees is certain. Thus, the ash, and more particularly the locust, is very obnoxious to most trees. Then, again, the grouping together of certain trees is particularly grateful to them all. Thus, the larch is a very good neighbour; the Scotch fir, the birch, and the Spanish chestnut grow very luxuriantly with it; the oak, the elm, the hazel, and the hornbeam are evidently good neighbours. The Roman planters had remarked this habit of trees. Thus, they believed that the elm was particularly grateful to the vine; and they were so convinced of the existence of what they called a sympathy between them that they called the elm the husband of the vine. It was invariably their custom to plant them near each other; and as we are indebted to them for the introduction of the vine in England, so hence in all probability came with them our first elm trees.

The expense of these different modes of planting is next to be ascertained; it is an enquiry which will well repay the planter. The favourite mode, that of digging a small hole and inserting the tree, is, apparently, attended with the least outlay of money; in some instances it has been done for 4*l.* or 5*l.* per acre, or even less; but such plantations are very rarely profitable, — the plants die, or barely vegetate for years, have to be renewed again and again, and the general appearance of the plantation, overrun with weeds, or heath moss, or furze, is very melancholy. About 40*s.* per acre more bestowed in deep ploughing or subsoiling, will make a strange difference in the rapid growth and consequent early profit of the plantation, and moreover save materially the expense of the trees; for the number of them which perish in land thus prepared for their reception is very small.

In a still greater degree are these good results obtained by the addition of, say twenty cubic yards per acre of marl, or clay, or a still less quantity of chalk, according to the nature of the soil, or lime, which may usually be procured for an outlay of less than 30*s.* per acre; or of two or three tons of well putrefied farm-yard manure, — a shovelful under each tree in the manner I have before described. Now, supposing that even *all* these preparations of the soil are made, the expense per acre will then, in many situations, stand as follows —

	£	*s.*	*d.*
Ploughing deeply - -	2	0	0
20 cubic yards of marl or clay, or 10 of chalk - - -	1	10	0
3 cubic yards of dung, at 6*s.* -	0	18	0
Trees, ploughing, &c. - -	6	0	0
	10	8	0

in my own practice and in that of others, as most necessary to be attended to in rearing profitable luxuriant plantations of timber trees, on the poorest lands of England; hardly any of whose soils, however, are so barren or so elevated as not to be able to produce, with only reasonable care and expense, an ample return for the capital of the planter. It is a pursuit which is, in more respects than one, worthy of the attention of the landed proprietor, since he not only by his plantations adds to the beauty and income of his own estates, but at the same time yields to the community at large great and important services; its barren wastes are made to produce timber and underwood, the soil is gradually rendered fertile, profitable supplies of labour are afforded, its health is promoted, the very climate of the district by a general system of plantations is ameliorated, for its bleak hills are clothed, its stagnant swamps are drained.

There is an excellent account by the Bishop of Llandaff of "The planting Cartmell Fell" (*Com. to Board of Agr.* vol. vi. p. 1.), and a paper "On planting Trees," by Mr. Hove, a Polish gentleman (*Ibid.* vol. vii. p. 281.), "On collecting and preparing the Seeds of Forest Trees, the Mode of sowing them, &c." by Mr. Adam, and other planters. (*Trans. High. Soc.* vol. iii. p. 329.) He advises Scottish planters to collect the seed of the white larch (*Pinus larix*) in November, from trees of twenty to forty years of age, at an elevation not exceeding 400 feet; that the seed-bed should be manured with cow-dung, well mixed with the soil for some time previously to sowing the seed, which should be in April and

be planted out wh
old. *Ash keys* are g
January, and laid i
third of their bulk
they should be tur
in the following year
for twelve or fourte
sowing in March, in
other, and one and
The seed of the *Sco*
and should be sown
beech is gathered in
the following March
a half inches deep. T
chestnut are best pro
may be sown in F
inches deep. The
to be sown in Octob
ing birch should be
thered, and covered
deep. Those of the
and sown in Octobe
gated by cuttings.

See also on the i
new forest trees in
High. Soc. vol. v. p
lative to Plantation
Mr. Thomson (*Ibid.*
Economy in plantin
Plantations of the
Estates" (*Ibid.* vol.
paring large Trees
planted," by Mr. M
"On pruning Fores
(*Ibid.* vol. iii. p. 59.
Matthew, p. 300.)

For a description
preparing the land f
advise the young p
works of Mr. Wither

Scotch acre (which is equal to 6150
ards) —

	s.	d.
year transplanted larches	1	9
-year seedling do.	3	0
year transplanted Scotch firs	0	9
-year seedling do.	1	0
of plants to the moor	1	2
of planting 3500	2	4
l expence per Scotch acre	10	0

M, Oak, Fir, Larch, Pine, Forest,

TING. In arboriculture, the art
g plantations of trees. Also the
serting plants in the soil by the
bble, trowel, or by other means in
griculture and gardening. As in
ding article I have gone very fully
particulars of planting trees, I shall
in this place the following useful
wing the number of plants required
re of land, from one foot to twenty-
distance from plant to plant.

Number.	Distance. Ft.	Distance. In.	Number.
43,560	8	6	602
19,360	9	0	538
10,890	9	6	482
6,960	10	0	436
4,840	11	0	361
3,556	12	0	302
2,722	13	0	258
2,151	14	0	223
1,742	15	0	194
1,440	16	0	171
1,210	17	0	151
1,031	18	0	135
889	19	0	121
775	20	0	109
680	21	0	99

HING. A mode of repairing or
g a hedge by bending down a por-
e shoots, cutting them half through
ground, to render them more pli-
twisting them among the upright
as to render the whole effective as
and at the same time preserve all
ches alive. For this purpose the
to be plashed or bent down must
t more than half through, in order
fficient portion of sap may rise up
root to keep alive the upper part
ranches. Where hedges are pro-
med and kept, they can very sel-
uire to be plashed; but this mode
ng a hedge is most valuable in the
hedges abounding with hedge-row
hen from neglect, or from any
use, the hedge has become of irre-
owth. See Fences, Hedges, and
.

TER OF PARIS. One of the
names of the sulphate of lime or plaster stone, which is found abundantly near Paris. When burnt and reduced to powder, and then mixed with water, it forms a firm, sonorous substance, admirably adapted for forming models and casts. See Gypsum.

PLASTER FOR TREES. See Canker.

PLASTIC CLAY. A clay used in the manufacture of pottery.

PLATT, or PLATTE, SIR HUGH, Knt., is stated by Mr. Weston, in his Catalogue of English Authors, to have been "the most ingenious husbandman of the age he lived in." From the same author, and from Sir Hugh's own works we learn, that he spent part of his time at Copt Hall, in Essex, then possessed by Sir Thomas Henneage, near which he had a country seat. In 1594, he lived at Bishop's Hall, in Middlesex, and had an estate near St. Alban's. In the title-page of his works he is styled "of Lincoln's Inn, gentleman;" and, therefore, although he does not inform us of what profession he was, further than that it was widely differing from cultivating the earth, we are justified in concluding that he was in the law. He had a very extensive correspondence with the lovers of gardening, &c. He was living in 1606. The following are his works: —

1. Dyvers Soyles for manuring Pasture and Arable Land, 1594. 4to. 2. The Jewel House of Art and Nature, containing divers rare and profitable Inventions, together with sundry new Experiments in the Art of Husbandry, Distillation, and Moulding. Faithfully and familiarly set down according to the Author's own Experience. 4to. 1594. Again in 1653, edited by Dr. Beati. 3. The Paradise of Flora, 1600. 4. The Garden of Eden, or an accurate Description of all Flowers and Fruits now growing in England, with particular Rules how to advance their Nature and Growth, as well in Seeds and Hearbes, as the secret ordering of Trees and Plants. Small 8vo. 1660. 5th edition. — A posthumous publication. 5. The second part of the Garden of Eden, &c. never before printed. 1660. "The Garden of Eden" is the same as "The Paradise of Flora," with the mere alteration of the title, by a Mr. Charles Bellingham, a kinsman of Sir Hugh's. The second part of "The Garden of Eden" is entirely an original composition of Bellingham's. (*Quar. Jour. Ag.* vol. xii. p. 69.)

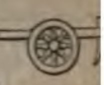
PLATTES, GABRIEL, was of humble origin, but of his lineage, place of nativity, &c. I have discovered nothing. His works, however, demonstrate that he was a practical man of clear intellect, and observing mind. Being a needy man, he at times was dependant upon the bounty of others for subsistence; amongst those who chiefly administered to his relief was S. Hartlib, to whom he bequeathed his papers, few of which were published. He died miserably in the streets, almost in a state of nudity. That he was justly estimated by his contemporaries is evident. Harte says of him, that "he had a bold adventurous cast of mind." Weston, in his Catalogue of English Authors, says he was an original genius in husbandry and an ingenious writer. Another author styles him "a singular honest man,"—a fourth says "he had as excellent a genius in agriculture as any man that ever lived in this nation before him." Yet this man was permitted to live in poverty, and to die ultimately of want, affording another testimony that those who benefit by the efforts of another's genius but seldom feel grateful for or appreciate the benefits they receive, but whilst they are enjoying them, as Frederick of Prussia said in discarding Voltaire, "Having extracted all the juice, I merely neglect the rind." He was the author of—

1. A Treatise of Husbandry. 4to. 1638. and 1674. 2. Practical Husbandry improved, a Discourse of infinite Treasure, hidden since the World's beginning, in the way of Husbandry. 4to. 1639, 1653, 1656. 3. Recreatio Agricolæ. London. 1640. 4to. 4. The Profitable Intelligencer. London. 1644. 4to. 5. Observations and Improvements in Husbandry, with twenty Experiments. London. 1653. 4to. He also wrote "Art's Mistress," containing his own experiments for fifty years, which however was not published. (*Weston's Catalogue*, p. 15.; *G. W. Johnson's Hist. Gard.*; *Quar. Jour. Ag.* vol. xii. p. 456.)

PLEASURE-GROUND. That portion of ground adjoining a dwelling-house in the country; and which is exclusively devoted to ornamental and recreative purposes. In the ancient style of gardening, the pleasure-ground was laid out in straight walks, and regular or symmetrical forms, commonly borrowed from architecture; but in the modern style, it is laid out in winding walks, and in forms borrowed direct from nature. A portion of lawn or smooth grassy surface may be considered as essential to the pleasure-ground under both styles. See GARDENING, LAWN, and PARTERRE.

PLOUGH. (Sax. *Plou.* Dan. *Ploegh.*) A well-known, perhaps the most ancient, certainly the most valuable of all agricultural implements. There are traces of it in even the earliest of all written authorities, and judging of its importance in agriculture, we can hardly imagine it possible to carry on extensive systems of cultivation in any period or country without

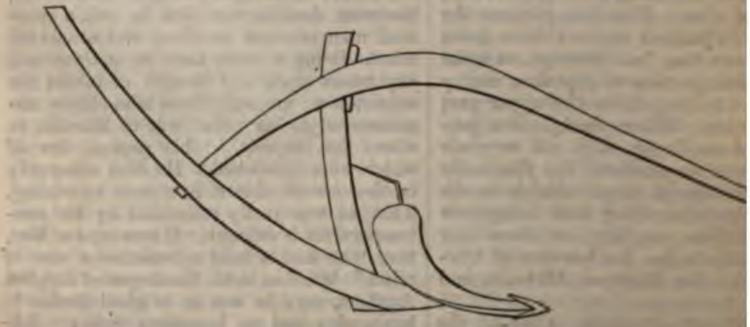
its assistance. The first
plough, observes Mr. J. Allan
from whose excellent work on the
ments of agriculture this article is, by
mission, extracted, are brief and
find, however, that in very early
ploughed with two oxen (*Deut.*
that their plough had a coulter and
share (1 *Sam.* xiii. 20.), and that
early aware of the advantages of
fallow. (*Prov.* xx. 4.) It is
their ploughs were long since
with wheels; a fact which is proved by the drawings of the early Greek ploughs which have escaped to us, of which the following is one copy.



Hesiod (*Works and Days*,
advised the Greek farmers to
plough, that an accident might
rupt the work; and he also
vantages of careful and skilful

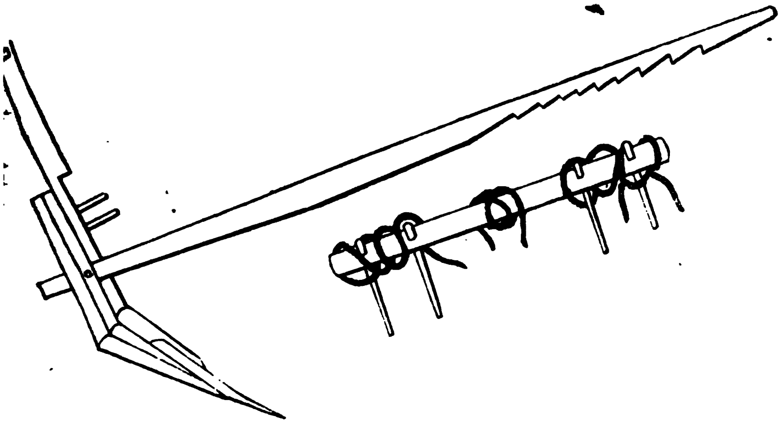
The ploughs of Rome were
simple form; the following
one of them I again insert in
order that the gradual
of plough-making may be the
traced.

Rivalling these in simplicity
ness of form, are the never
proved ploughs of the Hindo
Chinese, from whose implement
bable the shape of those of
borrowed. This may be
following sketches.

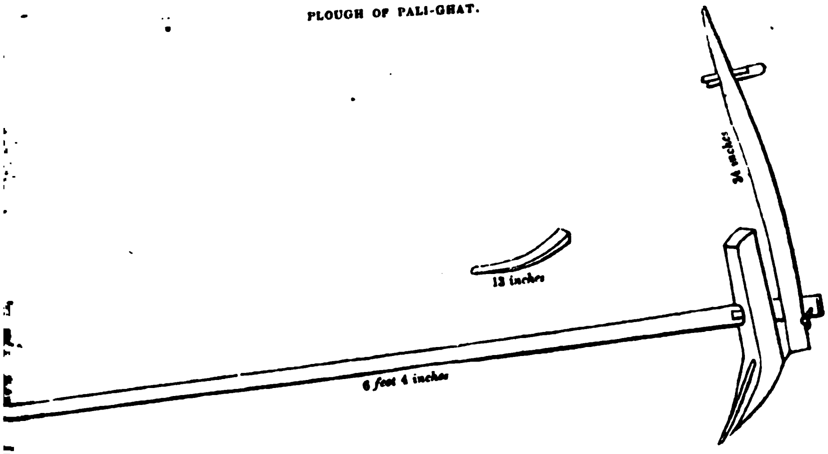


CHINESE PLOUGH.

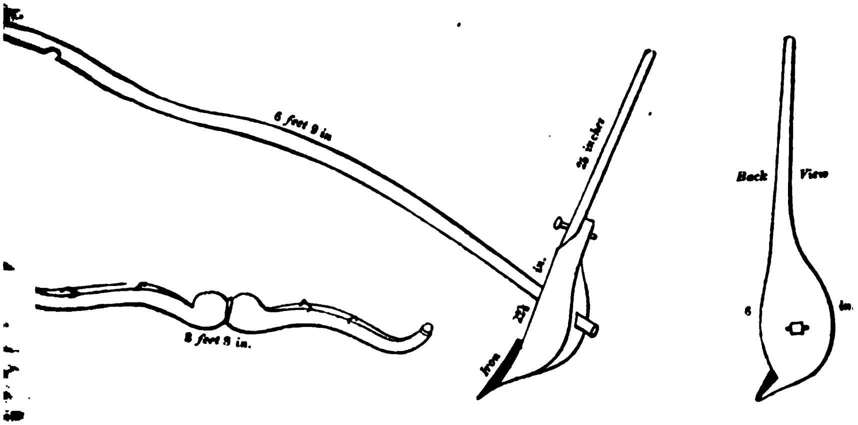
PLOUGH.



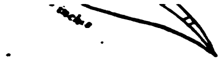
PLOUGH OF PALI-GHAT.



PLOUGH OF BANIWASI, IN CONARA.



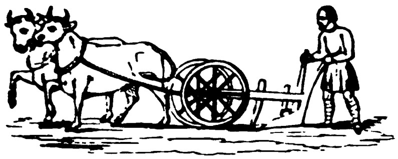
MANGALORE PLOUGH.



CHATAKRAL PLOUGH.

It is curious to trace the progress of plough-making in England. Those of the early cultivators were of necessity rude and imperfect, for in those days the ploughman made his own plough. A law of the early Britons in fact directed that no one should guide a plough until he was able to make one. The driver was, by the same law, to make the traces by which it was drawn, and these were to be formed of withes of twisted willow; a long exploded custom; many of the olden terms of which, however, are still retained by the rustic ploughmen. Thus the *womb-withy* is yet called the *wambtye* or *wantye*. *Withen* trees are denominated *witten trees*, or *whipple trees*, &c.

It is uncertain whether the early British ploughs had wheels; some of those of the Saxons were certainly furnished with them. The following engraving is taken from a Saxon Calendar. (*Cotton. MS. Tib.* b. 5.)



Yet it is pretty certain that they used ploughs of a form rivalling those of modern India in simplicity: a rude sketch of one of these is given in
MS. 603.)

From this cut it
Saxon forefathers
their horses to the p
barbarous custom,
formerly practised i
extent that the leg
1634, and declared,
c. 15. (Irish Parl.) en
plowing by the Ta
Wool off living Sh
places of this kingdo
long time used a
ploughing, harrowin
ing with horses, ma
and colts by the ta
the cruelty used to
of horses is much i
dome. And also di
use the like barbarc
off the wool yearly
stead of clipping o
These wretched prac
illegal, and to be pu
imprisonment.

The Norman plou
with wheels, and i
ploughmen to carry
clods, as is depicted
from whence the fo
graved. See *antè*, p.

y animal except the ox for this The first representation, of which ire, of a horse employed in the that given (A.D. 1066) in the f Bayeux.

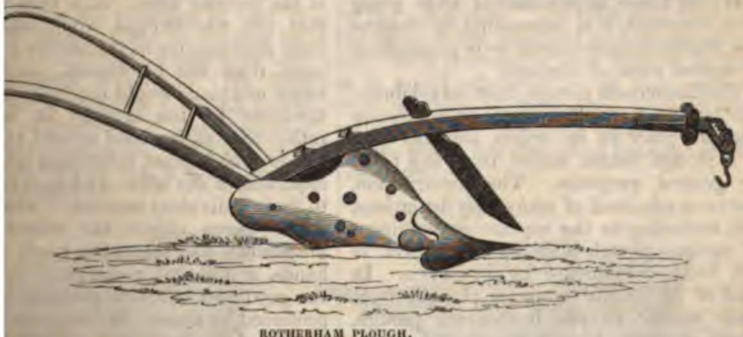
are evident traces in the early agricultural authors of the im- which they ascribed to the im- nstruction of the plough. This , however, was long drawn en- xen in Britain.

bert, in his *Boke of Husbandrye* eaks in a manner that shows that is day plough horses were not employed; he observes, "a hus- ay not be without horses and l specially if he goe with a horse Worlidge, in his *Mystery of Hus-* scribes (A.D. 1677) very clearly ude attempt to construct a sub- h: he tells us, p. 230., "of an young man of Kent, who had hs fastened together very firmly, ich he ploughed two furrows at under another, and so stirred up welve or fourteen inches deep. It neth and lighteneth the land to , but doth not bury the upper he ground so deep as is usually igging." When Heresbach wrote was not uncommon in some of r parts of Germany and Italy to ring the night, "that the moisture ess of the ground may remain under the clodde, and that the rough overmuch heate of the not diseased or hurt." (31. b.)

Jethro Tull, more than a century since, paid considerable attention to the plough; he had even searched into the early history of this implement, and concluded that it was "found out by accident, and that the first tillers (or plowers) of the ground were hogs." (*Husb.* p. 131.) The ploughs which he describes, and of which he gives drawings, were evidently (although rudely and heavily constructed) superior in several respects to all that had preceded them.

It is not necessary to do more than thus slightly advert to the various notices which are to be found in the early histories and pictures of this invaluable implement; for, in fact, for ages the plough was little more than a rude clumsy instrument which served only to rake the surface, instead of making furrows in the land sufficiently deep for the seeds to be buried. It was not brought to any thing like a perfect tool for the purposes required till the close of the seventeenth century.

The Dutch were amongst the first who brought the plough a little into shape, and by some means or other the improved Dutch plough found its way into the northern parts of England and Scotland. Those who have traced the history of the plough agree that one made by Joseph Foljambe, at Rotherham, under the direction of Walter Blythe, author of some works on husbandry, and for which plough a patent was obtained in the year 1730, was the most perfect implement then in use; and to this day it is well known by the name of the Rotherham plough.



ROTHERHAM PLOUGH.

ough was constructed chiefly of draught-irons, share, and coulter, additional plating of iron to the rd and sole, being the only parts on.

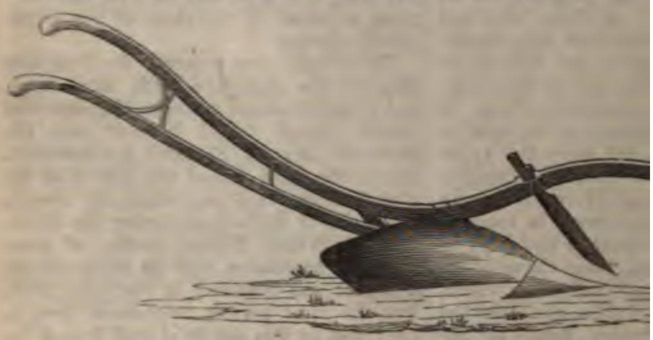
must now be made of a step in of improvements by the ingenious celebrated James Small, a Scotch- constructed a plough on true l principles, and was the first inventor of the cast-iron turn-furrow, commonly called the mould-board; and, although more than a century has since passed, Small's plough may, in most respects, be referred to as a standard for the elements of plough-making.

James Small established his manufactory of ploughs and other agricultural implements at Black Adder Mount, in Berwickshire, in the year 1763, and died about best part of his life to the furtherance of pursuits connected with agriculture.

What is known as the Scotch plough comes next under our view, which comprises the improvements made by Small; but, instead of the beam and handles being of wood, the whole plough is of iron, and, from

it forms one of the m
ance, as well as mos
the present day.

The Wilkies and
their practical experi
manship, brought the
into its present state.



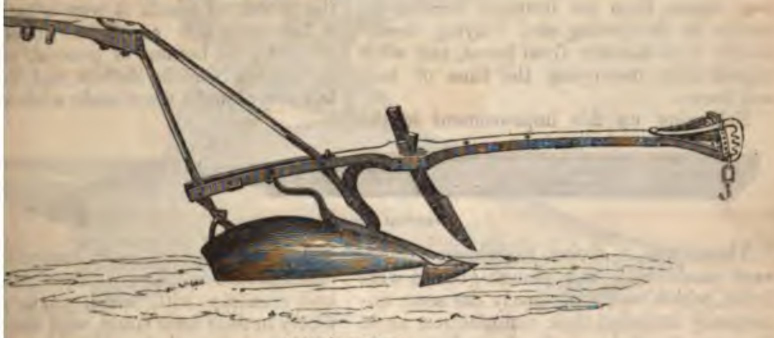
SCOTCH PLOUGH.

Whilst these improvements were going on in Scotland, it is interesting to observe how similar improvements were progressing in various parts of England.

The Rotherham plough, from its celebrity, had become partially known at a distance from the place of its origin, and was used as a plough better suited than any other for general purposes. The construction, however, admitted of many easy deviations, and, according to the caprice or judgment of various plough-makers, was altered to suit local convenience or prejudice. In most of the English counties ploughs were made similar to the Rotherham plough,

at the present time.
that the wheelwrigh
little interference in t
ment from the black
latter mechanic would
thwarted by the art
rather that each woul
things which least in
cupations of the other,
to their individual int
hand, where either
blacksmith had the en
hands, a different res
the good and effective
produced by them. I

hich he states there is "no other ngdom equal to it." The report ished in 1804; and at that time, the writer adds, Brand had been dead some years.

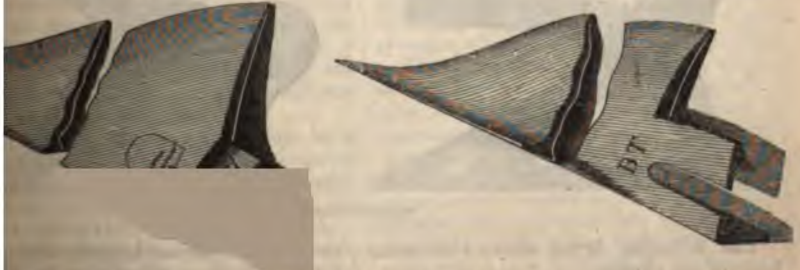


BRAND'S PLOUGH.

ood plough, as generally made, y objectionable points and pro- It was very liable to get out of n exposure to the soil and wea- continually required repair. For a correct principle or guide, it quently happen that if two ploughs e by the same maker, they would exactly alike; and it was a matter chance than certainty whether uld perform its work properly.

shares had been hitherto made of ron, until, in 1785, the late Robert of Ipswich, obtained a patent for shares of cast iron;" and this cir- e is worthy of notice, not only as portant and successful improve- the part in question, but as the drawing the attention of that in- and many others to further im- ts in the plough, which were very r carried into effect. In 1803 ansome obtained a second patent de of applying a case-hardening cast iron shares. This invention well known that a brief descrip- may suffice.

Before the time referred to, cast iron shares, although occasionally used in some districts, were found to wear away too fast from the under side. When the first edge was worn off, the share became too thick to cut the ground properly, and its tendency, when so worn, was to "lose its hold of the work," and to pass over weeds without cutting them; while the blunt edge greatly added to the draught. The improvement alluded to is that of case-hardening the under side to the thickness of one sixteenth or one eighth of an inch, which is, in effect, like a layer of steel underneath the share. This part, from its hardness, wears very slowly, while the upper part of the share grinds more quickly away, thereby producing a constant sharp edge on the under side. The land-side point of the share is also hardened in a similar manner, which prevents it from wearing so fast as it would otherwise do at that part; a fault to which all shares are more or less subject. The following figure shows a broken share, and the white lines the hardened parts.



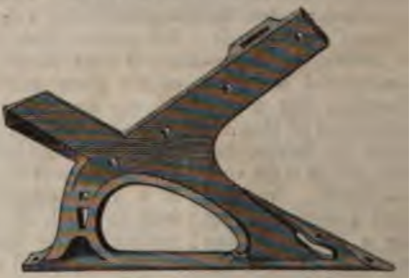
of cast iron shares, thus tem- able expense is saved; the o much less than that of wrought iron, that they may be renewed at a less expense than the repairs needful to the latter. Another benefit arises from

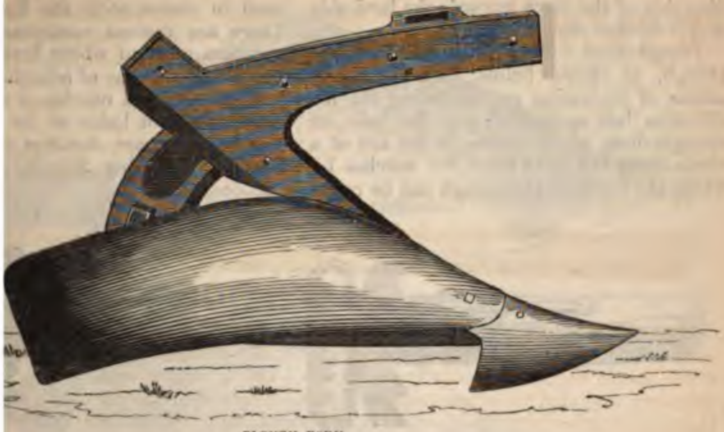
PLOUGH-GROUND SHARE.

There was a defect to which ploughs even made with this plough-ground were liable, which was, that nearly the same uncertainty attended their manufacture as in those constructed entirely of wood; scarcely two workmen would make them alike, and sometimes one plough would work well and easily to the holder, while another made by the same hand would be inferior in this respect; in addition to which inconvenience, the wood tenons in the iron mortices were liable to decay, and a constant expense of repair was entailed, which has of late years, under further improvements in the construction of ploughs, been obviated.

As improvements in the art of founding became known, cast iron gradually, and to a great extent, superseded the use of wood and wrought iron,
manufacture of plou
and economy with
nicety in their form co
of their being alway
to any extent. Soon
of the cast iron share,
having their entire b

The frames of whi
are sketches, were so
of the handles, beams,
soles, and other pa
them, and any portio
at pleasure. They
mould-board being s
rower furrow, and o
of the different parts
required.

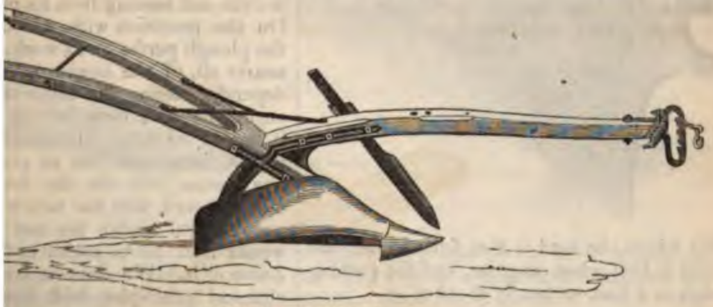




PLOUGH BODY.

ement of the body of the
very considerable improve-
any thing that had been be-
and is applicable to ploughs
ry description, as has been
d in the exhibitions of the
h-makers, at the annual meet-
yal Agricultural Society, al-
ne of which was so con-

Having thus far traced the several improvements which have been made in the construction of the different parts of the plough, and having given the description and figure of a perfect Scotch swing plough (see p. 964.), we shall here introduce a cut of one of the most approved English swing ploughs, and remark on the mechanical principles on which the swing plough should be constructed.



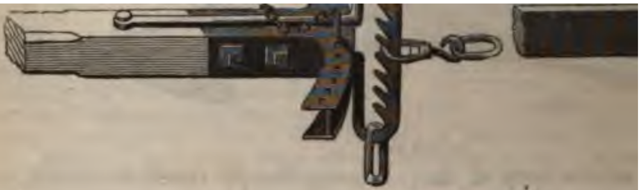
ENGLISH SWING PLOUGH.

ndles. — The handles should
wide apart to allow the
walk in the furrow, and long
e him a full command of the
at he can lift or depress it
k, guide it to the right or left
ng it round at the land's end
row into another.

m. — The beam should be of
that its end, commonly called
cut at the point of draught,
lrawn from that part of the
h the traces are attached, to
that part of it where it first
On the right arrangement
f draught in the structure of
lepends much of its steady
s proper depth. It is from

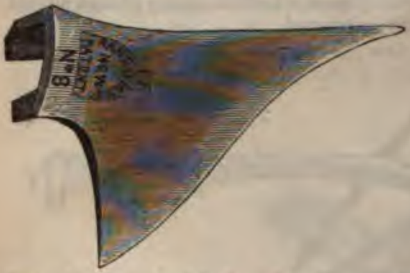
the principle of balancing from a point adjusted to the line of draught, that the plough takes its name of *swing* in contradistinction to the names of *foot* and *wheel* ploughs, which will be hereafter described.

The beam should be curved upwards at the coulter and throat of the plough, to clear itself of rubbish which sometimes accumulates, and should be inclined slightly from the land, or, in other words, towards the furrow, because its tendency is to yield towards the loosened land, and it therefore requires this counteraction in the line of draught to keep it in a right line. This is supposing a pair of horses to be harnessed abreast; if they be harnessed at length, the beam should be still more inclined; for as neither horse then walks on the "land," the

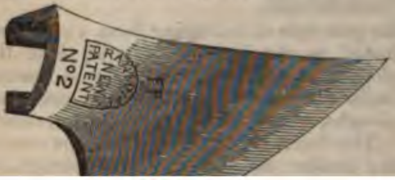


PLOUGH-HEADS.

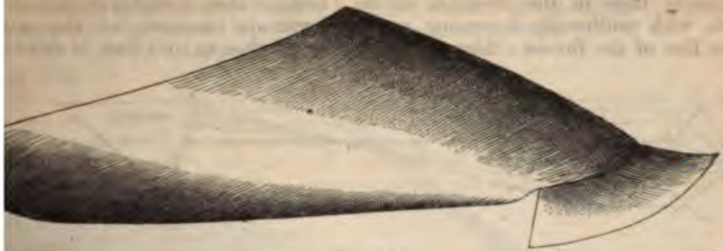
Plough-share. — The plough-share is the apex of the sole, as the hind part is called the heel. It varies in shape for different purposes. On stony lands it is best with a point, thus —

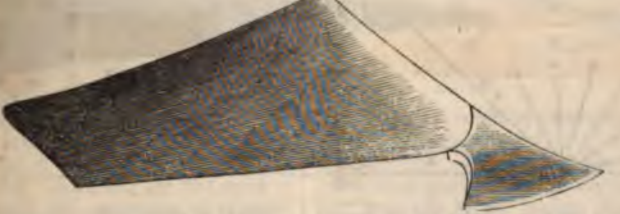


But where the land is free from stones, the wing is best when angular, and the cutting edge in a line, or nearly so, thus —

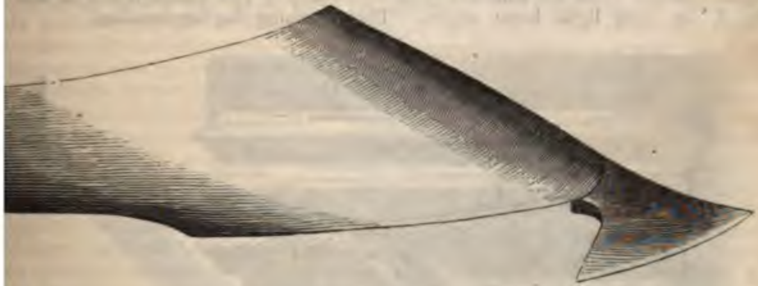


Mould-board. — Th box of the share shou of the rise of the the coulter and sh vertical and horizont and width of the fur board has to complete it over and leaving it On the precision wit the plough performs i nearly all, of the bea depends: hence the vering its true form it has to be used. I this is, there does not any precise rule for mould-board, that has an approval under t would lead us to spe dence of it. We hav chanical principles la Bailey, Gray, Amos, and others, but are not makers of the present here to either the one long as the mould-b on even the same farm always similar, as its sarily be affected by t





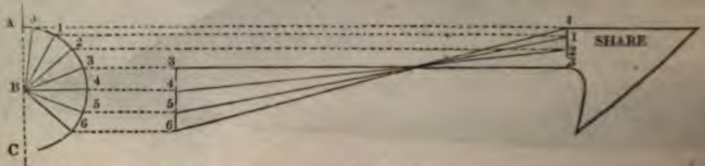
estern, many years ago, improved
form of the heavy land mould-
ise in that part of the county of
re he resides, by cutting away a
considerable portion of the lower and hinder part of the figure, and by making it in a straight line lengthwise from the nose to the hind part.



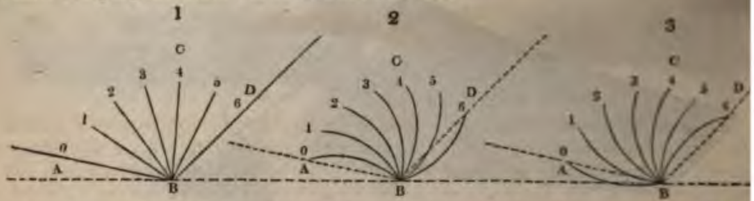
e circumstances always the same,
e no question but that one ma-
form of the mould-board would
ble to all others; but, under cir-
s so various, the plan hitherto
as been to prove, by experience
practical operation, the forms
d to different lands under an
epth and width of work, keeping
s possible to the principle of the
necessary for the proper lifting,
nd laying over the soil. Pro-
mould-board be made so that the
le in operation, goes on as it
a good practical criterion as to
vill be found in the evidence of
has undergone, and this, with the
etal now in use, can be determined
. If, on a given soil, the mould-
mes brightened uniformly—if the
ears to slip with light friction and
ame pressure from one end of it
to the other, it cannot be far, if any thing, out of its proper shape for the purpose intended. And yet, if the same mould-board be used on some other lands, it will immediately show its inapplicability to them by the soil adhering to it in parts, not slipping well through it, and thus evidencing a want of uniformity in its general friction. Therefore, considering that neither depth nor width of furrow is always the same, and that scarcely one circumstance affecting its use is unvarying, it is difficult to find a rule which shall aptly suit these changes. At the same time it is not presumed that such will not or cannot be found; and the theory which most accords with our view, is one which has recently been laid down by the Rev. W. L. Rham, rector of Winkfield, Berkshire, a gentleman whose scientific and agricultural knowledge entitles his opinion to considerable deference. His theory is, that the mould-board should be composed

of straight lines in the direction of its length, with continually increasing angles to the line of the furrow: these last lines

being either straight, convex, or
horizontal sections of the mou
would then exhibit lines of this ki



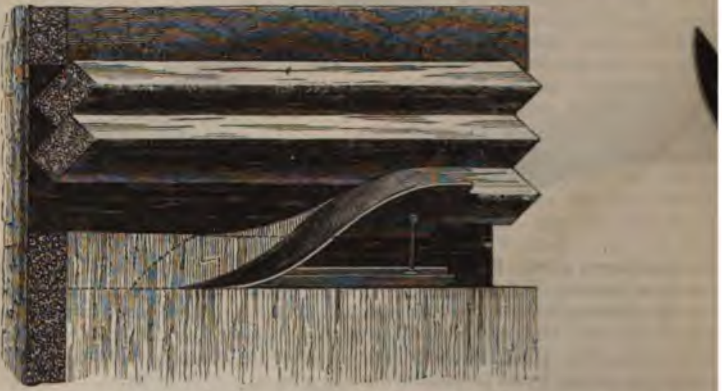
whilst the perpendicular sections would be thus —



A B being a section of the mould-board just behind the share, C B in the middle of its length, and D B at the heel. *Fig.* 1. is a section in which the vertical lines are straight, and is adapted to mellow soils; *fig.* 2. convex lines for adhesive soils, and *fig.* 3. for very light loose sands. This

subject is more fully explained
head " Plough" in the *Penny*
an article which we would rec
the perusal of our readers.

The following drawing exhibit
tion of the mould-board in th
turning the furrow-slice.



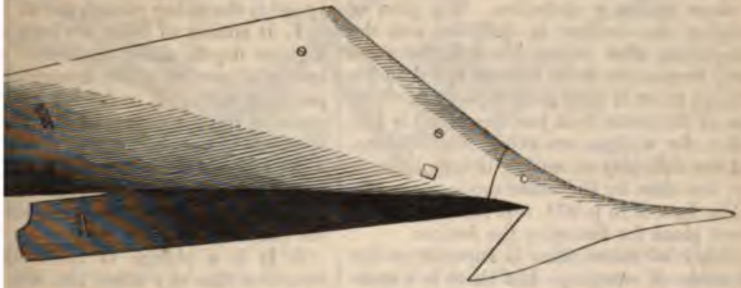
Having availed ourselves of the opportunity of testing several forms of mould-boards which have obtained general approval in various localities, we find that, though differing widely from each other, their form is nearly that which this rule, under the modifications of its straight, concave, and convex lines, leads to; and the conclusion we should thence draw is, that although no one form of mould-board will or can be applicable to every variety of soil and circumstance, there is no description of soil for which a perfect mould-board may not be made by this rule in some of its modifications.

There is another description
board, which, from being divide
lengthwise, approximates in so
to the upper and lower rests o
turn-rest plough. The upper
mould-board is nearly flat, and
in a wedge-like form to turn t
the lower part is called the g
which is fixed below and within
part, and cleans out the furrow.

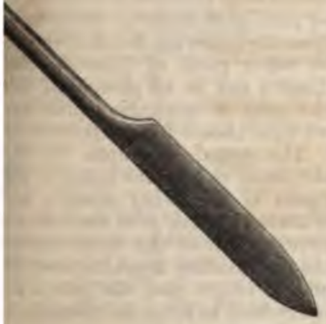
This kind of mould-board wa
made by Pritchett and Perry, ir
Millbrook, near Southampton, i
1809, and has continued in use
It is the one described by Phi

n interesting paper reporting his aental Enquiry on Draught in ;," and used on Hart's plough in ed form.

(See *Journal of the Royal Agricultural Society*, vol. i. p. 222.)



Simple as the coulter may ap- , it is a very important part of the d much depends upon its being ormed and fixed for the work it form in the operation of plough- hould be made of iron and steel, ficient substance to stand firmly to m in which it is set for its work, g either to the right hand or to The blade or cutting part should wo inches and a half wide, and



formed by the meeting of two curves shown in the accompanying figure, as this shape cuts the land easier than when the edge is either in a straight line or curved forward. The land side of the coulter should be flat, and the opposite side a gradual taper from the edge to the back: the thickness must be determined by the strength of the work it has to perform.

The angle at which the coulter is usually set, is about forty-five degrees from the plane of the ground; but in summer-lands it requires to be placed in a more slanting position, and to take the lead of the share about three quarters of an inch, to prevent the grass or rubbish driving in a heap, as it otherwise might do. On the contrary, when used for ploughing up hard fallows, it requires to be fixed in a more upright position, and rather more backward than the point of the share. It should be placed about half an inch above the share, and a quarter of an inch to the land side of it. Every good ploughman has his own notions on the subject of setting the coulter, but the above directions are given from practical observation.

The usual mode of fixing the coulter in the socket of the frame or beam, is by means

SOME.

HENSMAN.

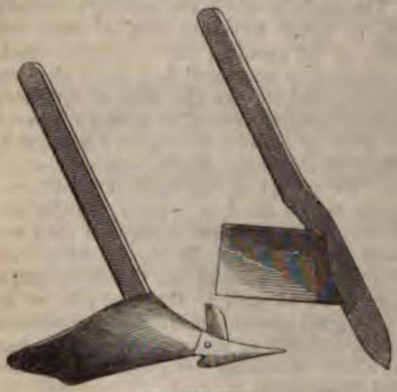
SANDERS AND CO.

of wood or iron wedges driven above or below the socket, or by a coarse cut screw-bolt, which turns into the side of the socket and presses against the coulter stalk. Each of these modes is defective. The plan of wedging the coulter is difficult, and the ploughman, after trying his skill for some time, frequently finds himself foiled in his attempt to set it in its proper position. The plan of the screw-bolt just described is also faulty, for wedges are even then requisite, and the difficulty of setting is very little, if any, less than by the other mode.

The figures in p. 971. represent three different plans for fastening the coulter.

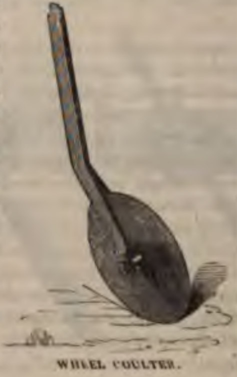
Either of these plans is superior to the old mode of wedging; but there is a complication in the details of all, that appears not quite adapted to the class of workmen who have to use them.

Skim Coulters. Skim coulters are sometimes used for the purpose of burying the surface grass or rubbish, and we here give sketches of the kinds we have observed in use. The usual plan is to fix the skim about six inches before the common coulter.



SKIM COULTERS.

Wheel Coulters are used in the fen-lands, and are useful when ploughing up turf. One of these coulters is represented by the annexed figure. The cutting disc should be made of steel, with a nave sufficiently long for it to be steady, and the box should be bored true, and revolve on a well fitted steel pin, as on the perfect fitting of the box



WHEEL COULTER.

and axle the correct working of and consequently of the effective of the plough, depends.

Swing Ploughs. — The advanta buted to the swing plough are as f

1. It admits of being set into a given depth, either shallower by the alteration of the draught point of draught, or by increas creasing the distance at which the the horses is applied.

2. The ploughman has also th regulating, in some degree, the the work, by either lifting or be the handles.

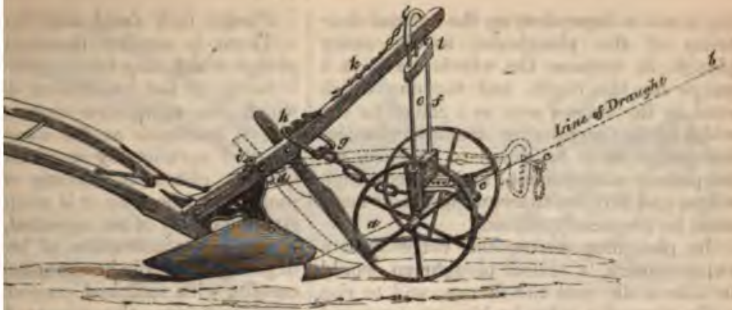
3. It is a plough of more s struction than any other, and less in its first cost.

4. A skilful workman can plo ridge and furrow at very nearly depth; he can work with it on lands, and in all weathers when can be done at all.

The Wheel Plough (with high — This derives its name from appendage of a carriage and w body of the plough is essentiall as that of the swing plough, a standing the different form of it point of draught should be the of the swing plough, namely, t drawn from the horse's shoulder or point of resistance. Its form from the following sketch of the in many parts of Norfolk, S Essex; and as all ploughs of th the same in mechanical princip we have chosen for illustration

The dotted lines upon the f the frame at *d* to the point *c*, w figure of the swing plough; a intended by this, is to show that draught will be the same notw the intermediate appendages of and in either case, the line *a* intersected at *b*, by the draught- plough at *c*.

The beam is elevated and m on a cross-bar of the upright and *f*, and the latter from part riage framing supported by the draught-chain *g* collars the bea will remove at pleasure to eit notches from *h* to *i*; the small ch to keep the standards in their sition; *l*, the bolster, is made to as the plough is wanted to cut s deeper. The plough is made t "to or from land," that is, to th left, by altering the chain *g* to a to the left or the right hand, or th the hake *m*. The former acts in the body of the plough, the latt



WHEEL PLOUGH, WITH HIGH GALLOWSES.

wheels; corresponding altera- ie latter must be made by the

uppose that the body of this ighout is similar to that of the h, but a slight deviation from ed by practice, from the un- land rendering it desirable to t pressure upon the wheels, in re an uniform depth of furrow, ffected by attaching the point slightly above the direct line; be obvious, that any remarks to the one, such as pitching re or less into the ground, vary- lth of the furrow, by expand- acting the width at which the works, or such like alterations, ually to the other. The dif- refore, in the construction of lough and the swing plough addition of the carriage and those parts which are in direct erewith.

ence to the sketch given above l plough, with the description parts, it will be seen how each heel gear mechanically operates in order to be clear, it may be it irrespective of any alteration the share, as that would alike her the swing or the wheel mode of setting the wheel greater or less depth, is by raising the cross-bar *e*, or by decreasing the length of the but as the latter serves to eel plough in an upright po- node of altering the depth of only used when alterations are uired.

ght-chain, which collars the plough, admits of change to ts of draught, for the purpose t the point at which the plough lf best: if it be set too for- ugh will incline too much to- ound at the share, and rise up at the heel; and if too far backward, the converse of this will be the case; the ploughman, therefore, ascertains by trials the point of draught, and regulates this chain accordingly.

The advocates for wheel ploughs state—

1. That ploughing can be more easily performed by them than by the swing plough.

2. That the work can be done with greater precision, both as to depth and width, for the wheels serve as gauges.

3. That shallower work can be done with the wheel than with the swing plough, and that when the ground is very hard or very stony, it can be worked with more ease than by the swing plough, and under some circumstances, when the swing plough, of the same construction in the body part, cannot be held in its work at all.

The advocates of either the swing or the wheel plough, each advance good reasons for the use at particular times or on particular soils of the one or the other; but our object is to furnish a clear description of both, and to point out the mechanical principles, by which their respective merits may be compared.

The swing plough requires more *skill* than judgment in the user. It is dependent upon the ploughman for almost every inch of its work; it will not go far without his aid, and long practice only can make him perfect in the use of it; but, when he becomes master of the art, he can manage it under all circumstances, he can cross ridge and furrow, and gauge his work with astonishing correctness.

The wheel plough with high gallowses is complicated in its construction, and it requires more *judgment* than *skill* in the ploughman, because the depth of its working is not alone dependent on the principle of balancing, but on the adjustment in unison therewith of the draught-chains; and the plough might "swim fair" to all appearance in its work, while its mechanical principles are set at variance with each other so as to add greatly to the draught. Its proper work-be able to dip into the furrow, and to rise again upon the ridge by his own command of the plough at the handles; but the wheel plough, unless altered when arriving at the above inequalities, would leave the lowest part unploughed, because the wheels as they rise at the opposite ridge, would in some cases take the plough nearly out of the ground.

There is generally a perceptible difference in the ploughings performed by swing and wheel ploughs, the latter being more even and uniform. In so far, therefore, as the work is concerned, the wheels give an advantage. When the draught-irons and wheels are all set properly in unison with each other, so that the plough has no conflicting forces in operation, and the wheels press but lightly on the ground, the force required to draw the wheel plough is less than that of the swing plough, from the regularity of its progress throughout as regards both width and depth of furrow.

It should, however, be observed, there is great liability of the forces, which act so well together *while in unison*, being, through the ignorance or carelessness of the ploughman set in some degree *opposing to each other*, and then the resistance of draught is greatly increased. Whatever approximates to this disagreement of forces is in its measure an evil; and it is the more likely to be fallen into, as the plough will hold steadily to its work, notwithstanding this mismanagement.

As a counterbalance to the advantages of wheel ploughs, in the precision of the work done, in the saving of labour to the horses, and in their adaptation to hard land, is the time consumed in frequent adjustments of

certain, with sufficie
with certainty, the
mode of attaching th
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tached to the doub
vented by Lord Som
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ployed in the midlan

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with a body of the
struction as those of
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many Scotch ploug
in the manner about
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the improved Scotch
constant as has ever
the Scotch ploughma
we much doubt whet
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will therefore choos
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England and Scotlan
more eligible for the

It will be observe
fixed at the fore pa
tute the difference
swing plough. One
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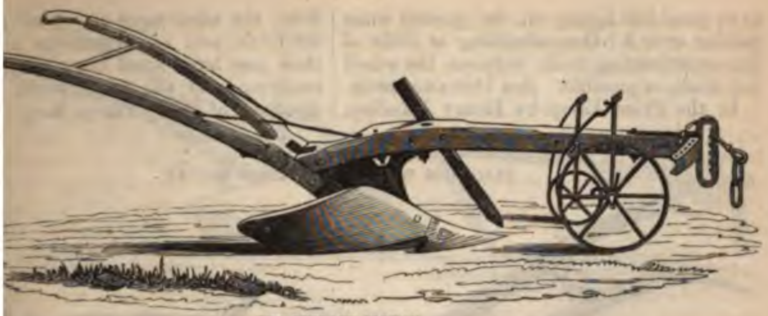
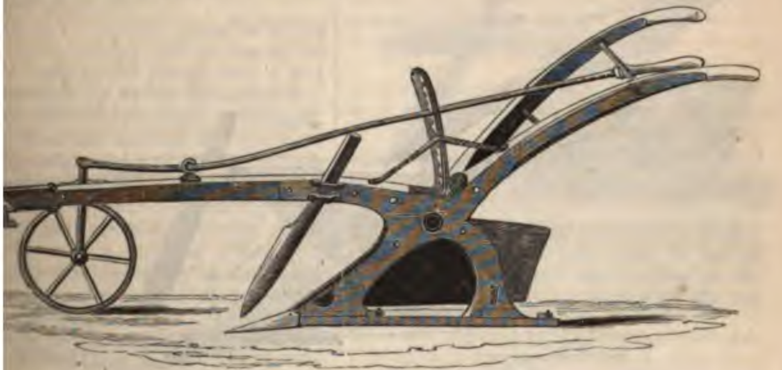
of its being set to



THE RUTLAND PLOUGH.

hed beyond the length required,
wheel must be raised at each end
ld just before the plough comes
furrow, or it will be taken gra-
t of the ground, and the land will
loughed to its full depth. The
is to extend the common furrow
r thereabouts, beyond its ultimate
to the headlands, which is after-
right by the cross ploughing at
ad bottom of the field.

The loss of time involved by alteration of the wheel may be overcome by a simple mechanical contrivance, with a lever, the longer end of which reaches the handle of the plough, and by it the wheel can be adjusted to any depth instantly. This was the invention of Henry Osborne, a gentleman residing in Suffolk, and it has been introduced with success into other counties.

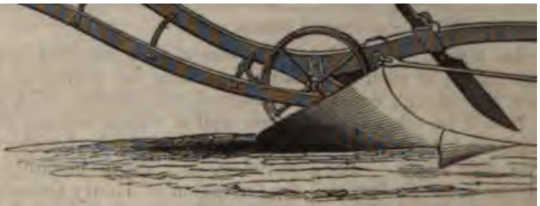


LEVER PLOUGH.

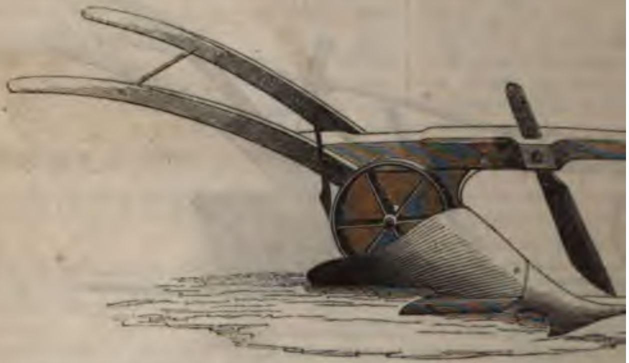
Report to the Board of Agricul-
the county of Leicester, published
it is stated, "that more than
ars ago, wheels were first applied
ore end of the beam, and it was
y 'pitching' the plough a little
nd setting the wheels so as to pre-
drawing too deep, the wheels were
nt guide, and the plough required
o hold it except in places of diffi-
If properly adjusted, a lad of
years of age can manage it easily;
writer of this article once saw, at a
g match, a lad having a plough of
—the only one in the field—walk-
rely beside it, to the great astonish-
the other competitors, and from
o their still greater astonishment,
d away the prize. This lad had been
loughing only a few months.

When one wheel only is attached to the plough, some persons give the preference to a small one to run upon the unploughed land, as it is less likely to clog up, and requires no alteration towards the end of the furrow; but others prefer a larger wheel which runs in the furrow, as it has an even bottom to travel over, and correctly regulates the width of the furrow-slice. It also more effectually facilitates the turning round at the headland, particularly if the horses have to go to the right hand. The larger wheel to run in the furrow, therefore, is best for general purposes, and with a lever attached to it, as described above, it is rendered very easy of adjustment.

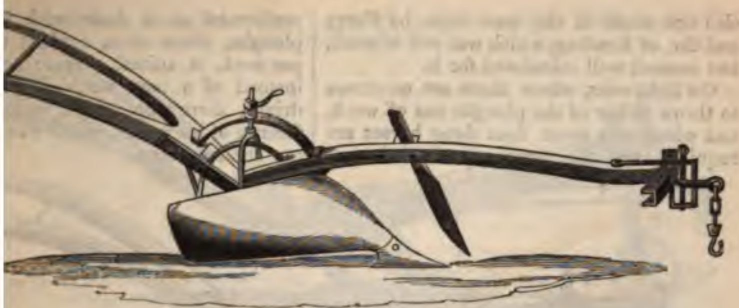
In the use of a gauge for the depth of ploughing, whether of two wheels, one wheel, or a foot, the plough should be so regulated



WILKIE'S, 1814.



PLENTY'S, 1815.



PALMER'S, 1840.

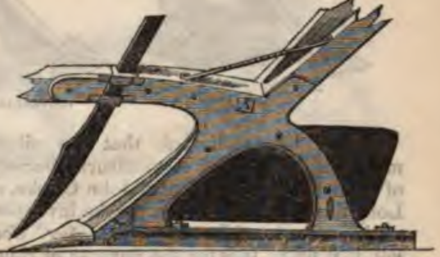
ketches of ploughs each with a el are not dissimilar in prin- slightly different in the mode the wheel.

se of a wheel being placed in shown in the hinder part of the reduce the friction that arises ding pressure of the sole, and er purpose of regulating what med the under pitch of the s to make it take more or less ground."

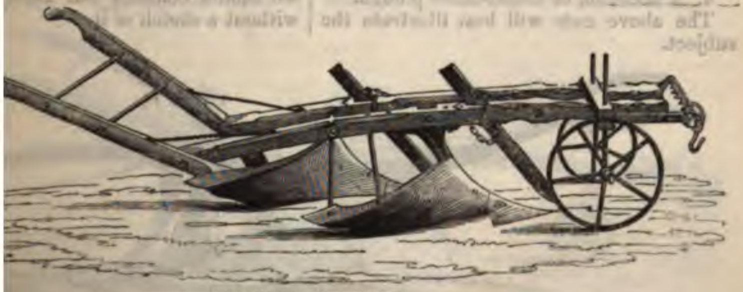
ears something plausible in the us reducing the friction at the making the plough into a sort riage, by which its motion for- rendered more easy of draught, oubtful whether it is not more balanced by the disadvantages it, viz.

sed weight. The wheel getting , and becoming unsteady at the rock a little on either side. , and clogging up on some soils. plication it gives to the struc- lough.

h be set as it ought to be, there is but little friction upon the sole at the heel, and the saving in that respect bears a very small proportion to the entire draught of the plough. It will be seen by the following diagram, that the plough, as commonly constructed, bears only upon the edge of the share and the heel, not all the way upon the sole.

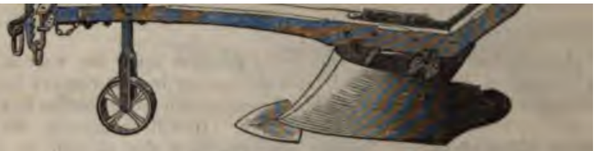


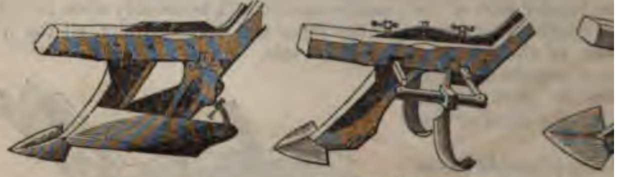
The alteration of the pitch of the plough applies equally to a sole made to rise or fall as to a wheel, and the bearing on the ground may be made as short with the one as the other.



DOUBLE FURROW PLOUGH

h is for the purpose of plough- ows at the same time. It was n of Lord Somerville. There very material alteration in of this plough; but as re- le in which it is now made, it has progressed in the same degree as the common plough, and is a neat and well finished implement. At the late agricultural meeting at Cambridge, a very light plough of this description, made by Ransome and Co., was exhibited at work; and there was





UNIVERSAL RIDGE PLOUGH.

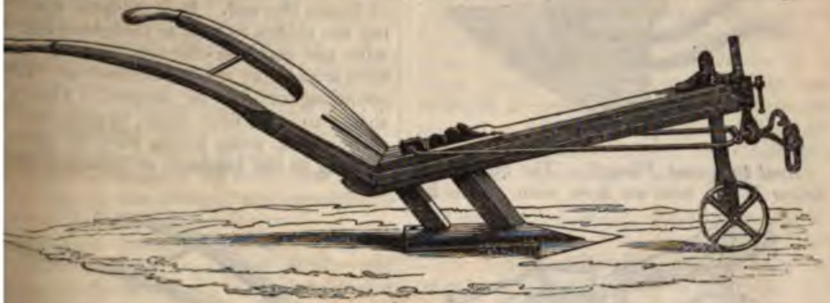
It will be recollected that the silver medal of the Royal Agricultural Society of England was awarded to John Clarke, of Long Sutton, Lincolnshire, for the invention of this plough. (*Jour. of Roy. Agr. Soc.* vol. i. p. 66.) It is for the purpose of ridge culture; and by an easy transition of shape, which is accomplished in a very simple manner, it becomes

1. A double tom or ridge plough.
2. A moulding plough.
3. A horse-hoe, or cleaning plough.
4. A skeleton, or broad-share plough.

The above cuts will best illustrate the subject.

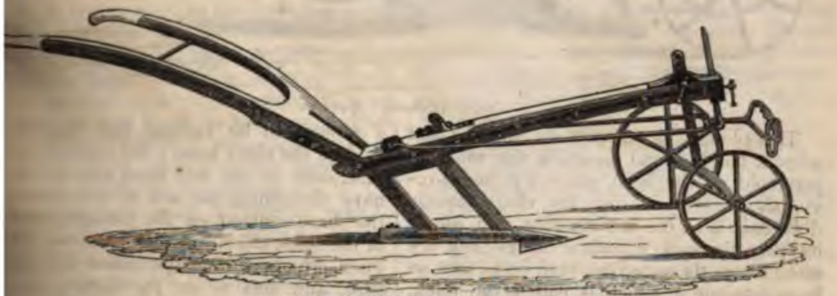
Subsoil Ploughs.–
subsoil plough, our
James Smith, of Dea
who has opened a v
portant view of till
subsoil ploughing, a
under soil without t
face. His practica
been devoted to the
and the results hav
The plough he inve
too well known to ne
we should consider
without a sketch of

on plough, which is the plan recom- ed, the depth below the surface ground is just as much again as the first plough effects.



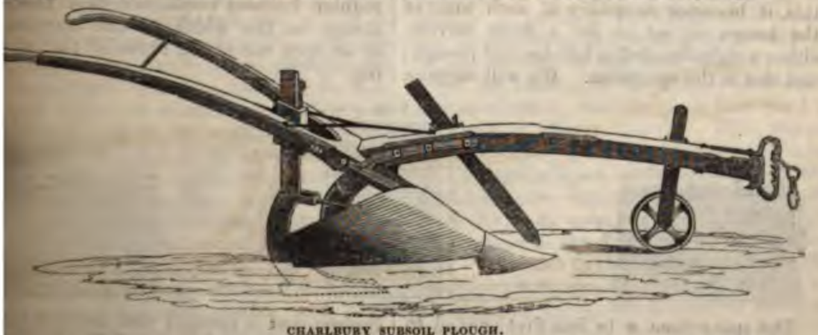
RACKHEATH SUBSOIL PLOUGH.

is plough answers admirably for under ghing grass lands, and is made into a rf plough by changing the wheel gear in front, to that of a carriage and two wheels, as shown below.



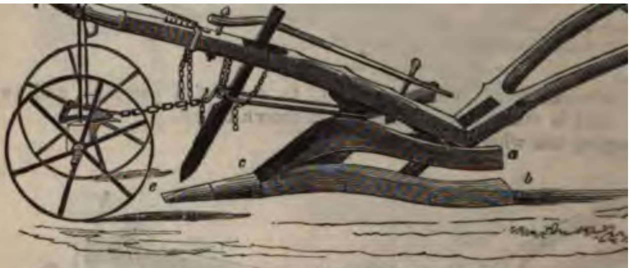
RACKHEATH SUBTURF PLOUGH.

Pusey, Esq., in an interesting paper in Eng. *Agr. Soc. Journ.* (vol. i. p. 434.), an account of a plough made to his by Charles Hart, of Wantage; at nder part of this plough was fixed a g tine, something like those on Bid- scarifier, for the purpose of under hing the soil. This tine was made to rise or lower at pleasure, and from the description of its use and operation given in the above paper, we should think it a valuable invention, as it may be easily attached to a plough of the common sort, and removed when not wanted. The figure below shows the Charlbury subsoil apparatus attached to one of Ransome's ploughs.



CHARLBURY SUBSOIL PLOUGH.

s, *or cleaning ploughs*, are often ormations of common ploughs for ose, by taking the mould-boards and shares off, and substituting for the shares subsoil or cleaning shares, with prongs, like the following sketch.



KENT TURN-REST PLOUGH.

This plough, as respects its carriage and wheels, handles and beam, is the same in principle as the high gallows plough previously described; but its characteristic difference is in the construction and use of its turn-furrows, *a* and *b*, or, as they are more correctly called, its turn rests, and on its nose-piece *e*, which is called the buck, and in its share *c*, which varies in width according to the work it has to do: the plough is sometimes used without its rests as a broad-share for cleaning land, and shares for it are made from two to twenty-four inches.

The plough is contrived so as to lay the furrows all in one direction, from one side of the field to the other. To accomplish this, it becomes necessary at each turn of the horses to set in for a fresh furrow, either a right-handed or left-handed plough; and this is the operation. We will suppose

a plough to be tur
over to the right han
case, cuts on the lef
nary ploughing, the
the share centred on
of the share alike, and
buck, which, as a we
slice, and sets it o
which forms the late
into operation, and fi

The furrow-slice be
the first furrow in th
ciently wide for the
first to stand on it
into its place. If t
ten inches wide and
must be sixteen inc
regular furrows com
always be the width
as an open one at the
ing.

he hinder part gently sweeps over the w-slice as it rolls, thus completing the urn. The lower rest aids the operation essure against the furrow-slice.

e furrow being completed to the right the ploughman next changes the po- of the coulter to the opposite side, by is called the "rod bat," that is, a wood- tick with a crook in it: this is instantly and he removes the lower rest to the side of the plough, and proceeds as e with the adjoining furrow.

he Kent plough, notwithstanding its ward appearance, great bulk, and sy combinations, is, in the hands of a ul ploughman, a very effective imple- t, and we have frequently seen plough- to the depth of eight inches, and with ows eleven inches wide, so accurately rmed as to astonish the judges who been accustomed to the lighter ploughs her counties. It is, however, difficult to ge, and requires much practice to use th any degree of facility. Having to per- both right and left ploughing, it must rfectly true in all its bearings, and the er must also be so accurately fitted to ngular hole, that when the upper part ssed either on the right or left by the at, its point shall be equally true to dge of the furrow it is intended to cut. ightly braced in all its parts, the upper of the gallows being confined by a to the top of the beam, and the draught is again braced tightly to the beam by s of a collar chain, or rather pair of chains, having what is technically d a "goose neck" passing through one links, which is made circular for its sion. In order to correct any tendency erve from the perfect straight line, g from the complicated series of braces, ploughman is provided with a parcel ils, of every sort and size, which he ently carries in the foot of an old shoe d upon the handle of his plough; and equipped, should a link not be suf- tly tight, or should any tendency to n away" from its work appear, after selecting a nail of the exact size fitted he place, it is ingeniously inserted at junction of the links, and every sub- nt alteration is effected by the never- g application to the nail store; it thus ently happens, that by the time the h is fitted for its work, almost every garnished with nails; and upon these on a number of ploughs at a trial field, the quantity of nails d in three, was respectively 15, 17,

s been before observed, the work rmed is nevertheless excellent, and for deep and heavy ploughing the principle is better adapted than a casual observer would suppose; but it is not to be denied that it is a more cumbrous implement than a plough formed as a turn-rest needs to be, for a large proportion of its present size and strength is requisite to provide against the strains to which it is subjected from the attempt to counterbalance the conflicting forces its erroneous construction has engendered.

The plan of laying furrows in one direction, so as to have neither ridge nor water furrows, has within the last year attracted more than common attention, and it has led to a careful inquiry into the system of ploughing pursued in Kent, and there seems to be a disposition among many of our first-rate agriculturists to try the plan, provided lighter implements can be furnished for the purpose, not exceeding the power of two horses' draught. To this object some eminent practical farmers have turned their attention, and a plough, made under the direction of Mr. William Smart, a farmer of great respectability and experience at Rainham, in Kent, bids fair to open a new and very important view of the mechanical principles of the turn-rest plough, which he has remodelled; and it may be made equally applicable to the power of two or four horses. A description of this, in a letter he has recently published in the *Mark Lane Express*, gives a clear elucidation of his view of the subject.

This gentleman, after many trials, arrived at the conclusion, that inasmuch as the work of the turn-rest plough depended on its wedge-like construction, its form could only be correct in proportion to its approach to the perfect wedge; and this form, obtained by straight lines in the direction, first, from the point of the share to the throat of the plough, to produce the effect of elevating the furrow slice; and, second, from the edge of the coulter to the heel of the rest, to effect the turning of the flag, is that which he has adopted; making these lines tend to an angle of fifteen degrees. With the assistance of an ingenious ploughwright in his own neighbourhood, several ploughs on this principle were constructed, and these have been the basis upon which still further improvements in the detail have been carried out. They are now so constructed that the ploughman can readily shift his coulter by means of a lever, which reaches the bottom of the handles, and also his rests or mould-boards from side to side, without leaving his station between the handles of his plough, they being so arranged that by withdrawing a small pin and pressing the projecting rest towards the body of the

IMPROVED TURN-REST PLOUGH.

Ploughs for the purpose of turning the furrows all in one direction, and laying the slices at an angle with the horizon, as is done by the common plough, have been within the last year or two brought before the public, but we cannot learn that they have been generally adopted.

The first of these is one most ingeniously contrived by James Wilkie, of Uddington. This plough has handles, beam, and framework very similar to the wrought iron Scotch plough. A spindle, fixed over the beam, has attached to it a right and a left hand mould-board and share, each so fastened, that when one is in work, the other is elevated over the beam, and by turning the handle on the spindle one fourth of a circle, the one mould-board is taken out of, and the other set ready for, work. The end of the spindle to which these are affixed, has an *eccentric*, which, acting upon the coulter, sets it to the proper cut for the mould-board which is in use at the time.

The above is a drawing of the improved Kent turn-rest plough.

The second is the invention of Captain Hay of Belton. This plough may be described as having a right and a left handed body

to left, so that the
one instance the slad
shall alternately bec
thus act on either si
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over the other. The
two blades or cutting
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and the other vertic
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We have seen this
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appeared to do its wo
tion was changed wit
culty.

In going thus at le
the plough, we have s
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in general use. To
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common routine of
carried us beyond w
the proper limit of
work. At the same
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for which ploughs of
ferent to any alrea

his should be effected with
liture of animal power, and
est economy; and, lastly,
be made as simple as pos-
ce to the ploughman who
them. The circumstance of
ill be continually required
r out, should also be kept
whole require to be made
plan, so as to insure every
perly; the workman may
n the spot as readily as a
manufactory. Nor should
hat quality of materials and
e main points in economy,
ense with either is to pave
tisfaction and trouble to all
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to suggest alterations on
aplements, which appear
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ion of requisites just given;
doubt that the plough, in
s, is capable of great im-
amongst the points to which
usefully directed, are the

aught that different forms
s and shares require, in
ne those best suited for the

rd that will best turn the
side of the plough, so as to
g changed from one to the
plan of the Kent turn-

s of altering the depth or
g plough while in motion,
the horses, so that it may
d to any difference in the
l, or inequalities on its sur-
lough may meet with.

respects the wheel plough,
any of its forces in oppo-
ier.

G. The art of turning
y means of the plough.
ious kinds of ploughing.
g is effected by the plough
ng the same furrow; the
e purpose of throwing the
the bottom of the furrow,
time for raising a furrow
r that which had been al-
er, and raising it up, &c.,
the first furrow slice, by
the surface soil is entirely
ratum of subsoil laid over
in the field what trench-
ade does in the garden.
g can only be employed
here the subsoil is natu-
good quality, or where it has been rendered so by draining and subsoil ploughing; for bad subsoil brought to the surface, unless considerably altered in composition and texture, would be unfit for receiving seeds or plants.

To excel in the art of ploughing, the ploughman should take a pleasure in his work, and not rest satisfied till he can make his furrows in a straight line, and lay the slices as much as possible at the same angle from the bottom of the furrow. He should open his first furrow in a uniform manner, and proceed with regularity of width and depth of the furrow slice, and "shut up" clean at last.

Ploughing matches, which of late years have been so general, have given a very increased interest to ploughmen and ploughboys. The face of the country is in many parts strikingly improved by the change which sound ploughing has effected, and much of this may be traced to the lively interest which has been paid to this part of tillage by agricultural societies and by practical farmers. I never knew a ploughing match meeting established in any rural district, without very beneficial effects being produced on the character of the peasantry. It never fails to elevate the ploughman in his own opinion; it induces him to strive to excel in his honourable vocation, to please his employer, and to stand well in the estimation of his richer neighbours. The very assemblage of the neighbouring farmers and gentry to witness the trial of skill, brings out all the latent pride of the roughest ploughman. The flowers in his horses' bridles, the network on their ears, the new gay-coloured tape with which their manes and tails are braided, betray the little feelings of honest pride in the ploughman's bosom. When at a recent meeting I noticed the air of triumph with which the victor in the field of Langley, in Buckinghamshire, after having had the Queen's prize of five guineas awarded to him, marched his sleek well-fed plough-horses off the field, with a sprig of laurel in their bridles, I could not but admit that the effect of that meeting would be felt, not only amongst the contending ploughmen there assembled, but through the adjoining hundreds. The triumph, too, was not confined to the ploughman; his master, nay his parish, shared in the honour; and I will engage that many an honest ploughman, between one year's meeting and the next, as he ploughs "his acre," thinks of the field of meeting, and of the best means of securing a prize. Such meetings, moreover, teach even the most ignorant the importance of such affairs; that there is a strange difference in the neatness, style, and profit to the farmer in which the ploughmen execute their work; and they are pretty sure to convince even the most listless that there is more skill required in a ploughman than many persons would readily believe.

Many papers on ploughs and ploughing are contained in the best modern agricultural periodicals. Wilkie's turn-rest plough is described in the *Trans. High. Soc.* vol. vi. p. 484. Mr. Heathcote's steam plough, *Ibid.* p. 72., Mr. Laidlaw "On the general Advantages of Two-horse Ploughs," *Quar. Journ. of Agr.* vol. ii. p. 712. "On the Plough of Palestine," *Ibid.* vol. iii. p. 373. "On Small's Plough as a Drill Plough," *Ibid.* p. 854. "On the mathematical Construction of the Plough," by Mr. Amos, *Com. Board of Agr.* vol. vi. p. 437. "On Wheel and Swing Ploughs," by Mr. Handley, *Jour.* *Soc.* vol. i. p. 140. "On Ploughing," by Mr. Pusey, *Ibid.* "On Subsoil Ploughing," by Sir Graham, *Ibid.* p. 245. "On the heath Subsoil Plough," by Sir *Ibid.* p. 253. "On the soil Plough," by Mr. Pusey, *Ibid.* "On the Rackheath Subturf Sir E. Stracey, *Ibid.* vol. ii. "On a light Subsoil Plough, two Horses," by Mr. Gabell, *Ibid.*

I conclude this article with the useful table, showing the distance by a horse in ploughing or acre of land; also the quantity worked in a day, at the rate of eighteen miles per day of nine

Breadth of Furrow-slice, or Scarifier.	Space travelled in ploughing an Acre.	Extent ploughed per day, at the rate of	
Inches.	Miles.	18 Miles. Acres.	16 Miles. Acres.
7	$14\frac{1}{8}$	$1\frac{1}{4}$	$1\frac{1}{8}$
8	$12\frac{1}{4}$	$1\frac{1}{2}$	$1\frac{1}{4}$
9	11	$1\frac{3}{5}$	$1\frac{1}{2}$
10	$9\frac{9}{10}$	$1\frac{4}{5}$	$1\frac{3}{5}$
11	9	2	$1\frac{3}{4}$
12	$8\frac{1}{4}$	$2\frac{1}{5}$	$1\frac{9}{10}$
13	$7\frac{1}{2}$	$2\frac{1}{3}$	$2\frac{1}{10}$
14	7	$2\frac{1}{2}$	$2\frac{1}{4}$
15	$6\frac{3}{5}$	$2\frac{3}{4}$	$2\frac{2}{5}$
16	$6\frac{1}{6}$	$2\frac{9}{10}$	$2\frac{3}{5}$
17	$5\frac{3}{4}$	$3\frac{1}{10}$	$2\frac{3}{4}$
18	$5\frac{1}{2}$	$3\frac{1}{4}$	$2\frac{9}{10}$
19	$5\frac{1}{4}$	$3\frac{1}{2}$	$3\frac{1}{10}$
20	$4\frac{9}{10}$	$3\frac{3}{5}$	$3\frac{1}{4}$
21	$4\frac{7}{10}$	$3\frac{4}{5}$	$3\frac{1}{3}$
22	$4\frac{1}{2}$	4	$3\frac{1}{2}$
23	$4\frac{1}{4}$	$4\frac{1}{5}$	$3\frac{7}{10}$
24	4	$4\frac{1}{3}$	$3\frac{9}{10}$
25	4	$4\frac{1}{2}$	4
26	$3\frac{4}{5}$	$4\frac{3}{4}$	$4\frac{1}{5}$
27	$3\frac{2}{3}$	$4\frac{9}{10}$	$4\frac{1}{3}$
28	$3\frac{1}{2}$	$5\frac{1}{8}$	$4\frac{1}{2}$
29	$3\frac{2}{5}$	$5\frac{1}{4}$	$4\frac{2}{3}$
30	$3\frac{1}{3}$	$5\frac{1}{2}$	$4\frac{4}{5}$
31	$3\frac{1}{5}$	5	5
32	$3\frac{1}{10}$	$5\frac{4}{5}$	$5\frac{1}{4}$
33	3	6	$5\frac{1}{3}$
34	$2\frac{9}{10}$	$6\frac{1}{5}$	$5\frac{1}{2}$
35	$2\frac{4}{5}$	$6\frac{1}{3}$	$5\frac{2}{3}$
36	$2\frac{3}{4}$	$6\frac{1}{2}$	$5\frac{4}{5}$
37	$2\frac{2}{3}$	$6\frac{3}{4}$	6
38	$2\frac{3}{5}$	$6\frac{9}{10}$	$6\frac{1}{8}$
39	$2\frac{1}{2}$	$7\frac{1}{8}$	$6\frac{1}{3}$
40	$2\frac{1}{2}$	$7\frac{1}{4}$	$6\frac{1}{2}$
41	$2\frac{2}{5}$	$7\frac{1}{2}$	$6\frac{2}{3}$
42	$2\frac{1}{3}$	7	$6\frac{4}{5}$
43	$2\frac{3}{10}$	$7\frac{4}{5}$	7
44	2	8	$7\frac{1}{10}$
45	$2\frac{1}{5}$	$8\frac{1}{5}$	$7\frac{1}{4}$
46	$2\frac{1}{8}$	$8\frac{1}{3}$	
47	$2\frac{1}{10}$	8	
48	$2\frac{1}{12}$	$8\frac{3}{4}$	
49	2	$8\frac{9}{10}$	
50	2	$9\frac{1}{10}$	
51	$1\frac{9}{10}$	$9\frac{1}{4}$	
52	$1\frac{9}{10}$	$9\frac{1}{2}$	
53	$1\frac{9}{10}$	$9\frac{3}{5}$	
54	$1\frac{4}{5}$	$9\frac{4}{5}$	
55	$1\frac{4}{5}$	10	
56	$1\frac{3}{4}$	$10\frac{1}{4}$	
57	$1\frac{3}{4}$	$10\frac{1}{3}$	
58	$1\frac{7}{10}$	$10\frac{1}{2}$	
59	$1\frac{7}{10}$	$10\frac{3}{4}$	
60	$1\frac{2}{3}$	$10\frac{9}{10}$	
61	$1\frac{3}{5}$	$11\frac{1}{8}$	
62	$1\frac{3}{5}$	$11\frac{1}{4}$	
63	$1\frac{3}{5}$	$11\frac{1}{2}$	
64	$1\frac{1}{2}$	$11\frac{7}{10}$	
65	$1\frac{1}{2}$	$11\frac{4}{5}$	
66	$1\frac{1}{2}$	12	
67	$1\frac{1}{2}$	$12\frac{1}{4}$	
68	$1\frac{1}{2}$	$12\frac{1}{3}$	
69	$1\frac{2}{5}$	$12\frac{1}{2}$	
70	$1\frac{2}{5}$	$12\frac{3}{4}$	
71	$1\frac{2}{5}$	$12\frac{9}{10}$	
72	$1\frac{3}{8}$	$13\frac{1}{8}$	
73	$1\frac{1}{3}$	$13\frac{1}{4}$	
74	$1\frac{1}{3}$	$13\frac{1}{2}$	
75	$1\frac{1}{3}$	$13\frac{3}{5}$	
76	$1\frac{3}{10}$	$13\frac{4}{5}$	
77	$1\frac{3}{10}$	14	
78	$1\frac{1}{4}$	$14\frac{1}{4}$	
79	$1\frac{1}{4}$	$14\frac{1}{3}$	
80	$1\frac{1}{4}$	$14\frac{1}{2}$	
81	$1\frac{1}{5}$	$14\frac{3}{4}$	
82	$1\frac{1}{5}$	15	
83	$1\frac{1}{5}$	$15\frac{1}{8}$	
84	$1\frac{1}{6}$	$15\frac{1}{4}$	

(J. Morton, Esq., of Whitfield, *Johnson and Shaw's Farmer's Almanack*, vol. i.

MAN'S SPIKENARD. See

(*Charadrius*, Lin.; Fr. *plu-*
aithology, the common name
ily of wading birds, belonging
Grallatores. There are se-
generally included among the

at Norfolk plover, or stone
nemus crepitans), is a summer
is country, arriving here in
ving again at the end of Sep-
October. It is most common
n and south-eastern counties.
re usually seen in unenclosed
where the fields are large;
t sheepwalks, fallow lands,
warrens, feeding on worms,
sects; and are believed also
vour small mammalia and rep-
ay their eggs, generally two in
ie bare ground, among stones
ts. The eggs are pale clay
ed, spotted, and streaked with
dark brown; two inches two
y one inch seven lines in
e feathers of the back, wing-
pale brown; the neck and
ownish white; the belly white;
black. The whole length of
enteen inches.

en plover (*Charadrius pluvia-*
idely scattered over the globe.
l, during the early period of
reeds on the high hills and
nds of the north of England
The nest is very inartificial,
of a few dry stems of grass,
depression amidst the heath.
plover lays only four eggs,
ge in proportion to the size of
it has only one brood in the
eggs are of a yellowish stone
ur, blotched and spotted with
the length two inches by one
es in breadth. The young,
l, are covered with a bright
d yellow and brown down.
ie nest soon after they are
they do not fly until they are
ld. The parents, however,
m with much anxiety; trying
ems to attract the notice of
from them; often tumbling
ning lameness. This plover
culiar call or whistle; but this
e breeding season. The plo-
worms, slugs, and insects in
s. In autumn the various
ate, form flocks, and together
y southwards. They are ob-
t numbers through the winter
on moors, heaths, downs, and large open fields, in most of the southern counties, and many resort to the sea-shores. They fly with great swiftness, usually making various evolutions and wheelings before they alight on the ground. They run extremely fast, and when winged can scarcely be caught. They are excellent birds for the table. The plumage of both sexes changes in summer from a dull sooty black, marked with large spots of golden yellow on the borders of the barbs of the feathers, to deep black, which pervades the whole of the upper surface of the body. The barbs of the feathers are spotted with gamboge or golden yellow. The throat and lower parts in winter are white; in summer the same parts are white, varied with large black and yellow spots. The bill is black; the iris brown; and the feet a deep ash colour. The whole length of an adult bird is rather more than eleven inches.

3. The dotterel plover (*C. morinellus*) has already been noticed. See DOTTEREL.

4. The ringed dotterel (*C. hiaticula*). This prettily marked plover is found throughout the year on most of the shores of the British islands, but more particularly frequents bays and flats along the coast where the sea at its ebb retires to a distance, leaving extensive surfaces of sand or shingle. These birds also haunt the sides of large rivers, and are not unfrequently found about the margins of inland lakes and large ponds. They deposit their four eggs in any accidental depression on a bank of sand, broken shells, or shingle, above high-water mark. The eggs are one inch five lines long, by one inch and half a line in breadth, of a pale buff or cream colour, spotted and streaked with ash blue and black. They feed on worms, insects, and, when at the edge of the sea, on the various species of the thinner-skinned crustacea, as shrimps, sand-hoppers, &c. with which almost every little salt-water pool abounds. The whole length of the adult bird is seven inches and three quarters. In summer the plumage of the breast, throat, and belly are white; across the neck is a broad collar of black; the back and wing coverts are hair-brown.

5. The Kentish plover (*C. Cantianus*). The habits and food of this little plover so closely resemble those of the species last described, that it is unnecessary to occupy space with the recital. The whole length of the bird is about seven inches. The colour of the back, wing-coverts, &c. is ash-brown; breast, belly, sides of neck and throat, pure white; just in advance of the carpal joint or point of the wing, on each side, is a patch of black, not continued

round the front; legs, toes, and claws, like the beak, black at all ages.

6. The little ringed plover (*C. minor*). This rare British bird bears considerable resemblance to the ringed plover (*C. hiaticula*), but it is readily distinguished on examination by its smaller size; its more slender form, being one-fourth lighter in weight; its black beak; its more slender and lighter-coloured legs, and other peculiarities. The food is similar to that of the other species, namely, aquatic insects in their various stages, and small worms. The whole length of the bird is about six inches and a quarter.

7. The grey plover (*Squatarola cinerea*), though similar in habits and somewhat in appearance to the golden plover, is by no means so plentiful as a species, and may be considered a winter visiter rather than a native resident, being much more common at the end of autumn, through the winter, and in spring, than in summer, retiring to high northern latitudes during the breeding season, and re-appearing in small flocks when that season is over. It frequents oozy bays, and the mouth of rivers, feeding on worms and small crustacea. The nest is any hollow in the ground, which the bird lines with a little dry bents: it contains only four eggs, which are of an oil green hue, blotched with black. This plover is very shy; but when it can be shot, in summer, it forms a delicious dish. The whole length of the bird is very nearly twelve inches. In winter the feathers on the upper surface of the body are dusky grey, edged with dull white; the throat, breast, and sides lighter in colour than the back; the belly, &c. dull white, with few or no marks. In spring the black feathers begin to appear on the breast, and the birds may be observed in various degrees of change from white, with only a few black feathers, to entire and perfect black. The breeding plumage is generally complete by the end of May.

Other species of this order have been noticed under the heads Courser and Lapwing. See also Sanderling, Oyster-catcher, and Turnstone. (*Yarrell's Brit. Birds*, vol. ii. p. 376—436.)

PLUM. (*Prunus*, from *prune*, its Greek name.) A genus of trees and shrubs, several of which are indigenous to Britain. Having already noticed the bird cherry (*P. Padus*), the wild cherry-tree (*P. Cerasus*), the wild bullace-tree (*P. insititia*), the black thorn or sloe (*P. spinosa*), under their several heads, it only remains to speak in this place of the wild and cultivated species of plum-tree. The wild plum-tree (*P. domestica*)
is a moderate-sized tree, without
found growing sometimes in wo
hedges, flowering in May. The le
elliptic-oblong, serrated, hairy und
and convolute while young. The
are linear, glandular and deciduous
stalks short, generally in pairs;
snow-white. The fruit is rather
seldom quite globular, its colour
vour very variable. "Whether al
tivated plums have originated
species, or from the wild bullace-
insititia), says Sir J. E. Smith, "
having disappeared by culture li
the pear-tree, is a question whi
no botanist can ever solve." A
rieties, Gerarde declares that "
plums particularly would requir
volume, and yet the end not
unto, nor the stock or kindre
known, neither to be distinguis
He adds that each country ha
dance of its own peculiar varieti
kinds of plum grow well in a
soil, and are increased by seeds
or by grafting or budding to
the particular kinds. There
rieties named in the catalogue
ticultural Society. As a choi
for a small garden, Mr. Nicol
the following twelve varieties:
tive, Wilmot's Orleans gree
magnum bonum, white ditto,
drop, Caledonian, mussel, da
sour, white bullace, blue impéra

The best plums for cultivat
thus classed —

a. Purple Round. — *Shoots smoo*
gage; nectarine plum; Kir
queen mother.
Shoots downy. — Royal nati
early Orleans; Coxe's fine lat
sour.

b. Oblong. — *Shoots smooth.* — B
trice; Inkworth impératrice
large red.
Shoots downy. — Blue perdri
shire damson.

a. Pale Round. — *Shoots smoo*
gage; Knight's large green
combe's nonsuch.
Shoots downy. — Drap d'or;
Washington.

b. Oblong. — *Shoots smooth.* — C
drop; St. Catherine; Whi
bonum.
Shoots downy. — Gumarsen;
drigon.

If plum-trees are much pr
grow too luxuriant to produce
often gum and spoil. The choi
of plums are much esteemed for th
the more common sorts are used

ɜs, &c. The wood is employed nd cabinet work, and for the ɟf musical instruments. (*Lou-* ɔ. *of Gard.*; *Phillips's Fruits*; *Flor.* vol. ii. p. 353.)

'om *poa*, signifying grass or ɜe meadow-grass. A genus of nsiderable extent, and very he pasturages of Europe. This s some valuable hay and pas- succeeding well in rich loamy the species are aquatic, grow- water, or in very moist situ- ɪcreased by seeds or divisions One of the commonest of all '*oa annua*. *P. trivialis* and *P.* sown extensively as a part of rasses for pastures and lawns, commonly made with picked l of "hay seeds." In general appear to be nutritious and cattle. There are nine in- ies, besides several varieties.

ked meadow-grass (*P. com-* s is a very common species in ound, flowering from June to

is moderately creeping, with stems obliquely ascending in , then erect and often crowded a foot to a foot and a half high, mpressed, by which this species e known, as also by a sudden ɪere the panicle begins. The ɪe latter are acutely angular, ng considerably while in flower, erect both before and after. narrow, roughish, especially with long compressed sheaths, ɪtuse stipule. The whole plant glaucous. Florets from three ɪe, connected at the base by a e folded threads, as fine and ɪr's web, which may be drawn iderable length. This grass, ɪcculent, is eaten by all cattle, e cultivated in moist or ma- . It never forms a close turf, it possesses superior nutritive roduce any where is far from

f this species (*P. c.* var. *erecta*) by Sinclair, which differs from ɪving culms more upright, less ɪd produced in greater quanti- vs closer, forms a pretty good he roots are less inclined to ɪt it is nevertheless inferior in growth, and the produce of

meadow-grass (*P. alpina*). chiefly confined to alpine regions and lofty mountains. It is perennial, and flowers from June to August. The root is fibrous, tufted, not creeping. Stem four to twelve inches high, erect; leafy below; naked, round, striated, and smooth at the top, with frequently a tinge of purple. Leaves linear, rather broad, flat, bluntish, with a small point, rough at the edges. Panicle loosely spreading. Spikelets heart-shaped, four or five flowered. Florets rather sickle-shaped, hairy at the base, without a web. The produce of this grass appears to be equal to that of the *Alopecurus alpinus*, and its nutritive powers greater, but not of sufficient importance to render it an object for the farmer's especial consideration.

3. Wavy meadow-grass (*P. laxa*). This species grows in some of the Highlands of Scotland. It is perennial, and flowers in July. Root slightly, whole plant more dwarf, slender, and delicate than the last, pale and somewhat glaucous. The root is creeping. The leaves are narrow, roughish above. Stipules all lanceolate and acute. Panicle close, drooping, in the lower part zigzag. Spikelets ovate, three-flowered; essentially distinguished from *P. alpina*, by the connected complicated web at their bases, while the keel only of each, not the sides, is silky. It is sometimes viviparous, but it possesses no agricultural merit.

4. Bulbous meadow-grass (*P. bulbosa*). This species tenants the sandy sea-shore, and other dry barren ground. It is perennial, and flowers in April and May. The root is a tuft of small ovate, white scaly bulbs, as truly such as the bulbs of a lily or garlic, and like them throwing out fibrous radicles from their base; which happens when the autumnal rains fix them in the moistened sands. Early in spring a dense crop of linear, keeled, slightly glaucous leaves, serrated with fine marginal teeth is produced, affording a grateful pasturage for cattle, and withering by the time when summer food abounds. Stem four or five inches high. Panicle close, slightly zigzag. Spikelets four-flowered. Florets hairy at the keel, connected by a web. Leaves finely serrated.

5. Roughish meadow-grass (*P. trivialis*). This is a very common species, in meadows and pastures, especially such as are rather moist. Perennial, flowering from June to October. The root is fibrous, and tufted; the stems several, about eighteen inches high, erect, leafy, with several knots, the naked part cylindrical, roughish to the touch, as are the edges and backs of the flat, slightly-spreading, lax, linear, deep-green leaves. In their long compressed

most excellent quality. Mr. G. Sinclair, another practical authority on the grasses, also observes, "The superior produce of this *Poa* over many other species, its highly nutritive qualities, the seasons in which it arrives at perfection, and the marked partiality which oxen, horses, and sheep have for it, are merits which distinguish it as one of the most valuable of those grasses, which affect moist rich soils and sheltered situations: but in dry exposed situations it is altogether inconsiderable; it yearly diminishes, and ultimately dies off, not unfrequently in the space of four or five years. Its produce is always much greater when combined with other grasses, than when cultivated by itself; with a proper admixture, it will nearly double its produce, though on the same soil, so much does it delight in shelter. Those spots in pastures that are closely eaten down, consist for the most part of this grass."

6. Smooth-stalked meadow-grass (*P. pratensis*). This is a very common species in all meadows and pastures. It is perennial, flowering in May and June. The root is strong and creeping, with horizontal runners. The general aspect of the plant is very like the last, with which it has usually been confounded; but the stems and leaves betray no roughness when drawn through the hand. Spikelets four-flowered; florets lanceolate, ribbed, connected by a web. But the clear and essential mark of this species compared with the last, consists in its very short, abrupt, pointless stipule, which in every leaf of every variety proves constant and invariable.

As an object of agriculture, this species is not less valuable than the *P. trivialis*, es-

named are as foll
spikelets oval, gene
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botanical character
meadow-grass (*P. a*
ficient to constitute
agricultural merits
P. pratensis, to whi
Its spring produce
properties of early
tive matter would
valuable grasses, bu
ing root. The cul
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in imitation of the

7. Annual mead
(*P. annua*). This
mon species every
as cultivated groun
to November. Th
pale, very smooth,
three to twelve inch
light green, spreadi
cid, roughish at th
small, widely sprea
five-flowered; flore
ribbed, without a w

This is a good gr
in proportion to th
easily raised, but n
nutive size of the
its cultivation unpr
that of any other
It is the most troubl

te. Florets from two to five, ob- five-ribbed, bluntish; silky at the d lateral ribs; hairy at the base, a web. Stipules of the lower leaves ort and blunt. The whole plant is ht pale colour, extremely and per- y glaucous. Root tufted, fibrous. rect, a foot and a half to two feet in round, striated. This grass pos- no properties of sufficient importance itle it to a place in the composition of pasture or soils of the best quality.

ariety called the sea-green meadow- (*P. glauca cæsia*) is mentioned by air, to which the same remarks will The whole plant is of a deep glau- colour. The culms are from six to a foot and a half in height, ac- ng to the nature of the soil it grows in.

Wood meadow-grass (*P. nemoralis*). is a very common species in some dis- in groves and woods, especially on soils. The whole plant is very slender elicate, one and a half or two feet Stems several, slightly compressed, h, striated, leafy, with four or five Leaves almost all on the stem, green, narrow, flat, more or less rough, ng to a fine slender point. Stipules short, notched. Panicle spreading, ry. Spikelets lanceolate, pale green hite, with a purplish tinge. Florets two to three. Mr. George Sinclair favourably of a variety of this spe- hich he names *P. nemoralis*, var. *an- lia*. Although the produce is incon- ble compared to that of many others y nutrient, yet the early growth of rass in the spring, and its remarkably ucculent, and nutritive herbage, re- end it strongly for admission into the ny of the superior permanent pasture s. It flowers in the third week of and ripens the seed in the end of

e *P. aquatica*, or water meadow-grass, ne botanists, is the reedy sweet-grass *eria aquatica*) of Smith. The decum- meadow-grass (*P. decumbens*) is the bent heath-grass (*Triodia decumbens*) ith's *English Flora*. The reflexed w-grass (*P. distans*) of Sinclair is the ed sweet-grass (*Glyceria distans*) of n botanists. The *Glyceria fluitans* is ometimes called the *Poa fluitans*.

ving disposed of the native species of w-grass, we come now to consider two exotic species which are men- d in Sinclair's work on the grasses.

e soft meadow-grass (*P. cenisia*). This species is a native of Germany, and s to a greater size than most others e same class. The root is fibrous. Panicle diffuse, nodding. Spikelets oblong, 5—7-flowered. Florets connected at the base by a villus. Sheath-scale short. It is rather late in the produce of foliage in the spring, and does not afford much after-grass. Its nutrient properties, as indicated by the quantity of nutritive matter it contains, are not superior to those of several other grasses which afford a greater abundance of herbage throughout the season.

The fertile meadow-grass (*P. fertilis*). It produces flowers about the first and second weeks of July, and seeds in the second week of August. This grass, which is also a native of Germany, seems to be allied to the *Poa nemoralis*. It differs in having the panicle more loose and spreading, and less attenuated. The spikelets are more oval, and nerved. The culm rises from a foot and a half to two feet in height, and sometimes more, ascending at the base, afterwards erect, somewhat compressed. The root is slightly creeping. In regard to early growth, this grass stands next to the meadow fox-tail, cocks-foot, and tall oat. The herbage is more nutritive than that of either of those grasses; and from its agricultural merits it deserves a place in the composition of rich pastures, and ranks with the superior grasses of irrigated meadows. It flowers in the beginning of July, and the seed is ripe towards the end of the month.

The nerved meadow-grass (*P. nervata*). This species is a native of North America. Panicle upright, often half a foot or more in length, with slender branches pressed close, and subdivided. Spikelets small, of a green colour. Valves of the blossom smooth, having five raised nerves on each valve. Leaves in two rows, resembling a fan, somewhat rough. Culm a little compressed. This grass is remarkably hardy, and possesses many very excellent properties: it will be found a valuable ingredient in permanent pastures, where the soil is not too dry, but of a medium quality as to moisture and dryness. The root leaves are produced on a shoot, and stand in two rows after the manner of a fan. This shoot, which is formed by the union of the base of the leaves, is very succulent, and contains a greater proportion of nutritive matter than the leaves, which accounts for the superior nutrient qualities of the lattermath. It flowers in the third week of June, and the seed is ripe in the last week of July.

I shall conclude this article with a useful table for the farmer, showing the comparative yield and nutrient properties of the different species of meadow-grass which are capable of cultivation. (*Smith's Eng. Flor.* vol. i. p. 120—130.; *Sinclair's Hort. Gram. Wob.*; *Paxton's Bot. Dict.*)

Species of Grass.	Description of Soil.	Produce per Ac	
		Green.	Dry.
		lbs.	lbs.
Poa alpina, in flower -	Light sandy loam - -	5,445	1,701
P. angustifolia, in flower -	Brown loam - - -	18,376	7,810
———, when seed ripe	ditto - -	9,528	3,811
P. annua, in June - -	Rich black loam - -	5,445	1,905
P. cenisia, in flower -	Sandy loam - - -	6,806	1,871
P. compressa, in flower -	Gravelly soil manured -	3,403	1,446
———, var. *erecta*, ditto	Light sandy loam - -	15,654	6,653
———, seed ripe -	ditto - -	14,973	8,235
P. fertilis, in flower -	ditto - -	15,654	6,653
———, seed ripe - -	ditto - -	14,973	8,235
P. glauca, in flower - -	Rich black sandy loam -	8,848	3,539
———, seed ripe - -	ditto - -	10,209	4,594
P. g. cæsia, in flower -	Brown loam - - -	6,806	2,892
———, seed ripe -	ditto - -	4,764	2,382
P. nemoralis, var. *angustifolia*, in flower - - -	ditto - -	9,188	3,905
P. nervata, in flower -	Rich sandy loam - -	21,780	8,167
———, seed ripe - -	ditto - -	21,780	8,712
P. pratensis, in flower -	Clayey loam with peat -	10,209	2,871
———, seed ripe -	ditto - -	8,507	3,403
P. trivialis, in flower - -	Brown loam with manure -	7,486	2,246
———, seed ripe - -	ditto - -	7,827	3,522

POACHERS. See Game; and Animals, Wild, Stealing of.

POCKET. A large kind of bag in which hops are packed up.

POD. A term used to express the siliqua and silicula of botanists. A seed vessel of some plants, consisting of two valves, separated by a linear receptacle, along each of the edges of which the seeds are alternately ranged. The wall-flower affords an example of the *siliqua*, which differs from the silicula merely in being oblong instead of being short and round. The satin-flower, or honesty, bears a pouch or silicula.

POINTER (*Canis avicularis*). A well known dog, used in shooting, trained to stop and point where the game is: hence its name. He is an invaluable accompaniment to a sportsman. Although neither so handsome nor so engaging in his manners as the setter, the pointer retains what is taught him longer and more completely. The value of the pointer consists in steadiness, and retaining his point: strong and able to stand work. For some excellent hints respecting the training and management of these dogs, Colonel Hawker's work, the *Sportman's Cabinet*, may be consulted.

POINTS OF CATTLE. The parts which show the excellencies or defects in their forms. See Cattle.

POISON. (Fr.) Any substance which in small quantity disturbs, suspends, or destroys one or more of the vital functions. Poisons are classified by Orfila under the four heads of irritants, narcotics, narcotico-
acrids, and putrefiants, or septi
may add, sedatives. The sam
which affect men usually affe
cows, and dogs; but goats and
many things that are virulent
other animals. Sweet almonds
are poisonous to dogs; sugar is
pigeons, parsley to parrots, and
hogs. On the other hand, ho
Nux vomica and henbane with
goats browse on *Aconite*, *Cicuta*
Arnica montana harmless; and
common hemlock without suffe
Animal and Vegetable Poiso
Yew, Sheep, Diseases of, &c.

POITTEVIN'S MANURE.
pound organic and earthy manu
well adapted for the use of the
Manures applicable by the D
p. 795.; and *Journ. Roy. Agr.*
p. 417., vol. ii. p. 264.

In three experiments with thi
tried in 1840, on turnips against
following are the results.

First, on a stony soil.
24 bushels of Poittevin's -
16 bushels of bones - -
Second, on a sandy soil.
24 bushels of Poittevin's -
16 bushels of bones - -
Third on a sandy soil with Swedes.
13 bushels of Poittevin's -
12 bushels of bones - -

This manure answers best on
it is generally used too sparing
mer's Almanack, vol. i. p. 189.)

LE. A small thick piece of wood, as a straight bough or young tree. are useful in husbandry for the mak- stakes, hurdles, and various other ses, as also for supporting the bind of The poles of ash, oak, willow, pop- estnut, and various other species of are employed in this way. The ash, and chestnut are probably the most ble. Poles for this purpose are usu- repared by having the bark removed, being sharpened at the thick end. should be taken of them after they eparated from the bind, by having properly stacked up in some dry situ-

LE. A measure of length equal to eet.

LE-CAT. (*Mustela putorius.*) A tory animal of a dusky-yellow colour, whitish ears and muzzle. The pole- urrows in the earth, and issues out g the night in quest of prey, commit- great havoc among poultry, bees, &c. ole-cat emits an exceedingly offensive so that its name has long been a term proach. The female breeds in the , and brings forth four or five young ime.

LLARD. A name given to a tree has been frequently polled or lopped, ts top taken off, or headed down to tem, for the purpose of fire-wood or poles for hurdle wood and other r uses, as well as for hop poles, &c. erm is most commonly in use in the ern and eastern districts of the king- *Pollard* is also applied to the fine or inner husk of wheat. It is a sub- much used in feeding hogs and dif- domestic animals.

LLEN. In botany, the pulverulent ance which fills the cells of the anthers plant, consisting of a multitude of hollow cases, filled with a fluid hold- ery minute molecular matter in sus- on. The latter is eventually dis- ed by the grains of pollen through hollow tubes, and is supposed to be permatic fluid of a plant. When the alights on the stigma of the plant, embrane lining the shell is protruded tube, which enters the stigma, and hens until it reaches the ovule, into it empties the impregnating fluid. pollen grains vary in form and mag- e, being globular, angular, compressed, le, and compound. *Pollen* is also vincial name given to the hen-roost. sometimes written hen-pollen.

LL-EVIL. An accident which some- occurs to horses, from the animal's ing or striking his head against the lower edge of the manger, or hanging back in the stall and bruising the part with the halter. Such injuries are serious in their nature and difficult of treatment, and will usually require the skill and anatomical knowledge of the veterinary surgeon.

POLYPODY. (*Polypodium*, from *poly*, many, and *pous*, a foot; having numerous root-like feet.) This is an extensive genus of very ornamental ferns. The hardy kinds are well adapted for ornamenting rock-work, or they may be grown in pots, in light loamy soil. All the species may be readily increased by dividing the roots, or by seeds.

There are four indigenous species —

1. The common polypody (*P. vulgare*) is found growing on walls, cottage roofs, shady banks, and the trunks of old trees. Root creeping horizontally, with numerous stout branched fibres, scaly. Frond from twelve to fourteen inches high, linear lanceolate, deeply pinnatifid; lobes oblong, somewhat serrated, obtuse; the whole frond elegantly imitating an ostrich feather.

2. Pale mountain polypody (*P. Phegopteris.*) This species grows on the clefts of rocks, and open stony moors in moist situations, but is not very common. The root is thread-shaped, slender, slightly scaly. Fronds scattered, erect, twelve or eighteen inches high, pinnate, delicate in texture, of a pale green, minutely hairy. Stalk brittle, slender, sometimes a little scaly. Leaflets lanceolate, united at the bases, pinnatifid, with blunt segments; the lowest pair deflexed. Ribs and veins hairy. Masses of capsules of a pale yellowish brown towards the margin of each segment. The name of *Phegopteris*, or beech fern, is by no means suitable to this species, which does not grow in beech woods, but in stony mountainous places.

3. Tender thin-branched polypody (*P. dryopteris*) grows on shady mountainous declivities. Root not unlike the last, slender, undulated, widely creeping, but blacker. Stalk slender, brittle, two or three times as tall as the leafy part, pale, very smooth. Frond about a foot high, three-branched, bright green, smooth, delicate and flaccid; branches doubly pinnate, spreading rather downwards; segments obtuse, somewhat crenate. Masses of capsules scattered, distinct.

4. Rigid three-branched polypody (*P. calcareum*). Inhabits mountainous heaths and woods, on a limestone soil. The root is creeping, but stouter and less extended than in the preceding species. Frond more firm and rigid; its stalk more scaly about the lower part. All the three branches upright, smaller than the last, rigid, and not

plentifully from July to September when planted against a south wall. They all grow well in a light rich loam, and strike root freely from cuttings or layers; the rarer varieties are sometimes increased by grafting on the common kinds. The pomegranate requires shelter from frost. The pulp of the fruit is of an agreeable acid, and the rind is highly astringent. (*Paxton's Bot. Dict.; Phillip's Fruits*, p. 311.)

POND. In agricultural parlance, a natural or artificial basin or pool of water. Various indications of the presence of water below the surface of lands have been suggested by the ancient writers on husbandry; such as the spontaneous growth of different aquatic plants, vapours near the surface, &c.; but the best mode of ascertaining it is by boring: and about the latter end of August, when the ground begins to be a little moist, is perhaps the most proper season for the purpose.

Reservoirs of this kind are extremely useful in many situations for the supplying cattle with water, and for other purposes, and should always be proportioned to the nature and size of the farm. Two great objects should be kept in view in the formation of basins, viz., first, the consideration whether a proper supply of water is to be obtained at all times of the year; and, second, what are the best means of making them retain water at all seasons. There is little art in the construction of these basins, and the manner of their formation must depend in a great measure on the nature of the soil. Chalk, clay, and brick or stone work, are used according to local circumstances. The average required depth of ponds for common watering purposes ap-

Sir J. E. Smith de
as they are of no
will be sufficient to
leaved pond-weed (
leaved pond-weed
Perfoliate pond-wee
Close-leaved pond-
Long-leaved floatin
tans). 6. Shining
7. Lanceolate pond
8. Curled pond-wee
(*P. crispum*). 9.
(*P. compressum*). 1
weed (*P. cuspidatu*
weed (*P. gramineum*
(*P. pusillum*). 13. F
(*P. pectinatum*). Th
tic, floating on imm
vascular texture wh
whole surface, is ex
pid. Stem branche
opposite, stalked o
vided, entire, rathe
with parallel longi
spiked, greenish, rai
seeds ripened at the
Dict.; Smith's Eng
237.)

PONTEY, WIL
gardener, residing
planter and forest
of Bedford. He p
works: —

1. The Profitable Plan
vation of the Larch and th
that their excellent quality
will render them so essen
mote the Interest of the
8vo. 4th edition, London,
or Timber-owner's Assist
Training or Managemen
whether intended for Us
cluding an Explanation of

ure after the dissolution of the mo- es, and other religious houses, by VIII. Till that period multitudes impotent and the idle were main- y the extensive daily charities of these religious houses. Various statutes ssed to supply the loss of these funds; se proving ineffectual, by the 43 Eliz. verseers of the poor were appointed y parish. This system, however, in ecame a mass of abuse; wages were rly paid out of the parish funds, and untry labourers were rapidly pauperising, when, by the 4 & 5 W. 4. c. 76., the present poor-law system of commissioners, unions and guardians, was established. See LABOUR, POOR LAW, POPULATION, &c.

There are papers containing valuable matter concerning the poor, by Lord Swinton, *Com. Board of Ag.* vol. vi. p. 201.; by the Rev. J. S. Tryon, *Quart. Jour. of Agr.* vol. v. p. 545.; of England and Scotland, *Ibid.* vol. vi. p. 1.; of Belgium, *Ibid.* vol. vii. p. 588.; of the working of the English New Poor Law, *Ibid.* vol. xi. p. 534.

NT of Money expended in England and Wales for the Relief and Maintenance of Poor, in Law Charges, and for other Purposes (excepting County Rates, and Pay- nts under the Registration and Parochial Assessment Acts), during the Years ended dy-day, 1834, 1835, 1836, 1837, 1838, 1839, and 1840 respectively; showing the crease per Cent. in each Year on each of the Heads of Expenditure, compared with Year ended Lady-day, 1834; also the Rate per Head of Expenditure for the Relief he Poor (on the Population in 1831) in each Year, together with the average Price Wheat per Quarter: —

	Expended for Relief, &c. of the Poor.	Decrease per cent. compared with 1833-4.	Rate per Head of Expenditure on Population, 1831.	Expended for Law Charges.	Decrease per cent. compared with 1833-4.	Expended for other Purposes.*	Decrease per cent. compared with 1833-4.	Totals of the three preceding Heads.	Decrease per cent. compared with 1833-4.	Average Price of Wheat per Quarter.
	£		s. d.	£		£		£		s. d.
34	6,317,254	- -	9 1	258,604	- -	935,361	- -	7,511,219	- -	51 11
35	5,526,416	13	7 11	202,527	22	935,361	- -	6,664,304	11	44 2
36	4,717,629	25	6 9	172,431	33	823,212	12	5,713,272	24	39 5
37	4,044,741	36	5 10	126,951	51	637,043	32	4,808,735	36	52 6
38	4,123,604	35	6 0	93,982	64	507,929	46	4,725,515	37	55 3
39	4,406,907	30	6 4	63,412	76	493,703	47	4,964,022	34	69 4
40	4,576,965	28	6 7	67,020	74	466,698	50	5,110,683	32	68 6

e being no separate heading for this item of Expenditure in the year 1833-34, the amount expended for the oses in 1834-35 is taken as an approximation.

R LAW. The humane provision r destitute persons, provided by the England, although it may be said to ommenced with the statute of the . c. 2., yet originated and was en- at a much earlier period. By the . 3. c. 7. it was directed that no one give alms to persons who were able k; and by the 12 Ric. 2. c. 77. poor , who are impotent, shall abide in ne town, or in the next within the d, that is able to maintain them. y the 15 Ric. 2. and 4 Hen. 4. im- tors shall be obliged to distribute a sum to the poor parishioners. And on is directed to be made for the nt poor by a series of acts, extend- m the 19 Hen. 7. c. 12. to the 39 Eliz. But it was not until the 43 Eliz. c. 2. e relief was directed, and regulated ny thing like a regular system, and nagement entrusted to the church- ns, and to two or more substantial tants of every parish, who were to be *overseers of the poor.*

s hardly necessary in this place to rate the various acts which have been to enforce and assist the operation act of the 43 Eliz., since many of these have been repealed, and the whole system placed on a new and improved footing by the recent poor law act, 4 & 5 W. 4. c. 76. By this act the management of the poor throughout England is transferred to three commissioners, who are styled, "The Poor Law Commissioners for England and Wales;" and are empowered to appoint and delegate their powers to assistant commissioners.

The act, by sect. 15., further authorises the commissioners to make rules and regulations for the relief and management of the poor. And, by sect. 23., they are empowered to order the erection of workhouses, and to unite, for the purposes of this act, two or more parishes together into an union. But by sect. 26. each parish of an union "shall be separately chargeable with and liable to defray the expense of its own poor, whether relieved in or out of such workhouse." And by sect. 26. two justices of the peace may order out-door relief to aged and infirm persons wholly unable to work. By sect. 36. guardians are to be annually elected by the parishes of the union, on the 25th of March, subject to such regulations, and in such manner, as the commissioners shall direct. By sect. 40. the ratepayers who are to shall be made on the net annual value of the property. "No rate for the relief of the poor in England and Wales shall be allowed by any justices, or be of any force, which shall not be made upon an estimate of the net annual value of the several hereditaments rated thereunto; that is to say, of the rent at which the same might reasonably be expected to let from year to year, free of all usual tenants' rates and taxes, and tithe commutation rent-charge, if any; and deducting therefrom the probable average annual cost of the repairs, insurance, and other expenses, if any, necessary to maintain them in a state to command such rent: provided always, that nothing herein contained shall be construed to alter or affect the principles or different relative liabilities, if any, according to which different kinds of hereditaments are now by law rateable." By sect. 2. rates are to be made in a given form; and nothing in the act is to prevent owners from compounding for rates. By sect. 3. power is given to the poor law commissioners to order new surveys and valuations. By sect. 4. power is given for surveyors to enter and examine lands, &c. for purposes of survey and plans. By sect. 5. power is given to any ratepayer to take copies or extracts of rates gratis. Penalty for refusal to permit. By sect. 6. justices acting in petty sessions to hold four special sessions in the year to hear appeals. Seven days' notice to be given of objections.

POPLAR. (*Populus;* some derive the word from *paipallo*, to vibrate or shake; others suppose it obtained its name from being used in ancient times to decorate the public places in Rome, where it was called *Arbor populi*, or the tree of the people.) Most of the species of poplar are very or-

canescens, also, ar
oval, and the stigm
Other characters,
such as the growth
are more upright a
cens, and the bark
that of *P. alba*. T
in favourable situa
frequently running
eighty or ninety f
trunk from three t
feet. As an ornam
worthy of a place
grounds, particular
situations, or near t
ever, to be grouped
of equally rapid g
comes disproportion
with those whose p
slow. No tree req
the shortening of
wanted, and large
amputated, as the
the wet, and soon c
rot to the trunk of
very white, and,
nature, allowing na
without splitting, o
lightness it is wel
cases: it also afford
deals for flooring l
and by the music
often substituted fo
tree. In Scotland
as well as by the tu
for its lightness and
and rollers around
articles are wrapp
poplar wood.

2. The black popl

quick-growing trees. The wood is
pale yellowish white colour, soft, and
worked, and is much used by turners
wls and other wooden ware; and, in-
it is applicable to most purposes for
the timber of the poplar is adapted.
mpish situations, planted in mass, or
with the grey poplar, where poles,
rafters, and railing are in demand, it
make a quick return, as a growth of
or ten years would render it fit for
purposes. When cut over young, it
ws out numerous shoots, which may be
like willows for basket-making; it
bears lopping much better than other
es, and, as a pollard, produces an
dant supply of stalks and poles; but is
st useless as a fuel. The bark is used
he tanner, and, as it becomes very thick
corky upon old trees, it affords a ma-
l to support and float the nets of the
rman.

r. Selby, in his elegant work *On British*
st Trees, to which we are mainly in-
ed for these particulars, enumerates
or four other species of poplar in ge-
cultivation, of which it may be well
ve a short notice.

The black Italian, or necklace-bearing
r (*P. monilifera*) appears to have been
introduced into Britain from North
ica, in 1772. Of all the poplars hi-
introduced, it is by far the most
ble, looking to it in the light of a use-
nd profitable timber tree, as it grows
astonishing rapidity, and produces a
r of large scantling and excellent
ty, equal, if not superior, to that of
ther of its genus. The wood is of a
sh white colour, tough when seasoned,
if kept dry, very durable; its great
enders it fit for the largest buildings,
flooring for manufactories and other
ions, nothing can surpass it; for, in
ion to the property of not splitting by
ssion, it possesses the peculiar advan-
of not easily taking fire, and, even
ignited, burning without flame or
nce. As an ornamental tree, it well
ves a place in extensive grounds, its
height and pyramidal form, before it
mes aged, being well calculated to
k long horizontal lines, or the mono-
s effect of round-headed trees: it also,
great measure, from its semi-fastigiate
th in the young state, supplies the place
e Lombardy poplar in such scenery,
r of wooded landscape or in combin-
with buildings, as is improved by the
nce of that tree.

The Lombardy poplar (*P. fastigiata*).
close fastigiate growth and cypress-
form, which seems to be retained during the whole of its existence, the Lombardy poplar is too conspicuous not to be immediately recognised and readily distinguished from all other species of the genus. As a useful and profitable timber-tree it is greatly inferior to some of the species already described, the twisted and deeply-furrowed trunk, even of the tallest and largest trees, cutting to much waste, and affording boards of only a moderate size when sawn up. The wood is also softer and more spongy than that of the black and the black Italian poplars, and rapidly decays unless kept perfectly dry. In Britain, therefore, it is cultivated almost exclusively as an ornamental tree, for which its towering height and spire-like form eminently qualify it.

5. The balsam poplar, or Tacamahac (*P. balsamifera*), appears to have been one of the earliest trees introduced into England from the American continent. The early period at which it bursts into leaf, cheering the eye with the first green tint of spring, and the fine balsamic odour emitted by the buds and tender leaves are the chief recommendations of the Tacamahac; for, unless planted in a sheltered situation and a rich soil, it seldom attains to more than the dimensions of a tree of the second rank, and that without assuming any beauty or peculiarity of form to render it a conspicuous object in ornamental planting. The wood is of little value, being soft and spongy, and is only fit for packing-boxes, or where a light material is required.

6. Nearly allied to the Tacamahac, is the Ontario poplar (*P. candicans*), also introduced from North America, and cultivated sparingly for the last thirty or forty years as an ornamental tree. The wood is soft, and not of much value.

7. The Athenian poplar (*P. Græca*), as an ornamental tree, is superior, in many respects, to the aspen (to which it is closely allied). It grows rapidly, young trees often making shoots in one season of five or six feet in length, and, though a slender-stemmed tree, it has the valuable property of resisting the wind, and is never seen, even in the most exposed situations, but an erect and perpendicular trunk.

The bark of all the poplars is more or less antiperiodic and tonic, containing an alkali, which can be procured separate; and is known by the name of *Salicina*. It may be used for curing agues, in the same manner as *Quinine*, an alkaloid got from Peruvian bark. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. iv. p. 242.; *Selby's Brit. For. Trees*, vol. i. p. 173—214.; *Loudon's Arb. Brit.; Phillips's Syl. Flor.* vol. ii. p. 124.)

POPPY. (*Papaver*, from *papa*, pap, or thick milk; the juice of the poppy was formerly used in children's food to make them sleep.) These plants succeed best in a light rich soil. The perennial kinds are increased by dividing at the roots. All the species are narcotic. There are six indigenous species of poppy, which are nearly all annuals. They are arranged under two sections — 1. Those with *bristly capsules;* 2. Those with *smooth capsules.*

Section I.

1. Round rough-headed poppy (*P. hybridum*), which grows in sandy or chalky fields, but rare. It flowers in July. The root is small and tapering; herb twelve or eighteen inches high, rough, with minute bristles. Leaves deep green, with numerous decurrent, narrow, linear-lanceolate, obscurely revolute segments, each tipped with a bristle. Flowers rather small, deep scarlet, or crimson, short-lived, often violet at the base. The pollen is bright blue; the stigma a little raised, with 5—8 rays. Capsule nearly globular, the size of a filbert, furrowed longitudinally, thickly beset with rigid, ascending, tawny bristles. Although named *hybridum*, yet, as Sir J. E. Smith remarks, it is a true permanent species.

2. Long rough-headed poppy (*P. argemone*.) This grows in corn fields and thin borders, also on gravelly or sandy soils. It is annual, and flowers in June and July. The herbage resembles the preceding, but the bristles are less closely pressed to the stem, and the segments of the leaves are somewhat broader. Petals pale scarlet, black at the base, soon falling, often jagged; the stamens diluted upwards; rays of the stigma 4—8. Capsule narrow, club-shaped, ribbed, equal to the rays of the stigma, bristly. Calyx slightly hairy. Leaflets doubly pinnatifid. The flowers are sometimes double.

Section II.

3. Long smooth-headed poppy (*P. dubium*). This species is found in cultivated fields, especially on a light soil. Annual, and flowering in June and July. It is of a stouter, more luxuriant habit than the foregoing, with broader leaves. The stem is clothed with spreading hairs; the flower-stalks with close-pressed bristles. Petals broader than they are long, of a light scarlet, the margin mostly crenate; the stamens linear; the pollen yellow; stigma 6—8 rays. Capsule perfectly smooth, and somewhat glaucous, oblong, angular.

4. Common red poppy, or corn rose (*P. rhœas*.) See CORN POPPY. This is the only officinal species of the British poppies; but it is used in medicine merely as a colouring agent.

5. White poppy (*P. somniferum*). This
species appears to grow wild on
ground in the neighbourhood of
the fen lands. But it is probable
places where it is found apparently
the seed from the cultivated pop
been deposited by birds. The
poppy is a native of Asia and Egypt,
cultivated in Hindostan, Persia, and
on account of its opium; in Germ
the oil expressed from its seeds;
England for the capsules, which
in medicine. It is universally
our gardens as an ornamental
is much cultivated in the vicinity
don. The whole herb is glauc
generally smooth, though the flow
now and then bear several rigid,
bristly hairs. The stem is three
feet high, erect, branched, leafy.
broad, wavy, lobed and bluntly
clasping the stem with their be
base. Flowers three inches broad
bluish white, with a broad viole
the base of each petal. In garde
varieties of every shade of purpl
crimson, and even green, mixed
are common, though nothing can
liable to change. The capsule
globular. Seeds small, whitish-b
sweet and eatable. There are
eties, namely, *P. album* and
chiefly distinguished by the foram
the stigma being absent in the f
present and open in the latter.
juice of the capsules, when ab
transverse incisions and inspiss
opium, which, as Haller well
far more potent and dangerous in
tries than in our cooler climates.
sules boiled afford a mild narcotic
more generally used for fomentat
ward pains, and for making a syru
misused by lazy nurses, who ad
to restless infants, and sacrifice the
own love of ease. Nothing is m
condemned than the indiscrimin
syrup of poppies. No opium, exc
periment, is made from poppie
country; and, could it be made
and the foreign opium should nev
ployed except by the advice of
alone ought to direct its use.

6. Yellow poppy (*P. cambricum*)
a perennial species (and the only
one) which flourishes in moist ro
tions in Wales and Westmoreland.
in June. The herbage is tender,
a light, slightly glaucous, green;
lemon-coloured. Stem a foot hig
flowered, thinly covered with
hairs, leafy, branched. Leaves
pinnate; leaflets nearly ovate,
lobed or pinnatifid, smooth,

t. Flowers of a most elegant full
—colour, deliciously fragrant; calyx
Capsule smooth, oblong, beaked;
4—5 rayed, but close, so as to re-
a short style. (*Paxton's Bot. Dict.*;
s Eng. Flor. vol. iii. p. 9.)

PPY, THE HORNED. See
ED-POPPY.

PULATION. As many very errone-
tions with regard to over population
ten, I think, entertained, and it mainly
nds upon the farmer to render unne-
ry all fears of a want of a sufficient
ly; and as many of the most phi-
ropic men in England have, at con-
able personal trouble and cost, pro-
d emigration, to avert the evils of war,
lence, and famine, from what Mr. Mal-
supposes to be the tendency of man-
to excessive population, it may be
for the public to peruse a paper (*Quart.*
. Agr. vol. iii. p. 89.) which, in detail,
examines Mr. Malthus's data, calcula-
, and conclusions; and the result being
ring, I shall give an extract. "Mr.
hus states, from a variety of sources,
the average births from each marriage
—

Europe - -	- 4·000
England - -	- 4·136
France, during the six years ending in 1822 - -	- 4·370
Russia - - -	- 4·110
America (in towns) according to Mr. Barton - -	- 4·500
America (in town and country average) - -	- 5·000

But, from returns made to Government
average births in England and Wales,
ng the thirty years ending 1820, fell
iderably under four from each mar-
; and of these, from personal defor-
and a hundred other causes, a con-
able portion of women must remain
arried.

But supposing *every woman, married or*
e, who lived to eighteen years of age,
ld have seven children, and the rate of
tality as favourable as at Carlisle, the
lation would require more than twenty-
ears to double itself; and twenty-five
s is the lowest rate of increase Mr.
thus has contemplated. But, supposing
tenth part of all the women who attain
ty to remain in a state of celibacy, and
rest were to bear each 3·66 children,
h is stated by Mr. Sadler to be the
age prolificness in England, and the
tality continued as at Carlisle, the po-
tion would remain entirely stationary.
he rich and fertile country of France,
population is nearly stationary, and in
nd, population increases faster than in England; which can only be accounted for by the institutions which encourage increased forethought before entering on the married state. Amongst barbarous nations, the period of marriage is almost always early; but as countries become civilised, a portion of early life is devoted to labour of mind and body; and the desire of distinction in some, and, amongst all, the pursuit of gain, delays marriage; and, happily for mankind, nothing is less consistent with universal experience than the terrible succession of evils Mr. Malthus fears from over population. Natural evils, and the more dreadful effects of misrule, have, indeed, spread death and desolation; but the consequences have not been increased plenty to the survivors: on the contrary, the page of history shows that, in the fairest portions of the habitable world, poverty and want have followed decreasing numbers.

"Whereas the wiser the laws, and, consequently, the more *secure person and property*, the slower men are to marry till they have secured for themselves and families, in a habitation of their own, the conveniences they were used to under their paternal roofs; and, consequently, the less tendency to the excessive multiplication of mankind; and we refer to Scotland, France, &c., as existing proofs.

"No society, well governed, we repeat, has been known to outgrow, or tend to outgrow, its means of subsistence. When, in our own country, one of the most populous in the world, we see how far the earth is yet from producing all that labour well directed can bring forth, when we look at the tracts lying waste or half cultivated, we must see how little it is to be feared as a possible evil, that our population will ever increase beyond the means of supplying itself with food. We have only to look to what minute care can effect in multiplying the produce of the earth, to feel in what a prodigious ratio it may be multiplied. A piece of heath land the most worthless, converted into a cottager's garden, yields a return of food exceeding that of the richest land of the cultivated fields. And nothing prevents the increase of this species of culture, but the want of hands to cultivate, and of mouths to consume. Every vegetable that grows, and is consumed, affords new materials for fertilising the earth, and increasing its productions; and thus every increase of the number of consumers is a means of calling new food into existence.

"The introduction of a single plant from another hemisphere, has more than doubled the power of this and of every country in Europe to support their inhabitants. An acre of potatoes will supply food sufficient same season. Our present knowledge of agriculture shows us, that throughout the whole kingdom the productions of the earth may be prodigiously multiplied; but what our present knowledge of this art is in comparison with what it may become, we know not. What other plants are yet to be applied to the support of animal life, what other means of fertilising the earth are yet to be discovered, what other application of mechanical power may yet take place in aid of human labour, we know not; nor need we, with relation to our present subject, be too curious in inquiring. It suffices that, with our present means and knowledge, limited as they are, we can multiply our means of subsistence in a degree to furnish food for increasing numbers for more generations of men than the cares of the living race need extend to.

"And if such be the case with a long peopled country, what must we think of the fear that the entire world will be overpeopled? The richest regions of the globe have yet been scarcely trodden by the foot of the hunter; a great part of Europe is still a desert; and a long desolation has overspread lands that once were the seats of nations, and which only demand security that they may be blessed with abundance again. Such as Asia Minor, Syria, and Greece, and such the long desolated shores of Northern Africa. It is not Nature that is barren of her gifts, but it is man that has abused them all; and in the climates and the lands where we might look for the verdure of an eternal spring, we find only the moving mountains and interminable tracts of the desert."

It is unnecessary, perhaps, to enlarge

three times; and it
losophical Transacti
same space of time,
duced 21,109 ear
grains, or nearly a
thus an acorn cup
enough to raise pla
and full 10,000,000
might be saved o
under wheat in E
which quantity, all
each person, would
sons, who, if emp
crops, would doub
shown by the increa
tenants under the a

And again, as reg
agriculture is yet on
bones, now so exte
unknown as fertili
since; gypsum, whi
is only slowly comi
of tons of the rich
nually wasted in c
suffered to putrefy
into the sea throu
"and yet," says th
Company, "strange
land is almost the
notwithstanding its
knowledge, which s
nure in question
away; while all th
Continent, and even
treasure it up for
object of extensive
and some export it
principal London s
fully gauged, and a
into the river Th

clay, at a cost of only 16*l.* This
ed a plate to retain what mould,
tenant has added, who has hired
ınd for fourteen years, at 40*s.* per
no land is hopelessly barren. Let
provements proceed; let science
l in hand with the farmer; let
ralist find new cultivateable vege-
or new varieties of those already
let the chemist yield his magic aid
nstrate the best mode of promoting
owth and increasing the fertility of
; and then, I fearlessly assert, that
mes the present inhabitants of Bri-
y be amply supported by the pro-
the land of our birth.

ES. In botany, apertures, more or
le, in the cuticle of plants through
anspiration takes place. They may
the cellular tissue; and when there
the organs of insensible perspira-
the plant: they may exist as cor-
es; or on the leaf as stomata or
g pores. Pores also exist in some
anthers, through which the pollen
l; as in the potato (*Solanum tuber-*

. The flesh of swine killed for
purposes. See Bacon, Ham, Meat,
c.

ER. A well known malt liquor.
Beer, and Brewing.

SH, or POTASSA. The name of
e alkalies, composed of 39·15 parts
ar metal called potassium, 8 parts of
and 9 of water. It derives its com-
ne from being first obtained from
s of vegetable substances, which
burned in iron pots—hence named
s. The chemical name *potassa*, is
to be consistent with soda. Potash
in almost all land plants, in com-
with the tartaric, citric, or other
e acid. The potash in these is no
n essential food or constituent of
on, and there is no fertile soil which
in some form or other contain this
It exists, however, in plants in
proportions. See Alkali. The
commerce is an impure carbonate
with salts of lime, and other sub-
In its separate or pure state, free
rbonic acid, it is a white salt,
lly attracting moisture from the
soluble in water and in alcohol,
g animal substances, consequently
ng the skin when applied to it. But
sually means the carbonate. The
procured from different plants
Fumitory yields 79·0 in 1000 parts,
od 73·0, young wheat-stalks 47·0,
5·0, vetch 27·5, common nettle 25·3,
lower 20·0, bean-stalks 20·0, barley
straw 5·8, vine-shoots 5·5, wheat-straw 3·9, and flax 5·0. The younger a plant is, if full grown, the more potash it yields.

"The perfect developement of a plant," says Liebig, (*Organic Chem.* p. 104.), "according to this view, is dependent on the presence of alkalies, or alkaline earths, for when these substances are totally wanting, its growth will be arrested, and when they are only deficient it must be impeded. In order to apply these remarks, let us compare two kinds of trees, the wood of which contain unequal quantities of alkaline bases, and we shall find that one of these grows luxuriantly in several soils, upon which others are scarcely able to vegetate. For example, 10·000 parts of oak wood yield 250 parts of ashes, the same quantity of fire-wood only 83, of linden wood 500, of rye 440, and of the herb of the potato plant 1500 parts. Firs and pines find a sufficient quantity of alkalies in granitic, and barren sandy soils; in which oaks will not grow, and wheat thrives in soils favourable for the linden tree, because the bases which are necessary to bring it to complete maturity exist there in sufficient quantity. The accuracy of these conclusions, so highly important to agriculture, and to the cultivation of forests, can be proved by the most evident facts. All kinds of grasses, the equisetaceæ, for example, contain, in the outer parts of their leaves and stalks, a large quantity of silicic acid (silica), and potash in the form of acid silicate of potash. The proportion of this salt does not vary perceptibly in the soil of corn fields, because it is again conveyed to them as manure, in the form of putrefying straw. But this is not the case in a meadow: and hence we never find a luxuriant crop of grass on sandy and calcareous soils, which contain little potash, evidently because one of the constituents essential to the growth of plants is wanting. Soils formed from basalt, grauwacke, and porphyry, are, cæteris paribus, the best for meadow land, on account of the quantity of potash which enters into their composition."

In the experiments of the Rev. E. Cartwright with various manures applied to potatoes, wood ashes, which contain potash, were found to produce very superior effects to several others: thus, where the soil, without any dressing, produced 157 bushels per acre, the land dressed with 60 bushels of wood ashes yield 187; with 60 bushels of malt dust, 184 bushels; with 363 bushels of decayed leaves, 175 bushels; with 363 bushels of saw-dust, 155 bushels; with 121 bushels of lime, 150 bushels per acre. (*Com. Board of Agr.* vol. iv. p. 370.) See Salts.

POTATO. (*Solanum tuberosum.*) A valuable well-known root, first imported from America into England by Sir Walter

Raleigh, and first grown at Youghall, in Ireland. In many parts of England this tuberose plant is very extensively cultivated, both in the field and in the garden; but, in districts removed from large towns, or convenient markets, its cultivation is of necessity restricted to the garden, or for the consumption of the live stock of the farm. As regards the field management of the crop, a writer in a popular journal remarks, when speaking of the preparation of the ground:—

"It is, I know, customary upon a large scale, to plough the land and make it tolerably fine before potatoes are planted; but still, if it is ploughed five, six, or seven inches deep, and made fine and mellow, still at the bottom of such ploughing the land is hard and smooth; and as the potato is a root that sends out fibres not only near the surface, but deeply if possible, it can never produce such a crop as where the land is broke eighteen inches to two feet. The potato, like the cucumber, only enjoys itself in deeply pulverised soils, which causes them to flourish so much in well-managed sandy land.

"I should therefore recommend that, in all land where potatoes are to be grown, if the land be springy or otherwise damp, that it be drained deep enough to take off all springs or surface water. When this is done, the land should either be fully trenched, or bastard trenched, by the spade or plough, but I prefer the spade. The width of the drills from each other must depend entirely upon the goodness of your soil: the richer the land, the wider apart must be your rows and sets in your rows,—say, in ordinary land rows, at two feet from each other, and twelve inches from set to set may do; but if your land be very rich, three feet from row to row, and eighteen inches from plant to plant, will not be too much."

In preserving your sets, always select the largest and finest potatoes you can procure; do not use the small refuse or middling-sized, the plant and produce from the latter being much inferior.

The potatoes most valued in field culture are the ox-noble, yam, champion, purple red, rough red, hundred eyes, kidney, and Moulton white. The nutritive qualities of these were examined by Mr. George Sinclair, with his usual accuracy. "The yam," he observes, "is a very productive variety, attains to a large size, but is often hollow, and less nutritive than most others. 64 drachms afford of nutritive matter 190 grains, which consist of starch 164 grains, and saccharine and albuminous matters 31.

The ox-noble is a productive potato, adapted for stock; and 64 drachms of it contain 194 grains of nutritive ma sisting of starch 164, and sacchari cilaginous, and albuminous matters

The purple red is smaller than noble, but well-flavoured, and very in light moist soils: 64 drachms 200 grains of nutritive matter, c of starch 169, and albuminous a charine matters 31 grains.

The hundred eye is very prolif loams; 64 drachms afford 218 g nutritive matter, composed of 170 starch, and the rest albuminous matters.

The rough red produces plenti on soils or climates of a moister m that adapted for the hundred-eye it is well-flavoured: 64 drachms grains of nutritive matter, whic posed of 199 starch, and 46 mucil and albumen.

The champion grows to a mod is very productive, and little sub disease called *curl*. See CURL.

It is hence of great importanc ing seed potatoes, to consider th the soil and climate; thus, so finest varieties which yield abund planted in suitable soils and moist will yield but inferior returns wh in drier situations.

	Soluble Matter.	Starch.
In 7000 grains, or one pound of the bread-fruit potato, I found by careful and repeated trials - -	975	546
—— the Barbadoes potato	980	667
—— Black kidney potato .	970	656

The soluble matters consisted mucilage, extractive, and salin (*Sinclair's Hort. Gram.* p. 409.)

The potato, although a tende grown in nearly all parts of the w the equator to Norway; and alth usual to plant it early in the spr is possible, by choosing a quick variety, to plant it successfully e as July.

The manures best suited for crop, are common farm-yard com partially decomposed, decayed le weed, the potato haulm, and an manures, that, while they afford have a tendency, by rendering the to facilitate the extension of Lime is injurious to it. Pond ditch scrapings to each cubic yard a month previously, a bushel of or other refuse common salt, mixed, is excellent. The soils be for the cultivation of the potato light, sandy, drained, peaty or loam

ghts in fresh soils: those of a
up meadow, old woodlands,
old yards or buildings, are
does not do well on wet

e readily consumed by live
unboiled state; but, generally
are best when steamed and
aff.

tion of the potato is thus de-
r. George Johnson; and al-
marks were intended for the
they apply in a great mea-
ield culture of this valuable

s of the potato are numerous,
ly increasing, as well as be-
t; the number, however, is
ncreased by local names for
ty being classed distinct.

, or first crop in the open
e are Broughton dwarf, early
-leaved kidney; Fox's seed-
nly, early mule, earliest for
ation, early kidney, nonsuch,
ldfinder.

rops, the varieties are ranged
ccording to their forwardness
– early champion, ox noble,
ey, large kidney, bread fruit,
Lancashire pink eye, black
ed apple, rough red.

nt of the garden varies more
ifferent gardens than the po-
riety will have a strong un-
r in one soil, that has a sweet
in another. In a heavy, wet
black loam, though the crop
and abundant, it is scarcely
. Silicious soils, even ap-
gravel, though in these last
usually corroded or *scabby*,
be planted in preference to
dry, mouldy, fresh, and mo-
oil is unquestionably the best
ty of the potato; and, for the
it may be with advantage
than for the main ones. The
and rough red thrive better
oist or strong cold soils. If
essary, whatever may be the
, it is better spread regularly
ce previous to digging, rather
the holes with the sets, or
trench when they are so
ble-dung is, perhaps, the best
s manures: sea-weed is a very
ition to the soil, as is salt.
d sea-sand are applied with
to retentive soils; but calca-
should never be used. The
always be open.

ated in general from cuttings of the tubers, though the shoots arising from thence and layers of the stalks may be employed. New varieties are raised from seed. Planting in the open ground of the early kinds may commence towards the close of February, in a warm situation, and may thence be continued until the same period of March; and it is only during this latter month that any considerable plantation should be made, as the late frosts are apt to injure, or even destroy the advancing plants. In the course of April, the main crops for winter's use should be inserted; for although in favourable seasons they will succeed if planted in May or even June, yet it ought always to be kept in mind that the earliest planted, especially in dry soils, produce the finest and most abundant crops.

Of the preparation of the sets, there is a great diversity of opinion. Some gardeners recommend the largest potatoes to be planted whole; others, these to be sliced into pieces, containing two or three eyes; a third set, to cut the large tubers directly in half; a fourth, the employment of the shoots only which are thrown out, if potatoes are kept in a warm, damp situation; and a fifth, that merely the parings be employed. Cuttings of the stalks, five or six inches in length, or rooted suckers, will be productive, if planted during showery weather in May or June; and during this last month, or early in July, it may be propagated by layers, which are formed by pegging down the young stalks when about twelve inches long, they being covered three inches thick with mould at a joint. These three last modes are practised more from curiosity than utility, whilst at the same time none of the first five mentioned plans can be individually followed to advantage, without modification. For the main crops, it is evident, from experiment, that moderate sized sets, having two healthy buds or eyes, are most advantageously employed; middling sized whole potatoes are the best, from which all but the above number of eyes have been removed, but especially having *the crown*, which is a congeries of small eyes always present, first removed; for from these proceed an equal number of little spindled stalks, which are comparatively worthless, and injure the main stem.

For the early crops, almost the very contrary to the above is the most advantageous to be practised. The set should have *the crown eye*, which is one growing in the centre of the congeries of small ones above mentioned, preserved. Some potatoes have two such eyes, but the generality only one. This is always the most prompt to vegetate; and if not known by this description, may be evinced by placing two or three potatoes in a pan of moist earth, near the fire; if the be allowed to remain. Mr. Knight plants the largest undivided tubers, which, from experiments, evidently support the plants, and finally produce the earliest and largest produce he ever obtained. Another remark, which he makes, restrictively for the early crops, but may well be attended to for all, is, that if the sets are placed with their leading buds upwards, few and very strong early stems will be produced; but if the position is reversed, many weak and later shoots will arise, and not only the earliness, but the quality of the produce be depreciated. (*Trans. Hort. Soc. Lond.* vol. iv. p. 448.) For the earliest crops, there are likewise several modes of assisting the forward vegetation of the sets. These should be prepared in November, by removing every eye but one or two; and being placed in a layer, in a warm room, where air and light can be freely admitted, with a covering of straw, they soon emit shoots, which must be strengthened by exposure to the air and light as much as possible, by taking off the covering without injuring them. During cold weather, and at night, it must always be renewed. The leaves soon become green, and tolerably hardy. In early spring they are planted out, the leaves being left just above the surface, and a covering of litter afforded every night, until the danger of frost is passed. The only modification of this plan that is adopted in Cheshire, where they are celebrated for the early production of potatoes, is, that they employ chaff or sand for a covering instead of straw. (*Holland's Agr. Survey of Cheshire.*) The most preferable mode of inserting them, is with the dibble, in rows, for the early crops, twelve inches apart each way; and for the

soil is good throu
two feet wide, and
must be made bro
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gardeners, on such
the surface, lay so
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this practice is in
(*Bath Papers*, vol.
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should be kept p
It is very injurious
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the plants are of g
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arliest crops will be in pro-
ne, or perhaps towards the end
may thence be taken up as
October, at the close of which
ring November, they may be
ip and stored; or, at all events,
ival of any severe frost. Their
taken up for keeping is inti-
decay of their foliage, which
s its verdure with the first
best instrument with which
ug up is a three-flat-pronged
r being cleared regularly away.
ould be sorted at the time of
ip; for as the largest keep the
e should be stored, whilst the
are first made use of. The
a mode of preserving them
e winter is in heaps or clamps,
lled *pyeing* them. These are
idal form, on a bed of straw,
l with a covering, six or eight
f the same material, laid even,
ng, and the whole enclosed
a conical form, a foot thick,
trench dug round the heap,
ed with the back of the spade.
ld not be stored until perfectly
ss free from mould, refuse,
tubers. It is a good practice
open on four different sides
tirely through the mould and
eek or two after the heap is
n proportion to its size it al-
, and these orifices allow the
vapours, and perfect the dry-
ally good mode, and much
nt, is to have them heaped in
d covered thick with straw,
r is given to look over them
or the removal of decayed
, &c. If carefully preserved,
in perfection until late in the
mer. A variety of the potato
onsidered to continue about
s in perfection, after which
ually loses its good qualities,
nferior flavour and unproduc-
arieties must therefore be oc-
ed from seed. For doing this
modes; the first of these,
detailed, is, however, the one
ed.

or apples of the old stock
in a warm room throughout
e seed must be obtained from
hing away the pulp during
his is thoroughly dried, and
ril, and then sown in drills
inch deep, and six inches
ch mouldy soil. The plants are weeded, and earth drawn up to their stems when an inch in height; as soon as this has increased to three inches, they are moved into a similar soil, in rows sixteen inches apart each way, and during their future growth earthed up two or three times. Being finally taken up in the course of October, they must be preserved until the following spring, to be then replanted, and treated as for store crops. (*Dr. Hunter's Georg. Essays.*)

Some gardeners sow in a moderate hot-bed, very thin, in drills, the same depth as above, and nine inches apart. Water is frequently and plentifully poured between the rows, and earth drawn about the stems of the seedlings, until they are a few inches in height. They are then transplanted into rows, water given, and earthing performed as usual. The only additional advantage of this plan is, that as the seed can be sown earlier, the tubers attain a rather larger size the first year.

It is to be remarked, that the tubers of every seedling should be kept separate, as scarce two will be of a similar habit and quality, whilst many will be comparatively worthless, and but few of particular excellence. If the seed is obtained from a red potato, that flowered in the neighbourhood of a white tubered variety, the seedlings in all probability will in part resemble both their parents, as a cross fecundation may take place; but seldom or never does a seedling resemble exactly the original stock. At all events, only such should be preserved as are recommended by their superior size, flavour, or fertility. It may be stated as an indication before these qualities can be positively ascertained, that President Knight remarks, that the rough uneven surface of the foliage, which in excess constitutes the curl, appears to exist as, and form a characteristic of every good variety; for he never found one with perfectly smooth and polished leaves which possessed any degree of excellence, though such are in general more luxuriant and productive. (*Trans. Hort. Soc. Lond.* vol. ii. p. 64.)

The early varieties, on account of their never flowering, were, until 1807, obtained by chance from plants that might now and then be produced from seed of the late kinds. In that year, Mr. Knight discovered that the cause of their deficiency of bloom was the preternatural early formation of the tubers. His mode of causing them to produce seed is to plant the sets on little heaps of earth, with a stake in the middle, and when the plants are about four inches high, being secured to the stakes with shreds and nails, to wash the earth away from the bases of the stems, by means of a strong current of water, so that the fibrous roots only enter the soil, and these being perfectly distinct from the runners that furnish the tubers, and which spring from the base of the stem, none of these are produced, and the effect is, that blossoms appear and perfect seed. (*Ibid.* vol. i. p. 58.; *G. W. Johnson's Kitch. Gard.*)

There are numerous valuable communications with regard to the potato dispersed through the agricultural journals:— As upon the "Use of the Potato Shoots for Planting," by Mr. Wright, *Com. Board of Agr.* vol. iv. p. 181.; "On Using for a similar Purpose the Scoops," by Mr. Rawson, *Ibid.* p. 185.; "On Starch from Potatoes," *Ibid.*; "On their General Cultivation," by the Rev. E. Cartwright, *Ibid.* vol. v. p. 217.; by Lord Hepburn, *Ibid.* vol. vi. p. 254.; by General Bestson (at St. Helena), *Ibid.* vol. vii. p. 225.; by Sir Charles Burrell, *Ibid.* p. 323.; "On the Manures best adapted for Potatoes," by the Rev. E. Cartwright, *Ibid.* vol. iv. p. 870. He remarks, "The soil on which my experiments were tried, is a ferruginous sand, brought to a due texture and consistence by a liberal covering of pond mud. Of this soil, in its improved state, I mean by the accession of pond mud (for having been used merely as a nursery for raising forest trees, previous to these experiments, the nurseryman had not thought it necessary to make use of any other manure); the following is the analysis 400 grains gave:—

	Grains.
Of silicious sand, of different degrees of fineness	280
Finely divided matter	104
Loss in water	16
	400

"The finely divided matter contained—

	Grains.
Carbonate of lime	18
Oxide of iron	7
Loss by incineration (probably vegetable decomposing matter)	17

"The remainder, principally silex and alumina. There were no indications of either gypsum or phosphate of lime.

"On the 14th of April, 1804, a portion of this soil was laid out, in beds one yard wide and forty in length, and were manured as in the following table. On the same day the whole was planted with potatoes, a single row in each bed, and that the general experiment might be conducted with all possible accuracy, each bed received the same number of sets. On the 21st of September the potatoes were taken up, when the produce of each row wa
succession, as follows:—

Manures in bushels, per acre.

1. No manure
2. Salt 8 bush., soot 30 bush.
3. Chandler's graves 9¾ cwt.
4. Salt 8 bush., wood ashes 60 bush.
5. Salt 8 bush., gypsum peat 363 bush., lime 121 bush.
6. Salt 8 bush., lime 121 bush., du 363 bush.
7. Salt 8 bush.
8. Salt 8 bush., graves 9¾ cwt.
9. Soot 30 bush.
10. Fresh dung 363 bush.
11. Salt 8 bush., malt dust 60 bush.
12. Wood ashes 60 bush.
13. Salt 8 bush., decayed leaves 363 bu
14. Salt 8 bush., peat ashes 363 bush.
15. Malt dust 60 bush.
16. Salt 8 bush., lime 121 bush., p 363 bush.
17. Salt 8 bush., saw dust 363 bush.
18. Salt 8 bush., peat 363 bush., b dust
19. Decayed leaves 363 bush.
20. Salt 8 bush., lime 121 bush., sulph acid
21. Salt 8 bush., peat 363 bush.
22. Salt 8 bush., lime 121 bush.
23. Peat 363 bush.
24. Saw dust 363 bush.
25. Lime 121 bush.

The following experiments upon
are extracted from Mr. George S
Communication to the Board of
ture, February 25th, 1820. These
ments were made upon a soil com
three-fourths silicious sand, in
thirty-six square feet.

	Bush. of Salt per Acre.	No.
1. Planted without any kind of manure	0	124
2. Twelve cubic inches of salt with the seed	13½	106 the
3. Six cubic inches of salt with the seed	6½	90
4. Twelve cubic inches of salt mixed with the soil	13½	93 the

"The weight of the crop of
was not taken. The superior siz
roots produced by No. 4., left no
doubt of the advantage of thirteen
of salt per acre, applied to the soil p
to planting, over the other modes
plication, still the superiority was n
great." "I may notice here," obser
Holland, (*Agricultural Survey of Ch*
p. 143.), "a practice pursued at W
near Frodsham, in the culture of po
which seems deserving of attentio
this place, situated close to the junct
the Mersey and Weaver, sea mud i

manure for crops of potatoes; twenty
ls being the quantity usually laid on an
e. The ground thus manured not only
s a large produce of potatoes, but is in
ate of excellent preparation for a suc-
ling crop of either wheat or barley.
adoption of this practice has increased
greatly the value of land about Wes-

here are also papers "On the Cultiva-
of the Potato in Kintyre," by Mr.
wart, *Trans. Highl. Soc.* vol. ii. p. 68.;
n an Apparatus for Steaming Potatoes,"
Mr. Liddell, *Ibid.* p. 321.; by Sir James
kenzie, "On the Potato in general,"
vol. iii. p. 250.; "On the commonly
ivated Scotch Varieties," by Mr. Law-
Ibid. p. 364.; and by Mr. Dudgeon,
vol. iv. p. 48.; "On the Benefit de-
d from Removing the Potato Blossoms,"
advantage he deems doubtful), *Ibid.*
36.; "On Different Varieties," by Mr.
rden, *Ibid.* vol. v. p. 85.; "On Pre-
ing them and Raising them from Seed,"
Sir James Mackenzie, *Ibid.* p. 349.;
by Dr. Singer, *Ibid.* vol. vi. p. 339.;
a Grubber, and Drill Harrow and
er for Potato Culture," by Mr. Ander-
Ibid. p. 341.; "On Potato Bread," *Quar.*
n. *Agr.* vol. iii. p. 721.; "Potato Beer,"
722.; "On their Winter Manage-
t," by Mr. Towers, *Ibid.* vol. vii. p.
; "On the Potato Raiser," by Mr.
son, *Ibid.* vol. viii. p. 549.; "On the
," by Mr. Falconer, *Ibid.* vol. ix. p.
; "On the Rohan Potato," *Ibid.* vol. x.
1.; "On the Disease or Failure of the
to Crop," by Mr. Towers, *Ibid.* p. 604.;
the Taint," by Mr. Aitkin, *Ibid.*
10.

here is a paper by Mr. Knight "On
Formation of the Buds in Tuberous
ts," *Selection of Papers*, p. 104.; and
emarked that the potato possessed the
er of reproducing the buds, *Ibid.* p.
; "On causing the early variety of the
to to produce Blossoms," *Ibid.* p. 133.;
n an Improved Method of raising early
toes in the open Air," *Ibid.* p. 256.;
the Potato," *Ibid.* p. 318.; "On the
antages of employing large Tubers for
," *Ibid.* p. 331. "The good effects,"
bserves, "which I have proved to arise
planting large tubers of the potato
t, obviously spring from the large ac-
ulation of fecula in them. Fed by
ns of this, not only a large breadth of
ge is produced, and exposed to sight
e early in the year, but that foliage
tains much disposable organisable mat-
which once formed a part of the parent
er." Knight thought that the ordinary
luce of potatoes might be very materially
increased. He remarks, "My opinion is, that more than a thousand bushels of potatoes may and will be obtained from an acre of ground."

Potatoes are fermentable, and are consequently employed along with barley by the Scotch distillers; and, also, by the London bakers in the manufacture of bread. The fecula is also separated and sold as arrow root: it is a good and sufficiently pure starch; but it is less nutritive than the potato itself, owing to the separation of the saccharine matter and the albumen.

POULTICE. An external application employed for promoting the suppuration of tumours, or abating painful inflammation. The chief intention of the poultice is to retain the stimulus of heat on the tumour for a sufficient length of time, consequently the worst conducting of farinaceous matters are the best fitted for poultices. The fatty matter usually added is to give softness to the poultice, which is otherwise apt to harden as the moisture evaporates. Poultices for animals are generally prepared with linseed meal, to which is added oil, lard, or other unctuous matter to prevent adhesion to the inflamed part. Bran, although frequently used for poultices, is objectionable, because it so soon becomes dry. Few farmers are aware of the value of these simple applications in abating inflammation, relieving pain, cleansing wounds, and disposing them to heal. The poultice may be rendered more soothing by opium, or increased activity may be given by the addition of common turpentine or chloride of lime, and in cases of foul ulcers, powdered charcoal may be added. As an emollient poultice for grease and cracked heels, and especially if accompanied by much unpleasant smell, there is nothing preferable to a poultice of mashed carrots with charcoal. See FOMENTATION.

POULTRY. A general term including every kind of domestic fowl, which is reared about the house or farm-yard, as cocks and hens, ducks, geese, turkeys, &c. Poultry constitutes a part of every farmer's stock, but the rearing of it in this country is not often productive of any pecuniary advantage; for though fowls are considered chiefly as an article of luxury, and sold at high prices in the market, they seldom or ever repay the value of the corn which they have consumed, especially if such grain must be purchased. Indeed, where profit is the object of the husbandman's labours, no poultry should be admitted into the vicinity of barns, unless for the purpose of picking up scattered grain; though, in general, it cannot be denied, that they acquire their fat substance from the corn left in the straw by negligent thrashing. The poor villager may, however, layers and sitters should be chosen, which are in general the game and Poland breeds, but the other breeds have probably the advantage in respect to the size of the eggs: as food, the game and the white breeds are said to be the most delicate.

The care and management of the poultry-yard usually devolves upon the farmer's wife, and the industrious housewife will do well to see to their food and rearing, &c. herself, and not trust too much to servants. For the most economical methods of keeping and managing poultry, &c., I refer the reader to the different heads of Fowls, Ducks, Goose, Dovecote, Turkey, &c. See also Eggs, Feathers.

The comparative value of keep for domestic fowls is as follows: geese 5 per cent., ducks 7½ ditto, pigeons 10 ditto, dunghill fowls 40 ditto, Turkeys and Guinea fowls 50 ditto. From a series of observations made on the diseases of domestic poultry, Mr. Flourens makes the following conclusions: — 1. In these animals cold exercises a constant and determinate action on their wings. 2. The effect of this action is the more rapid and more severe, the younger the animal is. 3. When cold does not cause acute and speedily fatal inflammation of the lungs, it produces a chronic inflammation, which is pulmonary consumption itself. [This, however, is a mistake, as pulmonary consumption is the deposition of tubercles in, not inflammation of, the lungs.] 4. Heat always prevents the attack of pulmonary disease: when the latter has taken place, heat suspends its progress, and even sometimes arrests it entirely, and effects a complete cure. 5. Pulmonary consumption in any stage is never contagious: fowls affect-

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overt within the
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be impounded at
the 2 Will. & Ma
mages are given in
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under the first-na
the cattle out of t
county, the venue
county. (*Pope* v.
The pound-keeper
thing offered to hi
swerable whether
pounded or not. (
476.) It is no ans
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and impounding.
432.) Neither is
accept compensat
though it is tender
impounded. (*Ans*
ton, 261.) And w
damage feasant, a
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action of trespass f
v. *Price*, 3 B. &
escape into his la
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v. *Holles*, 8 A. & E

PREGNANCY.
being with young.
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very fully into this
ing excellent obse

terest, and of no little difficulty; and me and the destiny of the female may much depend on the decision of the n. A certain time having elapsed, ing will speak for itself; but are ny symptoms or circumstances that rrant the veterinary surgeon, or the turist, in giving a decided opinion case in an early period of supposed ncy?

ccasionally happens that the fifth or th month arrives, and, even to the ed eye, there are few or no indica- of conception having taken place. are, also, but somewhat unfrequently, es which very closely simulate this al process. Can the veterinary sur- or the breeder decide? The answer is affirmative, and plainly and unequivo- This is one of the boons which the inary art can now confer on the agri- rist. The altered character of the e is regarded, and very properly, as a nstance of no little weight. She is ratively calm and quiet; her appetite s, and she regains her former con- and her former habits. Five or six pass, and there is no outbreak of any The owner concludes, and he is not vrong, that she is impregnated. He, er, has had little to do with mares h cows who has not witnessed the of the most furious œstrum, after a longer period of time has elapsed. known more than three months pass delusive quietude, and then a sala- ess worse than at first has indicated actual impregnation had taken place. e other hand, the œstrum, but not ll its former fury, has returned, two, ree, and four months after the con- n; and yet, as the result finally shows, gnation had taken place at their first ourse.

ry circumstances may cause the owner anxious to know the truth of the . He may wish to sell her, or he e unusually desirous to breed from Let the animal be examined per va- . Let the hand be slowly and cau- passed up the vagina until it reaches uteri. Let there be no attempt to ate farther. No information can be l from introducing the fingers into erus. It is simply wished to ascertain aracter of the os uteri. In its na- and unimpregnated state it will be ; but it will not be tightly or spas- ally so, and the contraction of the of the womb will form a kind of cup, e base towards that viscus. If she is gnated, the entrance to the uterus will re firmly closed, and the protrusion will be towards the vagina. This is the only exploration per vaginam which I would allow; it is easily made, and it will be satisfactory. If an exploration of this kind is attempted when half or more than half of the period of pregnancy has passed, it is not at all unlikely that so much irritation of the parts will ensue as to cause the expulsion of the fœtus.

I will suppose that two months have passed since the supposed impregnation. The fœtus is still remaining in the pelvic cavity. The heart has begun to beat, and the blood to circulate through its little veins. It will be situated immediately below the rectum. I introduce my hand into that intestine. I have not occasion to pass it very far up. I feel the little substance; for it then is small in proportion to its after growth. I feel it under my hand. I am certain that I am pressing upon the uterus and its contents. I cannot perhaps detect the pulsation of the embryo; but if I had delayed my examination until the fœtus was three months old, I should have assurance that it was there by its now increased bulk, while the pulsation of its heart would tell me that it was living.

For two months from this period in the cow, and for three in the mare, I should have no other indication of the presence of the fœtus, nor of its life and growth, except from the gradual enlargement of the abdomen of the mother; and, by that time, the little one would have increased in size and strength, and would have begun to take occasional exercise in its first domicile, and then would become the more evident, but not more satisfactory proof of the life of the fœtus; its motion strong enough to be seen through the integument.

I might, perhaps, wish to give this assurance of the life of the fœtus to some curious spectator, or to some intended purchaser. I would not gallop the mare in order to effect this: I would not so far disturb her or the young animal that she bore within her. Much less would I give her cold water to drink, and which she usually would drink until she annoyed the fœtus, and the unborn animal told us how much we annoyed him by endeavouring to shift his quarters and get away from the action of the cold. I would not run the hazard of giving her the colic, and perhaps destroying him or her by this unscientific and somewhat cruel method of exploration; but I probably should give a tap or two on the outer wall of his dwelling, just sufficient to rouse him from his slumbers, and induce him to express his anger at the annoyance by a tolerable distinct plunge or kick.

Most certainly, if it was a cow that I was side, and the tail on the right side." In the latter portion of its fœtal state its motions are pretty equally distributed on either side, and the beating of the fœtal heart is most plainly heard at the very base of the abdomen. The fœtus of the cow is huddled up on the right side of the belly. There its motions are most seen, and the beatings of its heart best heard. The enormous paunch, lying principally on the left side, presses every other viscus, and the uterus among the rest, into the right flank. This also explains a circumstance familiar to every breeder. If the cow should happen to carry twins, they are crowded together in the left flank, and one seems absolutely to lie upon the other. Whenever the farmer notices the kicking of the fœtus high up in the flank, he at once calculates on twins.

To return from this digression. If half the period, or more, of utero-gestation had passed, and I could not get the little stranger to move by my gentle tapping, and it was a cow with which we had to do, and a quiet one, I would have her carefully held by the cowherd, while I stooped and applied my ear flat upon the flank, and then slowly and with gentle pressure upwards and downwards, and forwards and backwards, over the flank and the lower part of it, until I heard — and which I should do in a great majority of cases — the pulsations of the fœtal heart. I should recognise it by their quickness, the pulsations of the fœtus being double or more than double those of the other.

If it was a mare, I would have a halter put on her, and an assistant should hold up one of her legs, while some person interested reached under, or perhaps knelt under the belly of the mare, and passing one ear along

begins to put forth
PRICKING.
of a hare, where
ceived. In farrier
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PRIDE, LOND
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March 13th, 1733.
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the agriculturist ;
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the roots of plants,
rived one great adv

st; in allusion to the early flowering plants.) This is an extensive genus all, but very pretty and desirable . All the species of primrose succeed a mixture of loam and peat, and in- readily by seeds, or by dividing the which should be done as soon as ave flowered. There are five indi- s species.

he common primrose (*P. vulgaris*). pecies grows common every where, ng our groves, hedges, and waste places in spring; flowering from to June. The root is somewhat with long fibres. Leaves numerous, , obovate-oblong, unequally toothed, led, soft, and somewhat downy, with short footstalks. Flowers numerous, sulphur-coloured, with a darker ra- g spot in the middle; their scent ble, though slight. Sometimes the s are in umbels, but in general they litary. There are cultivated varie- white, purplish, or brown, single or , of which the double sulphur-co- is peculiarly elegant.

xlip primrose (*P. elatior*). This is common species, found in woods and es, but rare. It is perennial, and s in April. The leaves are contracted, ated, about the middle, in which re- it differs from the preceding, and grees with the cowslip. The flowers eet-scented, all umbellate, smaller, less expanded limb than in the or its varieties, but larger, paler- ed, and less cup-shaped than in the p. It differs from the umbellated of the primrose.

ommon cowslip, or paigle (*P. veris*). WSLIP.

Bird's-eye primrose (*P. farinosa*). pecies is found growing in wet pas- and by rivulets, on mountains in the of England as well as in Scotland. ers later than the preceding species, e and July, and is only about half e of the cowslip. It is distinguished white mealiness of the flower-stalks cks of the leaves, whose upper sides een, smooth, and even, as well as by autiful rose-coloured flowers, whose is surrounded with a notched, yellow, lar border.

Scottish primrose (*P. Scotica*). This is met with occasionally in the of Scotland, and is near akin to that scribed; but the mealiness is said to lower, existing, more or less, on both s of the leaves. The limb of the is flat; mouth with a notched bor- tigma five-cleft. (*Smith's Eng. Flor.* p. 269.)

PRIMROSE, EVENING. See EVENING PRIMROSE.

PRIMROSE PEERLESS. See NARCISSUS.

PRIVET. (*Ligustrum*, from *ligare*, to tie; in allusion to the very flexible branches.) The common privet, print, or prim-print (*L. vulgare*), is a hardy shrub, growing from six to eight feet in height, in its wild state tenanting rather moist thickets and hedges, on a gravelly or chalky soil; but it grows well in any situation, and in all soils. It may be propagated by seeds, layers, or cuttings. These plants are well suited for making cut hedges in gardens, especially the evergreen varieties of the common privet. The branches are straight, filled with pith, and the wood is hard. Leaves on short stalks, imitating myrtle, but of a duller hue, almost evergreen in mild seasons, and not injured by smoke. Panicles terminal, many-flowered, dense, thrice-compound of strongly-scented white flowers, appearing in June and July, which become brown before they fall. Berries globular, nauseous and very bitter, black, varying to yellow. (*Smith's Eng. Flor.* vol. i. p. 13.)

PROPAGATION OF PLANTS. The greater number of plants are propagated naturally by means of seeds; but, in addition to these, many plants are extended over the surface on which they take root by the production of runners, or lateral shoots, which spread along the surface, and root at the joints or buds, from which they send up new plants, by suckers, or side shoots from the roots, by bulbs, by tubers, rhizomes, and by various other natural means. Artificially, plants are propagated by seed, by runners, suckers, offsets, dividing the tubers, layers, cuttings, grafting, budding, inarching, &c. Seeds are gathered when mature, and sown on recently-stirred soil, and covered to different depths according to the size of the seed, the nature of the soil and situation, and other circumstances. The plants formed by runners are separated from the parent plant by cutting through the runner, and removing the young plant, in order to plant it elsewhere. Suckers, slips, or side shoots from the roots are separated from the parent plant by being slipped down, or cut off, so as to carry with them a portion of fibrous roots; and they are afterwards planted in suitable soil, &c. Offsets are small bulbs which are produced round the base of larger ones, or on stems, in the axillæ of the leaves, and, being taken off and planted, become plants. Tubers are underground stems containing leaf-buds; and these may be separated and planted entire, or cut into as plant, and planted by itself.

Cuttings are portions of shoots, either of ligneous or herbaceous plants, and they are made of the young shoots with the leaves on, or of the ripened wood, either with or without its leaves; and after they have, either in an herbaceous state with the leaves on, or with the wood mature, and with or without the leaves, been properly prepared and planted, they form roots at the lower extremity, each cutting becoming a perfect plant. In general, cuttings should be taken from those shoots of a plant which are nearest the soil; because, from the moisture and shade there, such shoots are more predisposed to emit roots than those on the upper part of the plant.

The young, or last formed shoots, are to be taken in preference to such as are older, as containing more perfect buds in an undeveloped state, and a bark more easily permeable by roots; and the cutting is to be prepared by severing its lower extremity across at a joint, the lenticells, or root-buds, being there most abundant. When the cutting is planted, the principal part of the art consists in making it quite firm at the lower extremity, so as completely to exclude the air from the wounded section. Cuttings emit roots at this section, either in consequence of the action of the accumulated sap in the cutting, as in the case of the ripened wood in deciduous trees and shrubs; or in consequence of the joint action of the accumulated sap and of the leaves, as in the case of cuttings of soft wood with the leaves on, and in a living state. A few plants are propagated by cuttings of the leaves, the petiole of the leaf being slipped off from the parent plant, and

value of by far the
wood trees, but th
less essential in s
planting and judi
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trees are three, or
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would be better);
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the side branches a
done," says Mr. C
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such a degree as to
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Mr. Cree thinks tha
the tree should hav
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inches in height; a
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cies of tree should be pruned as
spring months as its nature will
The value of the timber is in-
y judicious pruning very consider-
n regard to the value of timber,"
Gorrie, "which has been pruned
stood detached in hedge-rows,
ng will depend on the mode in
at operation has been practised.
ling or conducting sales of wood,
nvariably found that trees from
rge branches have been lopped,
less money in proportion to the
evil inflicted." (*Digest*, by Mr.
rans. High. Soc. vol. vi. p. 141.;
y Steuart's Planter's Guide.)

hstanding these highly respectable
s, our experience rather leads us
clusion that such extensive prun-
ber trees is seldom advisable; for,
othing of minor evils, no portion
can be removed without propor-
hecking the flow of sap in the
the tree from whence it is severed.
ystem of close pruning is very apt
e a head disproportionate to the
, in consequence, such trees are
to be damaged by heavy falls of
high winds. In conclusion, I am
n that, although the pruning of
ees may be in some cases neces-
that it is a practice too often car-
extent that is prejudicial to many
plantations, of which I could in-
eral extensive plantations in the
f the metropolis.

uning of timber trees, however,
specially in Scotland, many warm
; and no one, perhaps, has ex-
e real or imaginary advantages of
n more clearly than Mr. Cree. He
—

anage woods in a proper manner,
es should be examined even the
r after they are planted; and if
leading shoots than one are found
the best one should be selected,
others shortened to one half the
the selected shoot. This practice
ing the trees should be continued
ar till they are about fifteen feet
. These shortenings, however,
uld not be confined to superfluous
shoots, but should include any
hich is gaining a disproportionate
y over other branches of the same
wth, should, at first, and even for
e previous to this stage of the
f the plant, be more cautiously
is necessary to be observed after-
nd should increase in severity as
pproaches to, and after it is, fifteen
ght.

"The process of examining a tree is a simple one: it is done in a moment by the pruner casting his eye over the whole tree, and detecting the branches which require to be shortened. And, as a general rule, when it is found that any branch has a greater growth upon it than the leading shoot, it should be shortened by cutting off as much as will reduce it to half the length of the leading shoot, or even less. By this I mean any branch which is either of greater thickness generally, or near its junction with the main stem of the tree, than the leading shoot is at the same distance from its top. And, as trees produce only one regular tier of branches in each year, any branch should be shortened which is of a greater length than the majority of the branches of the same tier, or if the whole are too long, they must be shortened. In the case of trees intended for timber, after they are at and above fifteen feet in height, this rule of shortening the branches must also be applied to the undermost tiers of branches. In this manner, all the under branches of any importance will have been shortened, which prepares them for the next operation.

"After the trees are about fifteen feet in height, the undermost tier of branches only should all be cut off close to the stem in one year; in the subsequent year another tier of branches should, in the same manner, be cut off, and so on every year afterwards, always cutting off only a single tier in one year. The same process of shortening the branches is always to be continued, as before directed; but must be discontinued some years before the cutting off of the branches shall be discontinued, so as to give a more extended top to the tree; for all trees that have naturally conical heads, such as the willow, poplar, larch, silver and spruce fir, require longer heads than those trees that are of a spreading nature, such as the oak, beech, and others. But no branch, whereever it be situated, is to be cut off close to the stem, until such branch stands upon the undermost tier. In this mode of shortening the branches, it will be seen that the tree will at all times present a head of nearly a conical form; and advantage should also be taken of shortening such branches as will balance the tree best, and produce the proper shape of the top. But in shortening the branches, too much should never be done in one year; nor will it be necessary to do so, provided the trees are attended to in the regular manner I have described.

"I have endeavoured to explain the important part which the leaves perform in the elaboration of the proper juice. Now, by this mode of shortening the branches, a foliage which a tree so shortened is found to exhibit, the leaves on these shortened branches will still remain to perform their useful functions. I may add, that, under this mode of pruning, I have found that trees in general will advance in growth as much in one year, as they will advance in three or four years under similar circumstances, but when not so pruned.

"Trees of a considerable size and age, which have been previously neglected, may be greatly improved by the system which I have laid down. But after the shortenings have been performed, a considerable period should be allowed to elapse before the branches are to be cut off close to the stem. And when this is done, especially in the case of large limbs, too much care and attention cannot be observed. The branches should always be cut off with a saw; and precaution should be taken, never to allow the branch to be split off by its own weight, or to injure in any other manner the main stem. Where this may be anticipated, and the branch cannot be propped up during amputation to prevent it, the branch should be removed at two operations, — first, by being cut off about twelve or eighteen inches from the main stem, and, finally, by being cut off close to the main stem, but so as not to injure the adjoining bark. This additional trouble will be amply compensated for, by the earlier and superior manner in which the wound will be cicatrized.

"Though the remarks which I have made regarding shortening and cutting off the branches, are intended to have reference in particular to deciduous and non-resinous trees, I am very far from thinking that resinous trees are not benefited by judicious

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latter circumstance, the danger is ap- nt of often finding large trees when down, though apparently sound on the ide, rotted in the interior. Such is uently the case with snags even in lle-sized trees. When large branches, are amputated from old trees, before growth of the tree can cover the part, as become rotted, and, by exposure to atmosphere, moisture is carried down pith of the tree, which commences the k of decomposition, spreading to the oining parts of the wood.

With regard to the proper season for rtening and cutting off the branches, I ceive that after the fall of the leaf in umn is the best period for shortening branches, except the gean, which should shortened in August or September. I e made many experiments in order to ertain the proper period for pruning or tting off the branches. I have performed in March, May, June, July, and other riods of summer, and in autumn; but I ays found, that the earlier in spring the uning was performed, the part was the ner cicatrized, and the tree did so much better afterwards. This I found to be best period for trees in general. But sycamore and birch should be pruned January, the Scots fir in September or tober, and the larch may be divested of decayed branches at any period when can be done with a blunt instrument." *uart. Journ. of Agr.* vol. iii. p. 59.)

PTARMIGAN. See Grouse.

PULSE. A term applied to all legu- nous plants, as pease, beans, tares, vetches, ins, &c. All the species of pulse afford ex- lent manure when turned into the soil in reen state. The custom of ploughing in en succulent plants of this kind is very ient. All the Roman agricultural writers mend it highly. Columella, particularly, ises lupins as a manure, which, if cut n and turned in while green, will have good effect as the best and strongest ging whatever. They may be sown n poor land about the middle of Sep- ber, and be ploughed in before they ain their full growth. In gravelly soils y should be cut down after they have forth their second flower; and in strong ds, where a little more advanced. In the mer of these grounds they are turned in ile young and tender, that they may y rot; and in the latter, are let stand ey grow stronger, that they may pro- a better effect on the stiff clods of and render them more mellow and ure. This practice is still extensively llowed in northern Italy

Pease, beans, lupins, vetches, and other succulent plants, have also been strongly recommended by the older writers on husbandry, as excellent manures, especially for sandy ground; these plants enriching the earth greatly if ploughed in, either green, or when in bloom. In strong land they are advised not to be turned down till the pods begin to harden. See Green Crops, Leguminous Plants, Rotation of Crops, &c.

PUMPKIN. See Gourd.

PURCHASE. See Buying and Selling, and Warranty. Purchase, in law, means, generally, the acquisition of lands or tenements by any other means than descent; as by devise, gift, deed, or agreement.

PURGATIVES. In farriery, such medicines as tend to evacuate the crudities of the bowels by stool, and which are sometimes called cathartics. (See Purging.)

The purgatives most frequently employed for horses and cows are sulphur, jalap, aloes, gamboge, *Rhamnus catharticus*, and calomel. Saline purgatives are not often required; but when they are, Epsom salts (the sulphate of magnesia), is adequate for every purpose.

PURGING is necessary in a variety of cases, for different sorts of animals, particularly in diseases of the inflammatory kind, swellings in the extreme parts. Aloes is the best form of physic; but Epsom salts, linseed, and olive oil, are sometimes used on certain occasions as laxatives with great propriety and benefit, and in gross full horses, in some disorders of the stomach, liver, &c., but it should always be directed with caution.

Violent purging or scouring, attended with inflammation, will sometimes arise when a horse is worked hard upon green meat. The remedy is change of diet or less labour. Astringents should be used with much caution. It is probably an effort of nature to get rid of something that offends. A few doses of gruel will assist in effecting this purpose, and the purging will cease without astringent medicine. See Aloes, Balls, Drenches, Linseed Oil, &c. (*Blaine's Encyclop.*; *The Horse*, p. 209.)

PURLIEU. A portion of ground near any forest, which being anciently made forest, is afterwards, by perambulation, separated from the same, and freed from that servitude which was formerly laid upon it.

PURSE-NET. A net used for snaring hares and rabbits at certain times. In hunting rabbits by ferrets, it is placed over the holes of their burrows in different directions, and the rabbits, in endeavouring to escape from the ferret, are bagged in this net.

PURSE, SHEPHERD'S. See Shepherd's Purse.

PURSLANE. (*Portulaca*; from *porto* to carry, and *lac*, milk; juicy nature of warm situation, a south border being generally allotted to them.

They are propagated by seed, which may be sown in February and early in March, in a moderate hot-bed, to remain where sown; and at the close of this last month, as well as once a month during the course of April, May, and the summer months, until the end of August, in the open ground.

The sowings are performed broadcast, or in drills, six inches apart; in either mode, very thin and buried about half an inch. The plants very soon make their appearance. They must be kept clear of weeds, and be thinned to six or eight inches asunder. In dry weather water is required to be given moderately two or three times a week. In general, they are ready for gathering from in six weeks after sowing, the young shoots being made use of from two to five inches in length, which being cut down low, shoot out again. These observations and directions apply equally to the open-ground and hot-bed crops. The latter require the air to be admitted as freely as possible, the temperature ranging between 50° and 75°. For the production of seed, a small quantity of which will suffice for the largest family, some of the earliest border-raised plants must be left ungathered from, the strongest and largest leaved ones being selected; they blossom in June and July. They must be cut immediately that the seed is ripe, laid on a cloth, and, when perfectly dry, thrashed. The refuse is best separated by means of a very fine sieve. (*G. W. Johnson's Kitch. Gard.*)

PURSLANE, THE SEA. One of the names of the shrubby ORACHE.

PURSLANE WATER (*Peplis portula*;

products. This ap
able to the more ab
trogen in the for
vegetables which ab
principles, such as
cruciform plants, ex
effluvia; hence, also
as are destitute of n
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The formation of an
cal compounds is a
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especially carburett
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cated and often high
gases, in which sulph
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composed, and resol
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agency of chlorine;
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acting disinfectant.
faction and the natu
to a great extent,
ature, moisture, and
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ing putrefaction, as
results. A tempera
80°, a due degree
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which it proceeds m
effective antiputref
are substances whic

mal principles with which it unites, are
tely liable to decay. Among saline
nces, the antiputrefactive powers of
e commonly known: when a piece of
salted, brine runs from it, in conse-
of the energy with which the salt
ts the component water of the mus-
bre; the flesh becomes indurated, and
ceptibility to putrefactive changes is
diminished; but it becomes at the
me less easy of digestion as an article
l. Corrosive sublimate is a far more
ful preservative than common salt;
appears to act not by the mere abstrac-
water, but by entering into chemical
with the fibre. Sulphate of copper
veral other metallic salts are similarly
ious; but their poisonous nature pre-
their employment in the preservation
cles of food.

inhabitants of northern climates avail
elves of freezing to prevent the putre-
of their food, and the supplies of
and other articles in the Russian mar-
re retained in a frozen state. Our
ngers resort to the same expedient
e preservation of their unsold fish,
is daily removed to the ice-house,
aving been exhibited in their shops;
is packed in ice for the purpose of
ort and preservation. (*Brande's Dict.
ience.*) See DECOMPOSITION, DRY-
FERMENTATION, ORGANIC CHEMISTRY,
RES, &c.

TTOCK. A local name for the Buz-

ROLIGNEOUS ACID. This term
rally applied to the acid liquor which
over along with tar and gaseous pro-
when wood is subjected to destructive
tion. This acid liquor is an impure
r, from which acetic acid is obtained.
in its impure state a powerful smoky
not unlike that of Westphalia ham.
cid is purified by converting it into
e of soda, and decomposing that salt
ans of sulphuric acid. This acetic
after distillation, is in a high state of
tration; but it differs from concen-
acetic acid, by being neither com-
le nor crystallizable. It is usually
d by the addition of water. If in-
for the table or for domestic use,
substitute for other forms of vine-
is usually coloured with a little burn-
gar. This manufacture of vinegar
carried on upon a very large scale,
e greater part of the vinegar used for
tic purposes and in the arts, in many
ch it is largely consumed, is derived
his source. Ordinary vinegar, besides
ning acetic acid and water, contains
lphate of lime, some ethereal matter,
a portion of sulphuric acid, and a colouring principle. See VINEGAR.

Q.

QUAGMIRE. See BOG and PEAT.

QUAIL. (*Coturnix.*) A genus of gallinaceous birds allied to the partridge, but of smaller size, with a more slender beak and shorter tail, and without red eye-brows or spurs. The flesh of the quail is delicate, and very little inferior to that of the land-rail; it is accordingly very much in request, and in London, in particular during the season, that is from May to August, the consumption is large. They arrive in this country in May, and seem more partial to open champaign countries than to those which are enclosed. The female scrapes out a small cavity on the ground, into which she collects a few bits of dry grass, straw, or clover stalks; she lays from seven to twelve eggs; nestling among wheat generally, but sometimes in a piece of clover or grass. The eggs are of a yellowish or dull orange-coloured white, blotched or speckled with umber brown; one inch one line in length, by eleven lines in breadth. The food of the quail consists of seeds, grain, insects, and green leaves. The whole length of the bird is seven inches. The adult male has the plumage of the back, wings, rump and tail, brown, with lighter-coloured shafts, and longitudinal streaks of wood-brown; chin and throat white, bounded by two half-circular dark brown bands, descending from the ear-coverts, and with a black patch at the bottom in front; breast pale chestnut brown, with the shafts of the feathers straw colour; lower part of the breast, belly, &c. yellowish white. (*Yarrell's Brit. Birds*, vol. ii. p. 355.)

QUAKING BOG. Peat bog in a growing state, and so saturated with water, that a considerable extent of surface will quake or shake, when pressed on by the foot or any body; such bogs are unfit for any useful purpose till they are drained. See BOG and PEAT.

QUAKING GRASS. (*Briza;* named from *brizo*, to nod, on account of the quaking character of the spikelets.) A genus of grasses of which some species are pretty and interesting, as *B. minor*, *B. rubra*, and *B. Clusii;* but the greater portion are mere weeds. The whole are of easy cultivation. Two species are indigenous to Britain, the smaller quaking grass (*B. minor*), and the common quaking grass (*B. media*). (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. i. p. 132.) See BRIZA.

QUARRY. A pit or drift from which

Soc. (new series), pp. 53—106.; and vol. v. pp. 57—84.; and 398—416. of which my limits will not even permit me to give an outline.

QUARTER. The fourth part of any thing, as of a carcass. As a term of weight it denotes the fourth of a hundred weight, or twenty-eight pounds; as a dry measure it signifies the fourth of a chaldron. Quarter is also a measure of grain containing eight bushels: it is the common measure by which grain is sold in the southern districts, especially when in large quantities.

QUARTZ. A German term, now universally adopted in scientific languages, and commonly applied in mineralogy to the purer varieties of silica, especially to rock crystal. Quartz occurs also in beds: it is usually granular, white, sometimes mixed with mica.

QUEEN OF THE MEADOWS. See Meadow-Sweet.

QUICKEN TREE, or MOUNTAIN ASH. See Rowan-Tree.

QUICKS. The young sets of the whitethorn used in planting hedges. The term is also applied to couch-grass in some places. See Quickset.

QUICK LIME. See Lime.

QUICK-SANDS — Are sandy spots of soil which contain water in such a proportion as to form a sort of shaking *quag* at certain times.

QUICKSET. A term applied to the white or hawthorn, the sets or young plants of which are raised by the nursery gardeners for sale for this purpose. See Fence, Hawthorn, and Hedge.

QUILLS. The hard and strong feathers

sometimes termed, i
found in the more s
toms of some of th
this country, blowin
and June. The long
fibres run perpendi
tuberous root into t
having no stem, con
rous awl-shaped qu
varying in height i
from three to nine i
longitudinal cells.
and grow fat on t
Eng. Flor. vol. iv.

QUINCE. (*Cyd*
genus of fruit-trees.
cies generally cultiv
a native of Candia
most parts of Euro
natural order *Pomace*
is of a roundish som
and contains ovate
seeds, yielding to b
of mucilage, which
practice as a demul
thrive in any soil,
by suckers. *C. japo*
somest hardy shrubs,
scarlet or white flow
The Portuguese quin
Quince-marmalade
those who are fond
good housewives kn
richness of flavour t
Bot. Dict.; *Phillip's*

QUINTINIE, JO
at Poictiers in 1626.
sults of his practice
plete Gardener, whic
by Evelyn, and in

manors, whereby the tenant is quit, from all other services, and is an edgment made of their subjection ›rd of the manor.

TTER. In farriery, an ulcer formed the hair and hoof, usually on the uarter of a horse's foot; it often rom treads and bruises, sometimes avel, which, by working its way up- lodges about the coronet; if it is erficial, it may be cured by cleans- sings, bathing the coronet every day rits of wine, and dressing the sore e-water, or a detergent application, red precipitate.

R.

BIT. (*Lepus cuniculus.*) A well- nimal, resembling the hare, smaller belonging to the order *Rodentiæ.* bit has shorter hind-legs than the d the ears are more thinly covered r. Rabbits abound in this country, in many cases preserved in warrens. rtility is great. They begin to breed onths old, and have several broods ar, and from five to seven young a brood. The young are blind at d nearly naked. Their fur, in a te, is of a brown colour; but varies mesticated. It constitutes a prin- ticle in the manufacture of hats. to its slight conducting power, it is, hare's fur, an excellent thing to er the shirt for those predisposed to ption. The usual mode of catching bits are by what are called purse- d by ferrets, though they are occa- coursed by greyhounds or spaniels to the sport. See ANIMALS, STEAL-

IES. See HYDROPHOBIA, and SHEEP, s OF.

E. In horsemanship, a trial of etween two or more animals. Races t commonly run by horses trained purpose. (See GAMING, &c.) Race mployed to designate certain kinds s and cattle, in the same manner as rent races of man.

EME. (Lat. *racemus*, a bunch of In botany, a form of inflorescence, h the flowers are stalked along a unbranched axis, as in the hya-

HIS. (Gr.) A branch which pro- nearly a straight line from the base pex of the inflorescence of a plant. so applied to the petioles of the f ferns.

RACK. A railed convenience formed above the manger in a stable for the reception of the hay. It should be constructed with openings at the bottom for the seed or dust to pass through.

RADICLE. In botany, that portion of an embryo which eventually becomes the descending axis or root. It is the lowest of the two opposite cones of which an embryo plant consists.

RADISH, CULTIVATED. (*Raphanus sativus.*) There are two kinds of cultivated radish, the fusiform, or spindle-rooted, and the globular, or turnip-rooted; and these again are divided into the spring and autumn varieties. As for the designation of short and long top, by which the old gardeners divided the varieties, I perfectly agree with Mr. Strachan, the gardener of the London Horticultural Society, in considering it as giving importance to a difference that is by no means permanent. The first may be sown at all times of the year; but the last, requiring a greater length of time to perfect their roots, can only, as the name implies, be obtained during the latter part of the year.

Spring Varieties.—Fusiform-rooted: 1. Long white, called also the white transparent, white Italian, and Naples radish. 2. White Russian, probably the *Raphanus sativus* of Gerard. 3. Twisted radish of Mons. 4. Scarlet or salmon, or scarlet-transparent radish. 5. Purple, formerly called exclusively the short-topped. 6. Red-necked white.

Turnip-rooted: 7. White turnip is the only one noticed by Gerard, as the *Raphanus orbiculatus.* 8. Early white turnip. 9. Pink, rose-coloured, scarlet, and crimson turnip. 10. Purple turnip. 11. Yellow turnip.

Autumn and Winter Varieties.—These are all of the turnip-rooted kind; and in the following list they are described in the order they follow in coming into use. 1. Yellow turnip. 2. Round brown. 3. White Spanish, is Miller's *Raphanus albus orbicularis.* 4. Oblong brown. 5. Black Spanish. 6. Large purple winter, or purple Spanish.

The soil best suited for this vegetable is a mouldy loam, rather silicious than otherwise, and moderately fertile. It should be dug a full spade deep, and well pulverised. The subsoil is best to be rather hard. Manure should not be applied at the time of sowing, if avoidable, as it is apt to cause the roots to be fibrous. If employed, it should be in a finely-divided putrescent state. The situation should always be open; but for early and late crops, warm and sheltered. Radishes are propagated by seed, which may be sown at all times throughout alleys a foot in width, the earth from which may be thrown out to raise the beds, or not, according as the season renders it desirable for them to be dry or moist. If drills are employed for the fusiform-rooted, they are required to be three inches asunder; for the turnip-rooted, four or five, and for the Spanish, &c., six or eight.

When the seedlings are well up, and advanced to five or six leaves, they are ready for thinning; the spindle-rooted to three inches apart, the turnip-rooted to four, and the larger varieties to six. These spaces, however, require to be rather increased in moist warm weather. In dry weather they ought to be watered regularly every night, as the goodness of their flavour and tenderness depends upon their rapidity of growth, which is chiefly accelerated by a constant supply of moisture. The early and late crops that have to withstand the attacks of frost, &c., should be kept constantly covered with dry straw or fern, to the depth of about two inches, or with matting, supported by short sticks, until the plants make their appearance, when the covering must be removed every mild day, but renewed towards evening, and constantly during frosty or tempestuous weather. Some gardeners sow lettuces, but more commonly spinach, with this crop. Others do the same with carrots among the early sown ones; so that if the radishes are killed by the frost, which sometimes occurs, the carrots supply their place; or even if both survive, the former being drawn young, and the carrot seed not vegetating for three weeks or more after that of the radishes, there is room sufficient for them both to succeed. The practice of mixing

way, being insert
pletely down to t
be applied as well
root, as occasion
growth, especially
ticable, it is best to
raised. To obtain
nish, some seeds m
or some of the wint
transplanted during
open from June
pods are of a size
must be gathered
during that last mo
they must be cut as
a brown hue; and,
wise it will thresh
stored. Two varieti
near each other, a
year's raising shoul
The seeds of the
easily distinguishe
seedsman. Those
are small, flat, and
purple, fusiform-ro
first very light co
those of the latter
small, round, and
rather larger, and s
turnip, larger, and
the long-rooted pur
Forcing.—A m
quired for this cro
with that of the fra
mould, about eight
face of which the se
as the violent heat
ditional half inch
The seedlings are i
a week, and in six

it must be kept to this heat by
:oatings as required.
is a deficiency of frames, hoops
may be employed, a frame of
ng formed round the bed, light
eing admitted as freely and as
ssible. If seed is sown within a
out any bottom heat, the plants
o or three weeks forwarder than
the open ground. (*G. W. John-*
. *Gard.; Trans. Hort. Soc. Lond.*
436—446.; vol. iv. p. 10.; *Rut-*
. *Univ. Guide*, p. 30.)

H, THE HORSE. See Horse-

H, THE GREAT WATER.

A quantity of light timber,
ether so as to be floated down
ther waters. This means of con-
ber to navigable situations may
geously practised in many places.
A torn piece of cloth of any sort:
e woollen kind, they are used as
Woollen rags are almost entirely
f animal matter: they are found
a very large proportion of albu-
bstance similar in appearance to
te of egg,) minute portions of
lica, and traces of various salts.
therefore, an excellent manure,
lecomposing in the soil; and are
main dissolving in it, and form-
and elastic matters for the ser-
ints, when applied at the rate
ight per acre, for periods vary-
two years on the heavy clays,
ose of the hop-grounds of the
ent, to three or four on the light
s of the valley of the Kennet,
re. The lightness of carriage,
diness, as well as cleanliness of
render it peculiarly eligible as
it keeps, too, for any length of
the farmer is ready to apply it
and, and is much more slowly
l and consumed than either
pe-cake, train-oil, or bone *dust*.
sumption of these rags by the
and Oxfordshire farmers, and
n Kent for the hop grounds, is
lerable. I am informed by an
ealer in these rags, that at least
are annually consumed by the
the south of England. My in-
mself has a sale of more than
r annum, which he delivers free
vessel, at any of the London
r five guineas per ton. The cus-
farmer is, to cut the woollen
ans of a chopper and block into
it the size of a crown piece, and
l them on their fields by hand, out of a common seed basket, as evenly as they can; they find that this manure is admirably adapted for hops, wheat, turnips, &c., and that the beneficial effect is as great the second year as the first. It appears that one farmer in Kent, Mr. Ellis, of Barming, purchases annually four or five hundred tons of these rags, almost exclusively for his hop grounds. The farmers of Kent think the application of the rags "*warms*" the ground, as they slowly putrefy in the soil; they certainly afford nourishment to the crop, for wool is composed almost entirely of a peculiar animal substance, with a slight portion of phosphate of lime, or earthy matter of bones.

RAGGED ROBIN. See Lychnis.

RAGWORT. (*Senecio.*) A portion of the species of this extensive genus has already been noticed under the head Groundsel; but there are four or five species of ragwort, properly so called. The four first belong to that section of the genus which have flowers with spreading rays and pinnatifid leaves; the others to that with undivided leaves and radiant flowers.

1. Inelegant ragwort. (*S. squalidus.*) This is an annual species, which flowers from June to October. The root is fibrous, stem erect, branched, leafy, smooth or a little hairy, twelve or eighteen inches high. The leaves are smooth, bright green, either sessile or somewhat clasping, pinnatifid, sharply toothed, with distant and somewhat linear segments. Flowers loosely corymbose, terminal, erect, with awl-shaped bractes on the partial stalks. Florets all of a bright golden yellow, spreading, elliptical, entire. The seeds somewhat silky, with roughish down. The scent of the herb is like tansy or mugwort.

2. Hoary ragwort. (*S. tenuifolius.*) This is a perennial species, growing in woods, hedges, and by road sides, in the chalky or gravelly counties, flowering in July and August. The root is somewhat creeping, with long stout fibres. Stem erect, straight, unbranched, usually two or three feet high, leafy, furrowed, covered slightly with loose cottony down; corymbose at the top, with several bright yellow flowers or bractiated stalks. The florets of the radius linear-oblong, three dentate, revolute in fading. Leaves numerous, alternate, deeply pinnatifid, with the segments somewhat revolute, dark-green, and nearly smooth above, downy or cottony, often snow-white beneath, seeds hairy, down rough.

3. Common ragwort. (*S. Jacobæa.*) This species is found almost every where. It is a perennial, flowering in July and August. The root is rather fleshy. The herbage for the most part quite smooth, of a deep shin-

by cattle whilst any thing else is to be had, though often devoured entirely by the black and yellow ringed caterpillars of *Phalæna Jacobæa.* It has been recommended as an application for cancers, by the name of swine's cresses, which it bears in Yorkshire. It passes under a variety of names in different localities, being known as rag-weed, stagger-wort, St. James's wort, seggrum, Scotch canker-weed, stinking elshinder, &c. Its virtues in cancer may be justly questioned.

4. Marsh ragwort. (*S. aquaticus.*) This is a common perennial species, in marshes and about watery places, near rivers and brooks. The herbage is of a lighter green than the preceding, and the leaves are lyrate, serrated; the lowermost obovate and undivided. The flowers are also few and larger, though of the same golden hue as the last, with more elliptical radiant florets. The seeds of the ray are not silky.

5. Great fen ragwort, or bird's tongue. (*S. paludosus.*) This is a very rare species, found occasionally about the ditches and fens of any part of England. It is a perennial, and flowers in June and July. The root is creeping and fibrous. The stems are perfectly straight, hollow, from three to six feet or more in height, loosely clothed with deciduous cottony down. The leaves are lanceolate, tapering, sharply serrated, smooth above, somewhat cottony beneath; the lower ones are dilated, clasped, and equally serrated at the base; the upper contracted and entire. Flowers corymbose, not very numerous, but large and conspicuous, bright-yellow, with many oblong-toothed spreading rays. Bractes awl-shaped, scattered. Down roughish.

water-rail. The
(*R. Crex*) is a bir
rives here in the
time as the quail,
countries towards
These birds are uni
grasses, broom or f
from twelve to twe
Bewick describes
more than nine inch
of the upper parts
brown, edged with
the neck and breast
ish white, legs pale

The water-rail (
resident with us, a
brooks, and damp
is formed like the
prodigious quantity
plants, but is genera
or flags in order to
away by the curren
six in number, of
oblong, and less
They are frequently
rat, and in large riv
are occasionally dev
while they are divi
fish. The whole le
ing its long bill,
The body is beaut
feet are not webbe
very fast. (*Blaine'*
Dict.)

RAILING. A
constructed with p
made use of in
fences, from the cr
animals. See F

ric action of the clouds on each other.
suppose the hygrometric moisture in
ir to be kept suspended by the mutual
sions of the electric atmospheres of the
cles, and that when the electricity is
any cause withdrawn, the suspending
r is likewise removed, and the particles
sce and fall in consequence of their
ty. That rain is connected in some
or other with the electric state of the
sphere, is a position which may be
ly conceded; but as the disturbance of
lectrive equilibrium remains to be ac-
ted for, this theory, as it at present
ds, brings us no nearer to definite ideas.
eaving, however, the theoretical and
uted part of the subject, I propose in
article merely to make a few leading
arks connected with the subject, to give
maries from the registers of several
rs of the average annual and monthly
of rain in different places, and to de-
e therefrom a few practical and useful
s and rules.

s the effects of rain are very consider-
on vegetation, it will be highly useful
certain the quantity or depth of rain that
annually in various districts, and the dif-
nce in the effects which are produced by
ore especially for the formation of re-
oirs for agricultural purposes. To use
words of Mr. G. Tatem:—Although
lly aware, that little reliance can be
ed upon any theory founded on data so
rtain as the quantities of rain that fall
ifferent years, I am convinced that
thing might be done towards establish-
rules for the guidance of agriculturists
botanists, if observations were made at
same place for a series of years, and the
lts recorded." The average quantity
ain which falls in a year at any given
e, materially affects the productiveness of
soil, and is necessarily influenced equally
the climate by a variety of general
umstances and local causes; such as la-
de, proximity to the sea, elevation of the
on, configuration of the country, and of
mountain ranges, exposure to the pre-
ing winds, &c.

ear the foot of high hills a greater quan-
commonly falls than over a level coun-
; the currents of the atmosphere in their
rse meeting with a hill, are so charged,
a deposition in showers very frequently
ws. The quantity that falls, and the
nner in which it falls, are the circum-
nces to be attended to. A great number
ainy days are more injurious to the soil,
n where the quantity is not great, than
vy falls at distant intervals of time; the ground, in the first case, being constantly over saturated, its fertility is much lessened; in the other, the superfluous moisture being soon drained off, only the portion necessary for the nourishment of plants is left, which is gradually given out in dry weather, during which the ground for a time is in its most productive state.

In general, more rain falls in the north of England than in the south. The east and south eastern counties have usually the driest seasons and years. The fall of rain is various, however, at any period of the year, as may be seen from the annexed tables. The mean quantity falling annually in England is reckoned to be 32 inches, or, according to Dalton, 31·3; but this is unequally distributed.

The annual amount in Westmoreland and Lancashire, according to Mr. Whistlecraft, usually ranges from above forty to nearly seventy inches, while that noted by the gauge in Essex and Suffolk, is as low as from fourteen to thirty-two inches; seldom however does it exceed twenty-five inches. It may indeed be fairly inferred, that these two parts of England produce our extremes. The former being situated bordering on the western ocean, where the waves of the vast Atlantic cause, by the gales from American shores, many clouds and frequent precipitation on the west and north-west coasts of our island, and the hilly nature of those districts also serve to aid and induce precipitation. On the contrary, the eastern counties are much elevated in a great part of their surface, and here the western breezes and vapours become more spent in the extremity of their passage. The continent of Russia too is here a great evaporating cause; at least the winds in passing from thence acquire that remarkable dryness which distinguishes them from other currents. (*Climate of England*, p. 2.)

Mr. Howard gives the annual average at London equal to 24·9 inches; Professor Phillips at York, 25·7; and Mr. Adie at Edinburgh, 25 inches.

At Keswick, in Cumberland, the depth on an average of seven years was found to be 67 inches; at Baverstock, near Salisbury, during the same period, 32¾ inches; and at Plymouth, in Devonshire, 45 inches. In the western parts of Scotland the depth is from 30 to 35 inches, which is from 6 to 10 inches more than that on the east coast.

The mean monthly and annual quantities of rain at various places, deduced from the average, for many years, by Dalton, is given in the following table:—

Dec.	3·832	3·288	2·569	3·955	6·084	3·142	1·981	1·7
Annual	36·140	34·121	27·664	39·714	53·944	36·919	21·331	20·6

Upon taking the average of the twelve months, it appears that the depth of rain for the whole year 1840, was at Aberdeen 24·627 inches; Empingham, 18·58; Epping, 20·767; Falmouth, 31·511; Gosport, 25·525; Greenwich, 18·24; and at the city of York, 24·72 inches, making the mean annual fall 23·424 inches, or 9·813 hhds., which in weight is nearly 2·363 tons.

The average depth at Paris, according to M. Arago, is 19·1 inches (*Journ. de Physique*, 1816); Berlin, 20·9; Brussels, 19; Florence, 41·3; Lyons, 39·5; Maestricht, 36·1; Marseilles, 18·4; Padua, 36·6; St. Petersburg, 18·2; Rome, 31·2; Rotterdam, 22·4; Stockholm, 18·7; Vienna, 17.

The greatest depth of rain which has been registered at any place in a year, is at Maranham, lat. 2½° S., and which is stated by Humboldt to be 277 English inches. But this is greatly above the average, and, indeed, more than double the annual quantity which has been observed at any other locality. At St. Domingo, the annual fall is estimated at 120 inches; at Cayenne, 116 inches; at the Havannah, 91; at Calcutta, from 76 to 118; at Bombay, from 83 to 96; the island of Martinique, 87 inches; and at Sierra Leone, 86. Of European countries, Portugal appears to be the most humid, 123 inches having been observed at Coimbra in a year.

Although winter usually produces more rainy days than summer, the quantity of rain which falls is greater in the latter season. Dr. Dalton has ascertained that

winter, and the qu
five inches; on th
produces 11 inche
of days. In Canad
usually is about th
about twenty gall
square foot of surf

The following ta
years' observations,
Cobham, Surrey.

Months.	Greatest Quantity.	Lea Qua tity.
January	4·08	0·2
February	4·09	0·3
March	3·58	0·3
April	3·10	0·2
May	2·31	0·6
June	2·65	0·9
July	5·47	0·3
August	3·50	0·8
Sept.	5·74	0·9
October	4·77	0·2
Nov.	3·94	0·6
Dec.	3·53	0·2

The rain was
rain-guage, which
on which the therm
inches from the gro

The following is
&c., for a series of y
be considered extre
of England.

1824 to 1830. Eppi
N., lo

Months.	Average Quantity of Rain.	Gre Qua of R

to 1826. Carlisle, Cumberland, lat.
50′ 50″ N., lon. 2° 58″ W.

ths.	Average Quantity of Rain.	Greatest Quantity of Rain.	Year in which it fell.	Least Quantity of Rain.	Year in which it fell.
ary	2·15	3·62	1819	1·53	1822
uary	1·90	3·01	1819	0·75	1821
h	2·50	4·01	1822	1·31	1825
	1·59	2·74	1821	0·85	1824
	2·41	4·61	1823	1·23	1824
	2·06	3·64	1820	1·05	1822
	2·95	5·33	1822	0·45	1825
st	3·65	5·03	1822	1·06	1821
	3·05	3·85	1824	1·33	1822
	3·74	5·15	1819	2·45	1820
	3·75	5·53	1824	1·06	1820
	3·30	5·63	1824	2·31	1825

rwin, Swift, Foster, and other authors,
detailed at considerable length, in
and verse, various signs of coming
but as our space is limited, we can-
o fully into the subject here, and must
fore be content to sum up with the
ving remarks.

frequent showers fall in the month of
ember, it seldom rains in May; and the
se. When the wind blows often from
. W., during either summer or autumn;
the air is unusually cold for those
ns, both to our sensations and by the
nometer, at the same time the mercury
low in the barometer — under these
itions a profuse fall of rain may be ex-
d. If the mercury in the barometer
when the wind is full south, it scarcely
fails to be a sign of rain. (*Brande's*
of Science; Howard's Climate; Lou-
Encyc. of Gard.; Quart. Journ. of
or. Soc.; Mag. of Nat. Hist.; Treatise
ain, by *P. L. Simmonds.*)

AINBOW. (Germ. *regen-bogen.*) The
ant coloured arch which makes its ap-
ance when rain is falling, in the region
e sky opposite to the sun, and the sun
ining at the same time. This well-
n meteor presents, when perfect, the
rance of two concentric arches; the
being called the *primary*, is the most
, and the outer the *secondary* rainbow,
hich the colours are fainter than in the
r. Each is formed of the colours of
olar spectrum; but the colours are
nged in the reversed order, the red
ing the exterior ring of the primary
, and again reversed in the secondary,
xterior bow. From the conditions in-
bly accompanying its appearance, the
rs of the rainbow were known at an
period to be produced by the sun's
passing through the drops of falling
; but the phenomenon is a complicated
and was not fully and satisfactorily ex-
ed until Newton had discovered the
ound nature of solar light, and the
ent refrangibility of the component
It is on this account that the colours of the outer arch are less brilliant than those of the inner, because the rays falling upon the drops of rain in that position are more reflected. The rainbow is always of the same apparent breadth, a circumstance depending on the refrangibility of the red and violet rays being always the same.

Rainbows are said to be signs that rain will not long continue, a thing easily understood, because they can only be seen in a passing shower. A rainbow is, for the same reason, a sign sometimes of wet, because the first that is seen shows that showers and showery weather are at hand. There is a well-known proverb —

A rainbow in the morning
Is the shepherd's warning.

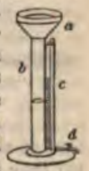
Double rainbows are very rainy signs; but after a rainy day it shows that set rain is giving place to mere showers; and then,

A rainbow at night,
Is the shepherd's delight.

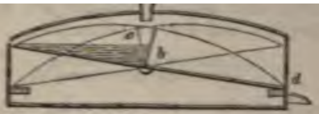
A fastidious description of the peculiar indications of the several colours of the rainbow, according as each prevails, is given by some authors, but without foundation. (*Brande's Dict. of Science; Forster's Nat. Phenom.*)

RAIN-GAUGE. An instrument for measuring or gauging the quantity of rain which falls at a given place. It is also known under the several names of ombrometer, udometer, pluviameter, and hyetometer. Its principles and construction are of the simplest nature; but it is made in a variety of shapes.

A convenient form of the instrument is represented in the annexed figure, where the rain which enters the funnel (*a*) is collected in a cylindrical vessel of copper (*b*), connected with which at the lower part is a glass tube (*c*), with an attached scale. The water stands at the same height in the cylinder and glass tube, and being visible in the latter, the height is read immediately on the scale. And the cylinder and tube being constructed so that the sum of the areas of their sections is a given part, for instance, a tenth, of the area of the funnel at its orifice, each inch of water in the tube is equivalent to the tenth of an inch of water entering the mouth of the funnel. A stop-cock (*d*) is added, by which the water is drawn off from the cylinder after each observation is made.



A curious circumstance attending the fall of rain is, that the quantity collected in rain-guages placed at the surface of the ground is considerably greater than when the instruments are placed at some eleva-



through which the rain passes to a vibrating trough (*b*), when, after a sufficient quantity has fallen into its higher side (*c*), it preponderates, and discharges the rain, which escapes by a tube (*d*), and, by its vibrating action, moves a train of wheel-work and indices, to record upon a dial-plate the quantity of rain fallen.

Messrs. Tagliabue and Casella, of 23. Hatton Garden, London, the oldest established philosophical instrument makers in the

shrubs or buildings,

RAKE. A tool
various sizes and for
dening, and for diff
poses. There are
field operations, som
by horses.

The Drag-Rake,
merely a long cros
teeth placed in it: in
they are, however, g
points projecting f
lent and light imple
of steel, and made
admit of their bein
of accident, is well
proved drag rake.

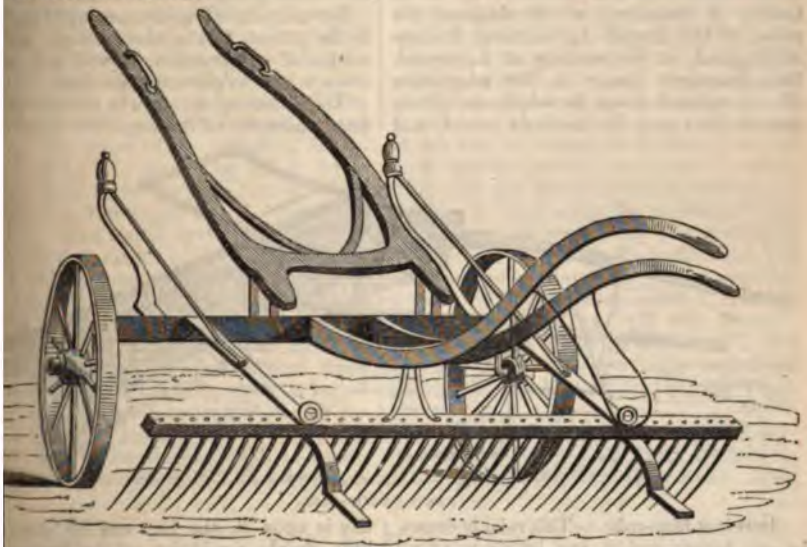
HAND DRAG-RAKE.

time to time, increased in length and weight, till they became too large to be balanced by the hand. Two small wooden wheels were then added, which rendered them ma-

nageable by women
dition having been
now sufficiently str
horse. Used on f

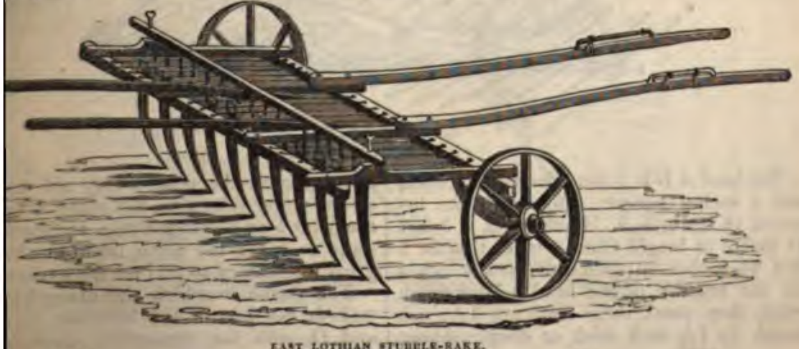
e the couch grass, they act as a harrow,
t together the rubbish, or in harvest-
they act as a rake to collect the loose
which may have escaped from the
e or sickle. In order to clear them
ly, there are different contrivances.
of the most simple and efficient is ex-
ed in the following sketch, where it will
erceived that by lifting the handle the
are brought between two iron bars,
constitute part of the framing; by
means all the rubbish is stripped off
the teeth of the rake.

The following is a sketch of "Wedlake's Horse Hay-Rake," the weight of the rake is balanced upon the carriage by two heavy balls projecting in front of it; so that a slight lifting power applied to the handle will raise it from the ground, and disencumber it of the hay or stubble it may have gathered. This rake obtained the commendations of the Committee on Implements at the meeting of the Royal English Agricultural Society at Cambridge.



WEDLAKE'S HORSE HAY-RAKE.

East-Lothian Stubble-rake, is a ma-
not so well known in this country as
its deserve. Its advantages over those
usly described are as follows:—It
ch tooth placed in a separate head,
working upon a centre like the
of a drill, adapt themselves to any
lity in the ground. To the handles,
a bar the length of the harrow is firmly fastened, and from this bar each lever is suspended by a few links of chain. When it is necessary to clear the rake, these handles, on being elevated, lift all the levers between a framing of light iron rods. The following is a sketch of this implement.



EAST LOTHIAN STUBBLE-RAKE.

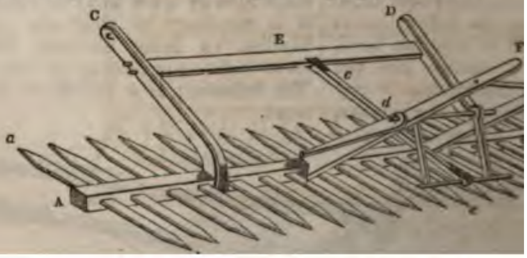
Grant, of Stamford, which obtained the prize of the Royal Agricultural Society of England, at its meeting at Liverpool. Its advantages consist in the adaptation of a compound lever, by which the whole row of tines may be instantly raised, and

Several minor imp in the patent, but as modes of constructi cessary here to parti

The following ske neral character of th

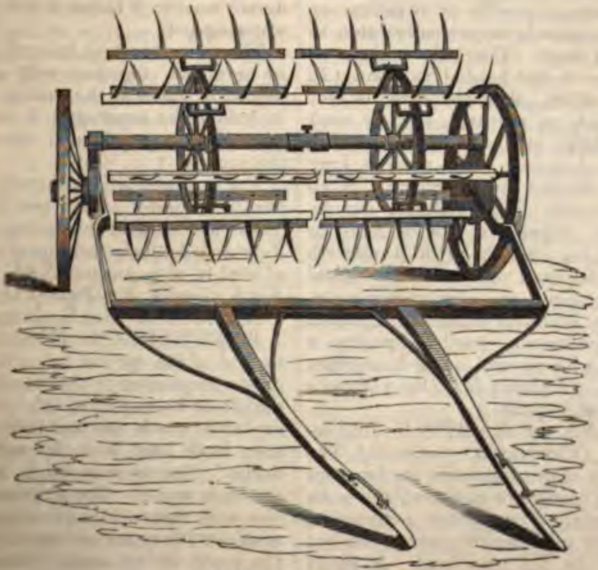
GRANT'S HORSE-RAKE.

American Hay-rake.—This rake is drawn by one horse; and it can be made to go either along or across the ridges, as may be required. It can carry between ten and twelve stones of hay; and when that quantity is upon it, the by a simple revolut afterwards to be de any particular place ping the horse.



C and D are straps to which the horse is
ched by traces or ropes, in a similar
to that in which it is attached to the
gh, but without swingletrees. The
cher E, which attaches the beams C and
s 5 feet 4½ inches in length, measured
the beams.
he part by which the instrument is
ed, consists of the handles F and G.
e handles are circled and strapped for
ournal of the head, in the same manner
e beams C and D. A little from the end
e handles at F and G, is a round con-
ng stretcher; and at *d*, 2 feet from the
e of the head, is another round stretcher.
this latter stretcher is appended the
e *e*, forming a parallel motion. The
standards of this frame are each 12½
s long, or, from the outside of its head
to the centre of the stretcher, 10 in-
There is a connecting rod *c*, 3 feet
hes long from centre to centre, which
cled and strapped round journals at
l *e*. The round stretcher at *d* is con-
l on the outside of F and G, so as to
t of a rod or catch on the outside of
handles, as seen at *d*, 2 feet 10 inches
or 2 feet 2½ inches to the centre of
nnecting stretcher at *d*; and upon the
A B the other end of each of these
ods or catches rests upon a kneed
a similar strap being also on the re-
side of the head.
r, when the frame C D E, to which
ught is attached, is in its proper position, by depressing the handles F G, the parallel motion at *e* will be pressed against the hind teeth, and thus the fore ones can be raised up, in order to surmount any inequality of ground. And when it is wanted to depress the fore teeth, the handles F G are to be raised, by which the rod or catch at *d* and its opposite side act upon the kneed straps on the head. When the rake has collected as much hay or corn as it can conveniently carry, it is emptied in the following manner. By raising the handles F G to a certain extent, the fore teeth are depressed in the manner above described, and (the point E remaining the same) the rod *c* pushes the under side of the parallel motion without the hind teeth. In this manner, as the beams and handles are all placed between the teeth, so as not to come in any way in contact with them, the fore teeth take the ground, and cause the whole teeth with the head to revolve, and deposit the hay or corn which the instrument was carrying at the time. By this revolution of the teeth and head, the instrument will again be in its proper position for working, all the difference being merely that the under side of the head will now have exchanged places with the upper side, and the fore teeth will now have exchanged places with the hind teeth. (*Trans. High. Soc.* vol. iii. p. 40.)

We have now only to notice the haymaking machine invented by Robert Salmon, of Woburn, and patented in 1816. This,



SALMON'S HAY-MAKING MACHINE.

supported by a spring, will yield to any obstruction caused by sudden unevenness of the surface of the ground, and return again to its original position. Its object is to spread the hay, and by thoroughly separating its parts, continually to expose them to the sun and wind, which it so thoroughly effects, as to render the hay fit to cart much earlier than by the common process of shaking it by the hand. To the practical agriculturist, it will not be necessary to remark on the advantages accruing from the ability to hasten, if only by a few hours, the process of hay-making; but it will be valuable to know, that the universal testimony of all with whom we have conversed is, that this implement is a time-saving machine, and therefore one of the greatest value.

RAM. A male entire sheep. See Sheep.

RAMPION. (*Phyteuma.*) This is a genus of handsome herbaceous plants, well adapted for rock-work, or growing in small pots; they will flourish in any common soil, and increase readily by divisions or seeds. *P. spicatum* is occasionally eaten as an article of food. The only indigenous species is the round-headed rampion (*P. orbiculare*), which, although rare, is met with sometimes on pastures, and by road sides on a chalky soil. It is a perennial, flowering in August. The root is long and woody, divided at the crown. Herb milky, not acrid. Stem solitary, simple, smooth, leafy, angular, a foot or more in height. Leaves smooth, with a mid-rib and many reticulated veins, crenate, radical ones heart-shaped, or elliptic-lanceolate. Flowers of an intensely brilliant deep blue, numerous, inodorous, sessile, forming a round head with several ovate-lanceolate,

over it; for, if the
its minuteness, it i
deep. The plants
sown; though in
those which are tak
crops may be tr
The best time for
is of an evening.
when about two i
must be set at a dist
being hoed at the ti
tion repeated two
performed in dry
free from weeds un

The plants of the
first mentioned mo
at the close of Au
tember, and contin
tumn. Those of th
good throughout th
following April. Th
growth, must be ke
dry weather by gi
derate waterings th
watering-pot.

The root, for whi
to be sliced, toget
salads, or eaten as
be boiled like aspar
when drawn young
the ground.

For the producti
winter standing pl
These shoot up in
July and August, a
of seed in early autu
Kitch. Gard.) See

RAMSONS. Se

RANUNCULUS
several of the speci

its varieties, should be grown in
loam and well-rotted cow-dung;
should be planted in October or
in the former month, they will
be slightly protected in bad
Seeds selected from the best
e varieties, sown early in Oc-
kept growing during the winter,
the next season; these latter
increased by dividing the roots.
Bot. Dict.) See **Crowfoot** and
r, for the indigenous species of
ulus.

A plant of the cole kind, greatly
n Flanders for the sake of the seed,
ely valuable also as green food for
sheep in winter and spring. "The
ys Mr. Low, "usually cultivated
name of rape, are the fusiform
f the following species of Bras-
or rape (*B. napus*), colza (*B.*
, fusiform common turnip (*B.*
early cole (*B. præcox*)." There
nt modes of treating this plant,
to the uses for which it is de-
he whole plant is of great service
cattle; and after the seed is
the straw and chaff, on being
rd ashes equally valuable as the
hes. Wheat yields an excellent
rape, and the plant is grown with
ntage on bog plant, where paring
ng has been practised. Rape is
, and with fair treatment it never
y soil. Cattle are so successfully
ith it, that many farmers prefer
s. See **Cole.**

den culture, rape is propagated
d, like mustard, and other small
ay be sown at any period of the
in request; being allowed a
d. For the production of seed,
s of a sowing which has been
t the middle of July, must be
about eighteen inches apart:
urvive the winter, and flower in
d June of the next year. The
is produced in great abundance,
uly and August, and must then
laid upon cloths to dry, as it is
shed.

edible-rooted. This name may
to a variety of the rape men-
Mr. Dickson, one of the vice-
of the Horticultural Society.
white, and carrot-shaped, about
f the middle finger. It is much
ate in flavour than the turnip,
root it is cooked, only that it is
, but scraped, its skin being re-
thin. It has been cultivated for
gth of years on the Continent,
out thirty years in this country, but only by one person, as far as Mr. Dickson is aware. It is propagated by seed, which, for the main crop, may be sown from the middle of July to the end of August, or even later: these will supply the table until April; and, if wanted throughout the year, a little may be sown in the latter end of October, the plants from which will be fit for use, if they succeed, during April and May: the last crop to be inserted from the middle of January to the middle of February, which will come in at the end of May, and during June. On a north border, and if the soil is sandy and moist, it is possible to have them sweet and tender during the whole summer, to effect which the seed must be sown at the close of March and May. They require the same modes of cultivation and treatment as turnips. In dry weather the beds must be watered regularly, until the plants have got three or four leaves. One great advantage attending the cultivation of this vegetable is, that it requires no manure. Any soil that is poor and light, especially if sandy, is suitable to it. In rich manured earth it grows much larger, but not so sweet and good. For the growth of seeds, Mr. Dickson recommends, in February or March, some of the finest roots to be transplanted to two feet asunder; but it would, perhaps, be a better practice to leave them where grown. The ground is to be hoed repeatedly, and kept clear of weeds. The seed must be cut as soon as ripe, and treated as directed for turnips, &c. (*Trans. Hort. Soc. Lond.* vol. i. pp. 36—39.; *G. W. Johnson's Kitch. Gard.*)

RAPE-CAKE. The refuse or marc remaining after the oil has been expressed from the rape or cole seed. (See **Linseed Cake.**) The use of rape-cake as a manure is pretty extensive in some parts of England, and its effects are so immediate and powerful, that its expense alone retards its more general employment. It contains a large quantity of mucilage, some portion of albuminous matter, and a small proportion of oil. It should be kept dry, and used when recently made. (*Davy's El. of Agr. Chem.* p. 281.) It answers admirably for turnips. When first recommended as a fertiliser, it was used in the proportions of half a ton per acre; but by pulverizing it, and drilling it in with the seed, about half that quantity has been found sufficient. Rape cake produces, when ploughed in with wheat, excellent crops. It has been found exceedingly noxious to the wireworm, and other field vermin, and when applied in compost, with thirty times its weight of farm-yard dung, it forms a very excellent manure.

Rape cake, in common with all fertilisers of the mode in which green manures operate, are considerable. It should teach the cultivator to carefully bury in the soil every portion of either animal or vegetable matter he can command; for every weed, every fragment of straw he thus employs, will again, under judicious management, be returned to him in new forms of beauty and usefulness. (*Johnson on Fertilisers.*)

RASPBERRY. (*Rubus idæus.*) This shrub, in its wild state, is found growing in our mountainous woods and thickets: flowering in May and June. The root is creeping. The stems are biennial, erect, three or four feet high, branched, round, pale or purplish, more or less besprinkled with small, straight, slender prickles, frequently rather resembling bristles than prickles, and sometimes altogether absent. Leaves primate, of five or three ovate, rather angular, lateral leaflets, serrated or cut, and angular, green, and nearly smooth above, very downy beneath, and a larger terminal leaflet. The foot-stalks are furrowed, downy, and prickly, with narrow lateral stipules. The flowers are small, white, or pinkish-white, pendulous, in drooping terminal clusters. Fruit crimson, of numerous juicy grains, beset with the permanent styles, and highly fragrant, with a very deliciously perfumed sweet and acid flavour, more exquisite in the wild state, in general, than when cultivated.

The wood of the raspberry bush produces fruit but one year, therefore that should be carefully cut down below the surface of the earth, and the young shoots should be shortened to about two feet high; and not more than three or four shoots should be left to each root, as these will produce a

gar, which is a refr
diluted with water,
and fresh leaves of
are eagerly eaten b
chard and Kitch. G
Smith's Eng. Flor. v

RAT. The name
and very prolific sp
the brown, or wate
Linn.), introduced i
from Asia, not, as
from Norway. It l
country, and multip
the old British spe
rat" (*Mus rattus*, L

Of all the four-fo
author of *Brit. Hush*
of vermin, rats and
nicious; for they b
the floors and in t
even are the stack
prolific that, if not d
incalculable mischief
every farmer to use
check the evil, and
every exertion was i
purpose; yet we con
overrun with these p
pains being taken t
hunt by farm servan
which, though not to
ineffectual remedy.
tionably, the constru
and roof in such a
them obtaining a per
building. The nex
clearance of the barr
remains to prevent
to close every part o
covering any holes t

ith charcoal. Then light the charcoal
the bottom, and when the heaps are
urning, quickly strew a good quantity
oken brimstone upon the top; retire
diately, shut the door fast, and leave
uilding entirely closed during a couple
ays following. On opening it, the
er portion of the rats and mice will be
dead around the charcoal; and, al-
gh some may have been suffocated
in their holes, and if not discovered
ccasion an unpleasant smell until their
ins are dried up, it yet will not last
The operation should be again re-
d just previous to harvest, and if any
ng be found into the barns while they
ull, by the burrowing of the rats,
tone matches should be inserted into
before they are stopped up. Traps
oisons are only partially efficient; but
ectual mode of trapping is detailed
small pamphlet, published some years
y Mr. B. Broad, of Thurton, under the
on of the Hereford Agricultural So-
which ought to be in the hands of
farmer in the kingdom.

ferret is a decided enemy to the rat,
kept in a hutch or cage, and only
onally used, will be found very service-
but he should be well fed to induce
return, or otherwise he will escape
ecome destructive to poultry. A cat
should also always be reared about
. In new barns and outhouses the
ce of rats is effectually prevented by
ng the joints, rafters, and flooring in
tion of corrosive sublimate. If a rat
ouse attempt to gnaw wood so pre-
their saliva moistens the sublimate,
ake it into the stomach, and are so
yed by it. (*Brit. Husb.* p. 551.;
lete Farmer.) See MICE, HARVEST-
, and VERMIN.

TTLE, THE RED, or LOUSE-WORT.
ularis, from *pediculus*, a louse, im-
a supposed effect of creating lousi-
in sheep which feed on it.) This
enus of beautiful little plants, with
egular finely cut leaves. In the gar-
ey thrive best if planted in a mixture
and soil, and kept moderately moist.
are most readily propagated by seeds.
are two indigenous species: —

Marsh lousewort, or tall red-rattle (*P.
ris*), which is found in marshes and
meadows: a perennial, flowering in
and July. The root is small. The
solitary, erect, twelve or fifteen inches
with many lateral spreading opposite
hes. Leaves partly opposite, and
scattered, stalked, smooth, bright
doubly pinnatifid. Flowers axillary,
ite, solitary, nearly sessile, of an elegant crimson, darker on the upper lip, without scent.

2. Pasture lousewort, or dwarf red-rattle (*P. sylvaticum*). This is a perennial species, flowering also in June and July; very common in moist heathy, rather mountainous pastures. It is of more humble stature than the preceding, with several spreading or recumbent unbranched stems, from a large fleshy, tapering, subdivided root. Leaves alternate, doubly pinnatifid, and notched; radical ovate, undivided, crenate, recurved. Flowers of a more uniform rose-colour than the last; the lobes of their lower lip not fringed. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. iii. p. 129.)

RATTLE, THE YELLOW. (*Rhinanthus;* from *rhin*, a snout, and *anthos*, a flower, in allusion to the appearance of the corolla.) For garden culture, the seeds of the yellow rattle have only to be sown in a moist situation. There are two native species: —

1. The common yellow rattle (*R. crista galli*). An annual plant, which is very common in rather barren meadows and pastures, flowering in June. This plant is reckoned unprofitable to the farmer, encumbering rather than enriching his crop of hay, as cattle are not fond of it, and whether they ever eat it by choice is doubtful. The root is fibrous. Stem about a foot high, with few and generally short branches, leafy, square, often spotted with red or purple, smooth. Leaves lanceolate, spreading, acute, sharply serrated, rough, and minutely wrinkled on both sides, from an inch to an inch and a half long. Flowers yellow, crowded into a terminal bracteated spike, each pair crossing the next. The bractes heart-shaped, acutely serrated, green. Calyx bladdery, ribbed, smooth: corolla yellow; segments of the upper less bluish. Capsules dry and membranous, making a rattling noise when touched.

2. Large bushy yellow rattle (*R. major*). This is also an annual, growing in corn fields in the north of England. It is distinguished from the last by its greater size, copious branches, narrower leaves, and smaller flowers, with a purple upper lip. (*Eng. Flor.* vol. iii. p. 119.)

RAVEN. (*Corvus corax.*) This "bird of ill omen," as it has been termed, is by far the largest specimen of the genus *corvus* among British birds: it is rather a rare bird in England, and, though his presence is hateful to the farmer, as he makes a prey of young poultry and lambs, he is, in some respects, useful as a devourer of putrid matter. Bold as well as sagacious, with a quick eye, and a keen sense of smell, the raven is always an object of suspicion to the entrails, and feeds at his leisure, retiring to a small distance to digest his meal, and then returns to feed again. The raven inhabits high rocks on the sea-coast, extensive woods, mountains, or open plains, where danger may be seen and avoided. Like other birds of this genus, the raven is not particular in his food, but eats indiscriminately small mammalia, birds or their eggs, reptiles, insects, grain, or carrion: on the sea-coast the shore is closely searched for dead fish of any sort, or other animal substance washed up by the tide. These birds live to a great age. Their nest is generally placed in the fork of a branch, and is formed on the outside of sticks, with a lining of wool and hair; the eggs are four or five in number, two inches in length, by one inch four lines in breadth, of a pale green ground colour, spotted and speckled with darker greenish brown. The plumage of the raven is glossed with steel-blue and purple. The legs, toes, and claws, as well as the beak, are shining black. The whole length of a male bird is twenty-six inches. (*Yarrell's Brit. Birds*, vol. ii. p. 63.; *Quart. Journ. of Agr.* vol. iii. p. 377.)

RAY, JOHN, an illustrious English naturalist, was the son of a blacksmith, and born in Essex, November 29th, 1628. He early devoted himself to the study of nature; and in 1663 accompanied Mr. Willoughby on a tour through Europe, of which journey he published an account in 1673. Mr. Ray was elected a fellow of the Royal Society in 1667, and the Transactions of that body afford ample proofs of his attention to science. His letters, &c., were published after his death, which happened at Black Notley, January 17th, 1715. The works for which he deserves notice here.

contain ample catal
&c.: amongst the
tulips (184 in the f
carnations, fruits p
and yet the size
crously small, "fou
the fruit, and thirty
will be enough for
tions the horse ches
fruit here, and as
seen. (*G. W. John*

REAPING. Cut
with a sickle, hook,
ing machine. The
advantageously per
or pulse is not qui
thoroughly ripe; be
the seeds are apt to
of handling, turning

Mr. Hannam (*Q*
xii. p. 22.) enters in
culations on the
wheat a fortnight
which he deduces
that, independently
cent. on the value
1st, straw of a bett
ter chance of securi
a saving in securing
smaller the sheaves
cially in a wet ha
diameter of the sh
thirty inches. It
also, not to tie the sh
In making the shock
across the furrows,
free circulation of a

In some districts,
years been partially
pose of reaping

which requires immediate and clean
, and is too valuable to admit of any
rities or wastefulness in harvesting,
be reaped. The mode of reaping
bagging, and practised a good deal
ondon, and part of the west of Eng-
thus executed:—The left leg being
into the standing corn, and the
nclined with the left hand over the
t, is then cut close to the bottom
stroke from the right hand. The
e of straw, where this is valuable,
this a good method of reaping.

mode of reaping varies with the na-
the crop. Barley and oats are gene-
t with the scythe, beans with the
peas with what are called fagging
which rather tear up than cut; and
the same way.

ing is a great part of the expense of
The average price is from 12*s.* to
acre. (*Quart. Journ. of Agr.* vol.
222.; *Doyle's Pract. Husb.*) See
G, BANDS, HARVESTING, and BAR-
HEAT, &c.

PING-HOOK. An implement
cut down corn. It is one of the
nstruments employed in husbandry.
are two kinds of hooks; that which
ipally used by the British labourer,
smooth blade of wrought iron and
bout twenty-five inches long, and
nearly to a semicircle; the other,
s universally preferred by the Irish
has a finely serrated edge, and to-
the lower point recedes from the
direction to nearly a straight line.
al action of the reaping-hook is that
w, consequently the serrated edge is
ntage. See SICKLE.

PING MACHINE. A contrivance
purpose of reaping grain by means
al labour. With this view, and to
e an operation of such importance
armer, different attempts have been
o construct machines, so as to dis-
the work in a rapid manner by the
ce of horse labour, but the success
hich they have been attended has
been far from complete.

y contrivances have also, of late
been resorted to for supplying the
of the reaping-hook, but hitherto
ave proved effectual, nor are the dif-
arising from roughness and irre-
y of surface likely soon to be sur-
ed. No one will dispute the great
and advantages of an efficient reap-
chine, if it could be carried into
on, as these advantages are univer-
knowledged. Such an implement is
re required now that our agricul-
bourers are greatly reduced in number by emigration, and harvest work has become more expensive. There is now a much greater quantity of corn to cut down, and most of the grain ripens about the same period. In 1815, Mr. Smith, of Deanston, invented a reaping machine, which, in some experimental trials, appeared to perform its work exceedingly well; but, upon longer trial, it has not answered the favourable expectation formed of it. Since that period, another invention of a similar nature, by Mr. Patrick Bell, has attracted considerable attention, but does not appear to be of sufficient merit to have come into general use. The original cost of these machines, 40*l.* or 50*l.*, must, in many instances, preclude their employment.

An excellent article on the advantages of a reaping machine will be found in the first volume of the *Quart. Journ. of Agr.* p. 137.; and Mr. Bell's machine is figured and described at p. 217. of the same volume.

RECKLING. A provincial word signifying the last of a farrow or brood.

REDBACKED SHRIKE. See SHRIKE.

REDBREAST (*Erythaca rubecula*). The redbreast (says Mr. Yarrell), is so generally distributed over the British islands, and so universal a favourite, mixed up as it is with our earliest associations, that all are sufficiently interested in this bird to make themselves acquainted with its habits. These may be observed either in the wood, the field, or the garden, since there is scarcely a hedge without its redbreasted inhabitant; and if robins appear to be more numerous in winter than in summer, it is partly owing to the state of vegetation at the former season, which leaves them more exposed to observation, and partly because they resort to the habitations of man for food as they find it decline elsewhere. During summer they feed indiscriminately on earthworms, various insects in their different states, fruit and berries. In winter every country-house has its attendant pensioner, who requires but little invitation to become an in-door guest.

> He pecks the crumbs on the sanded floor,
>   That the smiling infants strew,
> The willing tribute of the poor
>   To their feather'd minstrel due:
> The only thanks he can repay
> Is his sweetly warbled roundelay.

The song of the robin is sweet and plaintive, but not very powerful. The robin breeds early in spring; its nest is formed of moss, dead leaves, and dried grass, lined with hair, and sometimes a few feathers. The nest is frequently placed on a bank sheltered by brushwood, or a short distance above the ground in a thick bush, lane, or hedge, sometimes in a hole of a wall partly covered with ivy. The eggs are from five

CON.

REDPOLE. (*Fringilla*, Bewick; *Linaria*, Selby and Gould.) There are two species of this bird known in the British islands.

1. The mealy or stone redpole (*Linota canescens*, Yarrell), has been considered by several ornithologists to be merely a larger variety of the lesser redpole; in length it is about five inches and a quarter. The beak is much larger than that of the common redpole, but of the same form, and yellowish brown. In winter the feathers of the forehead are dark red; back of the head, neck, and upper part of the back, a mixture of dark and light brown; lower part of the back, rump, and upper tail coverts mealy or greyish white; tail deeply forked, neck, breast, and belly brownish, white streaked with darker brown, legs, toes, and claws dark brown.

2. The lesser or more common redpole (*Linota linaria*), is the smallest of the British linnets, and is even a trifle smaller than our diminutive siskin. It is more especially a winter visiter to the southern counties of England, appearing in small flocks from Michaelmas to April; but is not often seen in the south of England in summer. It is at once distinguished from the mealy redpole, last described, by its smaller size. In some of the northern counties of England, and in Scotland particularly, this little bird is resident all the year. It builds its nest in a bush, or low tree, of moss, and the stalks of dry grass, intermixed with down from the catkin of the willow, which also forms the lining, and renders it a particularly soft and warm receptacle for the eggs and young. The eggs are four or five in number; their colour pale bluish green, spotted

winter. The bird h
straight beak, and its
twelve inches and
plumage the adult b
grey breast, and belly
it changes to a sooty
red colour of the le
white spots on the wi
manent at all ages ar
2. The common re
much more numerous
accordingly much bett
dent in many parts of t
In the winter season
on the sea-shore, over
which are left bare b
the birds are then s
spring, however, the
marshes near pools
banks of rivers, where
season, they are only
They feed on aquatic
or other worms, whic
their beaks in soft m
makes a slight nest w
the moist parts, or mo
and begins to lay early
reddish white, tinged
with dark red brown
six lines and a half,
lines in breadth. In
the back, head, &c.
and tail feathers, nec
belly, white; with a fe
in the line of the shaf
the spring plumage t
front of the neck, and
of the body, sides a
and streaked, with b

generally about the second week in
. It inhabits the skirts of forests,
meadows, orchards, and gardens, and
tial to old walls and ruins, particu-
if overrun with ivy. The food of
redstart is worms, beetles and their
s, flies, spiders, ants and their eggs,
and berries. The nest, which is
r loosely constructed, is formed of
externally, and lined with hair and
ers. It is occasionally placed in a
w tree or in a hole in the wall. The
, which are from four to six or eight,
of a uniform greenish blue colour, eight
and a half long, by six and a half
d. In the adult male during summer,
top of the head, back, and wing-coverts
ead-grey; forehead white; chin, throat,
of neck and face, jet black; breast,
, &c. pale chesnut; legs and toes brown.
whole length of the bird is five inches
one quarter.

he black redstart (*Phœnicura tithys*)
already been noticed. See Black
start. (*Yarrell's Brit. Birds*, vol. ii.
7.)

ED-WATER. A well-known disease
attle. "The disease commonly called
water, brown-water, black-water, moor-
c." says Mr. R. Thompson, of Auch-
der, "is most prevalent in old foggy
ures. It is seldom seen in hill pastures,
new sown pastures, in which there is
dance of clover; but it sometimes
ens at the stall, where the animal has
her allowance than straw, turnips, and
toes. It usually makes its appearance
a few days of rain, followed by cold
weather. As the disease appears at
in all situations, it is difficult to trace
xisting cause, which may be the nature
e pasture, or the state of the weather,
th combined. It attacks every breed
kind of cattle.

The first symptom is the appearance of
thing like blood mixed with the urine.
rifling is the complaint in some in-
es, that no inconvenience seems to be
by the animal, who eats and drinks as
l, chews the cud, and is free of the
se in a few days. In such cases a
ral diarrhœa comes on, to which the
may be attributed. In general, how-
, the disease is not observed until the
al refuses food, separates from the rest
e herd, appears dull and heavy, and
fests great languor and apathy. The
droop, the urine is of a reddish or
nish colour, and if it be a milch cow,
milk is often similarly tinged. The
e ranges from sixty to seventy; there is
inate constipation of the bowels; the
e is discharged in moderate quantity, and apparently without pain. If relief is not afforded by some brisk purgative, at the period when the urine changes colour from red to brown, the pulse begins to sink, and if a little blood be drawn at this time, its surface assumes a brownish colour; the eye appears of a yellowish brown tint; the urine acquires a darker hue; the animal refuses to rise; the pulse sinks; the legs, tail, and horns, turn cold; and the animal dies, to all appearance perfectly exhausted, although it has manifestly no symptoms of acute pain during the course of the disease.

"Purgatives of any kind, if given in large quantities of water, are found to be the best medicines that can be employed. Medicines given to cattle that have lost the power of chewing the cud, generally pass into the first and second stomachs, and if a good draught of water is not given to wash them from thence, if the animal dies the greater part of the medicines will be found in these stomachs; and upon this principle, common salt, if properly managed, will be found among the best. Dissolve the quantity to be given in as much water as will enable it to pass freely from the bottle or drenching horn, and let the animal have plenty of water to drink afterwards. Should it refuse to drink, no time should be lost in drenching it profusely with water. Without a plentiful dilution, there is no certainty of purging cattle that have lost their cud. If purging does not commence in from twelve to twenty-four hours, a second dose should be given. Injections of soap and water should also be tried if the case is obstinate, and when they operate a pint of linseed oil should be given as a laxative. So obstinate is the constipation in some cases, that the salt acts only as a diuretic, causing a plentiful discharge of urine. Diuretics and astringents combined, seem only of service when the bowels are open, and their improper administration often causes inflammation of the bowels and kidneys. If, after purgation, the bowels are kept open by laxatives, such as linseed infusion, the disease will gradually disappear without their use. In the last stage of the disease, when the urine assumes a dark brown or black colour, no remedy seems to have any efficacy, the animal is sunk beyond recovery, the bowels lose their action, suppression of urine follows, the animal stretches itself out and dies, as if perfectly exhausted.

"There are two diseases which in their symptoms bear some resemblance to red-water in cattle, viz. inflammation of the kidneys, and inflammation of the mucous membrane of the bladder or the urethra, hard. As the disease advanced, the urine became black and fetid. The animal all along exhibited symptoms of excruciating pain, until death terminated its sufferings. Post-mortem examination disclosed extensive inflammation of the peritonæum. The abdominal cavity contained a large quantity of dark-coloured fetid fluid; the fat surrounding the kidneys, as well as the kidneys themselves, was in part gangrenous; and the fat generally exhibited a yellow colour, as is usual in cases where death terminates inflammatory diseases." (*Trans. High. Soc.* vol. ix. p. 9.)

REDWING. (*Turdusiliacus.*) This bird is one of the winter visiters to the British islands, which, like the fieldfare, comes to us in flocks from the northern and north-eastern parts of Europe, but with this difference, that they make their appearance earlier in the year than the fieldfare, arriving frequently by the middle or before the end of October. While in this country the redwings inhabit parks and pleasure-grounds that are ornamented with clumps of trees, and, like the thrush, which they most resemble in external appearance, they seek their subsistence in mild and open weather in pasture lands and moist meadows, feeding principally on worms, snails, and other soft-bodied animals. The whole length of this bird is about eight inches and three quarters. The top of the head, the upper surface of the neck, the back, rump, upper tail-coverts, and tail-feathers, uniform clove-brown; chin, throat, belly, and under tail-coverts, dull white, tinged with wood-brown, and streaked longitudinally with clove-brown; sides of the body, under wing-coverts, and axillary

The term *reed* is
applied to the straw
has not been bruise
REED-GRASS.
REED-MACE.
REED-WARBL
REEL. An angle
to the butt of the
winding in the line
The barrel of the re
cient diameter to wi
is often lost by not
rapidly within reac
especially where, as
length of line has
term *reel* is also ap
upon which garden
by which they work.

REGULUS. Th
this little bird, wh
country.

1. The golden cre
(*Regulus amicapillu*
quently to be obser
where these diminu
the smallest among
may be seen all life
from branch to br
them in various pos
their backs downw
sucking various sm
their hidden larva as
ing also a few seeds
remain in this countr
The nest is placed u
and generally tow
bough, being suppor
the laterally diverg
which are interwov
which the outside of

rs brownish black, edged with
llow.

crested regulus (*R. ignicapillus*)
where so numerous as the little
It is about half an inch longer.
ee dark lines contrasting with
oloured lines on the sides of the
crest is large, and of a much
red colour than that of the same
e gold crest. The tail feathers
onger. (*Yarrell's Brit. Birds*,
7—325.)

T, or RUNNET. The pre-
r membrane of the calf's sto-
h has the property of coagulating
en of milk, and converting it
nd whey. The maw is cleaned,
suspended in paper bags. Pre-
its use, the salt is extracted by
e rennet; which is then soaked
r during the night; and in the
e infusion is poured into the
gulate it. This is the result of
juice, which is acid; and acts
aseous part of the milk, in the
er as other acids. It some-
ens that no rennet sufficiently
urdling milk can be procured;
us plants have been advantage-
tituted for this purpose. The
f these are the flowers of the
es' bedstraw (*Galium verum*),
gland, and the cardoon (*Cynara*
), in Spain. A strong infusion
he down of the latter vegetable
ng and on the succeeding morn-
pint is poured among fourteen
new milk, which is thus effec-
ulated, and in consequence pro-
cious cheese. See CHEESE, COA-
CHEESE RENNET.

(*Redditus;* from *redeundo*.) The
ey or other consideration issuing
of lands and tenements paid
upier to the owner. This has
aken the present form of pay-
ney, from a very different origi-
; for, in former days, the land
ly held of the superior lord, by
ices rendered, of either a military
ature, such as carrying out the
re on to his land; certain days
g, digging, or cutting the corn,
landlord; the general adoption
rent or money payment in lieu
bitrary and vexatious tenures,
ance of modern days. To dwell
, however curious and interest-
arch would be, is hardly compa-
he assigned limits of this work.

e.—Rent is not due until mid-
e day agreed upon, per Judge
in *Cutting* v. *Derby*, 2 W. Blackstone, T. R. 1077., "though the rent is demandable at sunset, yet it is not due, nor does the lease expire, till midnight" (1 Saunders, 287., and Lord Kenyon in *Leffley* v. *Mills*, 4 T. R. 173.): "The party bound has, till the last moment of the day, to deliver himself from the obligation by paying." (See also 1 Rol. Rep. 189.) And yet when a tender is to be made, or a demand of rent, sunset is the proper time; but then, as was observed by Judge Gibbs in *Tinckler* v. *Prentice*, 4 Taunton, 554., the person who attends should be there a sufficient time before sunset, to count the money. When rent is reserved generally by an agreement, and no time or manner of payment is mentioned, in that case nothing is due till the end of the year. And when rent is specified to be payable in advance, such agreement should state it to be *always* in advance, otherwise the Court may rule otherwise, as in *Holland* v. *Palsar*, 2 Starkie, 160. And when, by a parol agreement, the rent was to be paid from Lady-day following, evidence is admissible to show that Old Lady-day was intended (*Doe* v. *Benson*, 4 B. & A. 588.); and even in a written agreement not under seal (*Denn* v. *Hopkinson*, 3 D. & R. 507.), where the tenant, who is about to quit his farm, advertises a sale of his stock, the payment of his rent to the end of his term to his landlord, who has notice of the sale, does not raise an implied promise on the part of the landlord to consent to the sale, and the removal of the property. (*Bushley* v. *Fisher*, 3 N. & M. 381.)

Payment of Rent.—There is an implied covenant for payment of rent under the words "yielding and paying" (*Iggulden* v. *May*, 7 East, 237.), and a net rent means the same to be paid to the landlord clear of all deductions (*Bennett* v. *Womack*, 7 B. & C. 627.). No security which can be given to the landlord by the tenant, as a bill or bond, or promissory note, even if the landlord give a receipt for it, will be regarded as payment of rent: he may still distrain for it (*Harris* v. *Shipway*, Buller N. P. 182.; *Curtis* v. *Rush*, 2 Ves. & B. 416), and receiving interest for the arrears is no waiver of the right to distrain (*Sherry* v. *Preston*, 2 Chitty, 245.). When the tenant is directed by his landlord to pay the money due for rent into a bank (*Breed* v. *Green*, Holt, 204.), or remit it by post, and the banker fails, or the letter is lost, in either case the loss falls upon the landlord (*Warwicke* v. *Noakes*, Peake, 67.); but then the letter should be delivered to the General Post Office, or its main branches: it will not suffice to deliver it to a bellman in the street (*Hawkins* v. *Bull*, Peake, 167.), or lay the letter in a place amongst others from

Essex, in 1818. He published the following works:—

1. A Letter to Uvedale Price, Esq., on Landscape Gardening. London, 1794, 4to. 2. Sketches and Hints on Landscape Gardening; collected from Designs and Observations now in the Possession of the different Noblemen and Gentlemen for whose Use they were originally made; the whole tending to establish fixed Principles in the Art of laying out Grounds. Sixteen coloured plates. London, 1795, folio. 3. Observations on the Theory and Practice of Landscape Gardening, including some Remarks on Grecian and Gothic Architecture, collected from various MSS. in the Possession of different Noblemen and Gentlemen; the whole tending to establish fixed Principles in the respective Arts. Many plates. London, 1803, 4to. 4. Observations on the Changes in Landscape Gardening. 1806, 8vo. 5. On the Introduction of Indian Architecture and Gardening. 1808, folio. 6. On the supposed Effects of Ivy on Trees. In the eleventh volume of the Trans. of the Linn. Society, p. 27. 1810. 7. Fragments on the Theory and Practice of Landscape Gardening. London, 1817, folio. In this work his son assisted him. (*G. W. Johnson.*)

RESERVOIR. A conservatory of water. The husbanding of water is now becoming a subject of peculiar interest to the agriculturist. This arises from its scarcity in many districts, in consequence of the improved drainage of the land, and from the many uses to which machinery may be applied in farming operations by the agency of water power. The construction of reservoirs must resolve itself into the following heads:—

First, where a sufficient quantity of water can be diverted directly from the channel of a stream or river.

Second, where the supply is to be obtained from drainage, which maintains a stream during part of the year, but which stream fails during the summer months.

Third, where there are grounds affording a favourable situation for the construction of a reservoir, but through which there is no natural stream passing.

Previous to the formation of a reservoir,

If they are always un
will be found well ca
pose, and it should
of moistened and we
down in layers. No
be given which will ap
construction of reser
necessarily depend o
country supply of w
and from what sour
hints, however, will
volume of the *Highla*
—325. See Ponds a

RESINS. Peculia
of allied properties,
hydrogen, and oxyge
of which is the rosin
sidue after the disti
in order to obtain th
no water is used in t
reumatic, brownish-ye
substance remains, na
ler's rosin; when wat
is the opaque yellow
rosin. When every
evaporated from the
state of fusion at a n
and then allowed to
resin is procured. It
fusible at a modera
and soluble in spirits
and also fixed oils an
heat. The mineral ac
ficial tannin; the alka
in combination with w
pentine and wax, for
furniture. Rosin co
carbon 75·944, hydrog
of the other resinous
copal, *mastic*, *sandara*

root, resisting the harrow's prongs,
e the English name. The stems are
l, though often considerably woody,
rubby, various in length, hairy.
s generally simple, entire towards
base. Flowers mostly solitary, large,
andsome, of a brilliant rose colour.
h's *Eng. Flor.* vol. iii. p. 266.)

IZOMA. (Lat. *rhiza*, a root). A
applied to roots which spread under
d, like those of the iris.

ODODENDRON. (From *rhodo*, a
and *dendron* a tree, because of the ap-
nce of the terminal bunches of flowers.)
rhododendron is decidedly one of the
of all known genera, containing some
e most handsome, elegant, and showy
s; all of which are admirably adapted
r for ornamenting the green-house or
bbery, or for planting singly on lawns.
soil is most suitable to these plants,
they may also be grown in very sandy
getable mould. They are propagated
vers or seeds. The small-wooded kinds
e also increased very freely by young
gs, planted in sand under a glass.
on's *Bot. Dict.*)

UBARB. (*Rheum rhaponticum*, from
spread, and *Rheum hybridum.*) The
st suited to these plants is one that is
rich, deep, and moderately moist. A
eavy or shallow soil never produces
n perfection. The compartment can-
too open.

ay be propagated by cuttings, but the
almost universally practised is by
This should be sown soon after it is
September or October, for if kept
the ground until the spring it will
continue dormant for twelve months;
danger of this, however, is risked, it
be inserted early in February or
. The seeds are best inserted in
three feet apart and an inch deep, the
to remain where raised; for although
will bear removing, yet it always
and somewhat lessens their growth.
they make their appearance in the
, and have been thoroughly cleared
eds, they may be thinned to six or
inches asunder, and the surface of the
d about them loosened with the hoe.
rds the conclusion of summer, when it
e determined which are the strongest
, they must be finally thinned to three
ur feet, or the hybrid to six. They
be continually kept clear of weeds. In
n, when the leaves decay, they are
ed, and the bed being gently turned
a little well putrefied stable-dung
, and some of the earth applied over
ools. In the spring, the bed may be
dug, previous to the plants making their appearance; and as the stalks, when blanched, are much less harsh in taste, require less sugar to be rendered palatable, and are greatly improved in appearance, as T. Hare, Esq., Assistant Secretary to the Horticultural Society, accidentally discovered (*Trans. Hort. Soc. Lond.* vol. ii. p. 258.), at this period a trench may be dug between the rows, and the earth from it laid about a foot thick over the stool. This covering must be removed when the cutting ceases, and the plants allowed to grow at liberty. As the earth in wet seasons is apt to induce decay, the covering may be advantageously formed of coal-ashes or drift sand, which are much less retentive of moisture. Those plants produce the seed in greatest perfection that are not gathered from, but on no account must they be subjected to the process of blanching. Two year old plants often produce seed, but in the third year always. It must be gathered as soon as ripe, and great care taken that none is scattered over the beds, for the plants thence produced often spring up and greatly injure the old plants by growing unobserved amongst them. (*G. W. Johnson's Kitch. Gard.*)

RHUS. (Derived from *rous*, in Greek, which is from *rhudd*, a Celtic word signifying red; alluding to the colour of the fruit and leaves of some species in autumn.) The hardy kinds are rather ornamental, and well fitted for shrubberies; some are propagated by cuttings of the roots, and others by cuttings and layers. The juice of *R. radicans* and *R. toxicodendron* is milky, stains black, and is extremely poisonous. *R. coriaria* is powerfully astringent, and is used in tanning Turkey or Morocco leather. (*Paxton's Bot. Dict.*)

RIB-GRASS. See PLANTAIN.

RICHARD'S PIPIT. (*Anthus Ricardi.*) An occasional visiter to this country. The whole length of the male bird is six inches and three quarters. The plumage is brown, tinged with yellow. For habits, &c., see PIPIT.

RICK. A pile of corn, hay, straw, &c., regularly heaped up in the open air, and sheltered from wet by thatch. See STACK.

RICK-YARD. A term sometimes given to that part of the farm-yard in which the stacks are placed.

RIDDLE. A sort of sieve used to separate dust and the seeds of plants from corn. They are made of various sizes for different uses.

RIDGE. A piece of ground laid up between two furrows, having always considerable length, but different small breadths, according to circumstances.

RIDGLET. A provincial word, used to

RING-DOVE. See Pigeon.

RING-OUZEL. See Ousel.

RINGS, FAIRY. See Fairy Ring.

RINGS IN TIMBER. The concentric layers, by which the wood is formed. See Alburnum, Bark, Liber, &c.

ROACH. (*Cyprinus rutilus.*) This is a well known river fish, which is almost universally distributed, and they breed profusely as well in ponds, weirs, and marshes, as in rivers and lakes. The best season for roach fishing is from autumn until the following spring: they usually spawn in May. The baits used are gentles, worms, and pastes. (*Walton's Angler; Blaine's Rural Sports.*)

ROADS. See Highways.

Macadamization.—This process in road-making, which has received its name from Macadam, consists in forming the road crust of stones, broken with a hammer into angular pieces of a small and uniform size. When the stones of which the road crust is to be formed are broken to the proper magnitude and form, they are spread over the surface of the road in a layer of three or four inches thick. After this has been consolidated by carriages working upon it or by rollers, another layer of broken stones of equal depth is laid upon it; it is consolidated in like manner; and thus one layer is laid over another until an artificial crust is formed of broken stones of sufficient thickness to give the requisite strength to the road.

Mr. Macadam disregarded the nature of the substratum on which his roads rested; and he maintained, that if it was not such a

are to be broken of
the interstices to be
firmly wedged or p
light hammer; so th
is finished, its cross
convexity of surface
in the centre, abov
eighteen feet in the
are to be coated with
stones, six inches de
four must be first pu
by carriages and h
traffic of the road,
stantly to rake in th
has become firm and
After this, the rem
stone may be put
stone, forming six in
sist of pieces broke
ticable into a cubic
magnitude that the
ring of two inches
ameter. The space
middle eighteen feet
broken stone or well
up to the level of
boundary of the ro
whole convexity of
the middle above t
and the whole of the
and consolidated sho
coating one inch an
gravel, free from cla
Dict. of Science.)

ROARING. In
known to jockeys an
usually accompanies
wind. It is general
continued or violent

ET, LONDON. See Hedge- .

ET. (*Reseda.*) There are two is species of rocket or mignonette. r's rocket, or yellow weed (*R.* see Weld and the base rocket or ionette (*R. lutea*), which is found abundantly on chalky hills and ces, flowering in July and August. is rather woody; the stem bushy, feet high, striated and branched. es are deeply three-lobed, lower natifid. Flowers buff-coloured, cented, in clusters. (*Smith's Eng.* ii. p. 347.) See Mignonette.

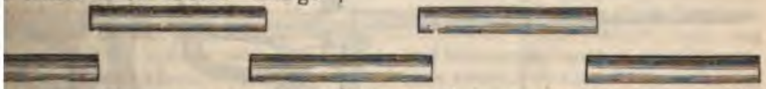
ET, THE SEA. (*Cakile.*) This s of annual plants, of little beauty cultivation. One species, the pur- cket (*C. maritima*), is indigenous, ery common on the sandy sea- wering from June to September. age is smooth, fleshy, bushy, a much branched and spreading in ection; the stem and branches ly twisted and zig-zag, never The leaves are fleshy, pinnatifid, little glaucous, with a saltish bit- Flowers rather large, of a bright ur, densely corymbose. (*Eng.* iii. p. 183.)

PIPIT. (*Anthus aquaticus.*) The t inhabits low flat shores in the f the sea, and the neigbouring salt where it feeds on marine insects. a nest on the ground of dry grass, four or five eggs, which are green- , mottled with ash brown; nine a half long by seven lines and a d. The general colour of the is olive, or yellowish brown. Whole f the bird six inches and three (*Yarrell's Brit. Birds,* vol. i. See Pipit.

ER. (*Coracias garrula.*) In or- , a perching bird, which is an l visitor to our shores. The general colour of the plumage is blue of various shades, tinged with verditer, brown, and black. The whole length of the bird is thirteen inches. The food of the roller consists of worms, slugs, insects in their various stages, and berries. (*Yarrell's Brit. Birds,* vol. ii. p. 195.)

ROLLERS. An implement of simple construction, like the roller, the main object of which is to render smooth the surface of arable lands, would not seem to admit apparently of much variety in its construction. Nevertheless, it is an implement in which greater diversity of form is found to exist than in most other agricultural machines. Rollers are of all sizes, weights, and lengths; and the material of which they are made is occasionally iron, sometimes stone, but most commonly wood. Of these, the first is undoubtedly the best, and particularly for the jointed roller, by which the operation of turning at the ends of the ridges is materially facilitated, and the slading of the earth which would otherwise take place on the head-lands, not only to their great detriment, but to the no small increase of labour to the horses, is thereby prevented.

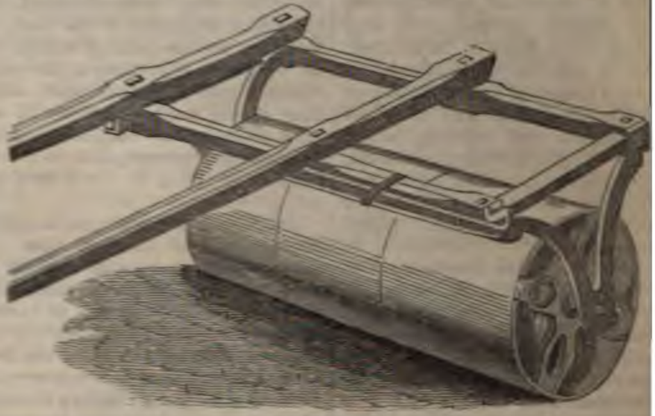
An ingenious gentleman, the late George Booth, Esq., of Allerton, near Liverpool, who to a great love of farming added a very tolerable share of mechanical skill, and to both ample means to carry out his various devices, constructed a roller, or rather a nest of rollers, on the lever principle. He contended for a very small diameter as the most effective in crushing the clods, and throwing the greatest possible weight on the surface of the ground. We regret being only able to give an idea of his invention from memory; but do not think his roller was more than a foot in diameter at the outside. It consisted of five cylinders or rollers, arranged somewhat in this manner.



rollers.— These are not by any modern invention, having been wn to the farmers of Norfolk and or the greater part of a century. improvement they have under- been to render each ring in- t of its neighbour, so that the f turning at the end of the field ted, as in the case of the jointed ready mentioned. The modern rs in other respects have not im- if the doctrine of Mr Booth, noticed, be correct, that a small diameter is better than a large one. The drill roller is used for the double purpose of crushing clods on rough lands, and making grooves ready to receive the seed of wheat or other grain sown broad-cast on light soils. It is a capital tool for either purpose. In the first case it is followed by a harrow, of sufficient weight to lighten up the surface; in the other, the fine short-toothed harrow, or even a mere bush harrow, will be found sufficient. The less such land is disturbed after sowing the better, and the more distinct will be the several rows or grooves of corn.

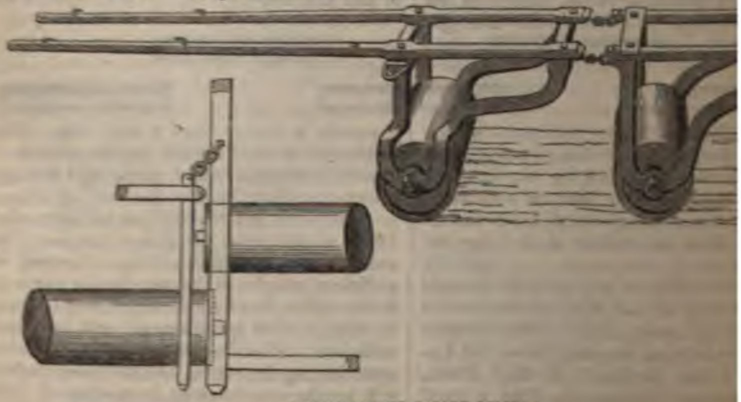
DRILL ROLLER.

Heavy Rollers.—The heavy roller shown in the following sketch, is very effective: it is formed of three separate cylinders, about two feet in diameter, and of the same length; the axis of each being in of the other. On turning they co revolve in different directions, "slading" at the land's end is av



HEAVY ROLLER.

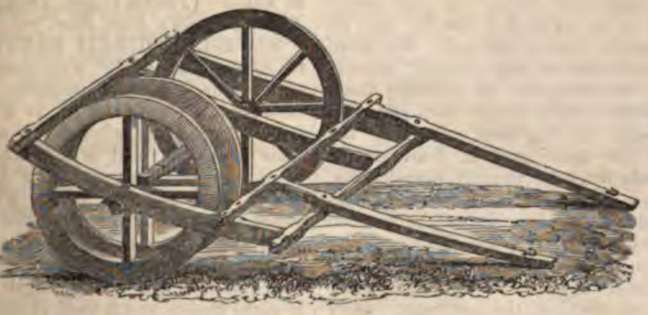
The double-jointed barley roller is a very useful implement. It is so constructed that the two sides being separate rolls or distinct frames, may revolve at opposite angles, and when required one may be placed behind the other. A plan has for many years been in use in Norfolk, of ing them with twisted joints, s under end of one roll shall w the end of the other, thus leavin between the roller.



DOUBLE-JOINTED BARLEY ROLLER.

sskills' clod crusher is under many
istances a valuable implement. It is
sed of a series of iron rings, with
d edges set apart from each other
three or four inches. Small cross
r knives are placed at frequent in-
on the faces of these, and near their
notched rims, so as to intersect every
of land over which it passes. Its
uction, combined with its great
, renders it very effective for the pur-
hich its name denotes. Indeed, as
farming bailiff once aptly remarked,
roll and a harrow combined. The
s an implement which requires some
nt as to the time of its use, and this remark applies with increased force to the one under consideration.

Seam or Land Presser. — If a drill is so effective an implement, far more so is the seam or land presser, inasmuch as its whole force and weight is directed to each individual furrow, as it is turned over by the common plough. The seam presser is in fact an abstract of a drill roller, consisting of but two cylinders of cast iron, which, following in the furrow, press and roll down the newly turned-up earth, and it is more particularly useful when applied to clover stubbles intended for wheat. (*Ransome on Agr. Imp.*)



SEAM PRESSER.

LING. In agriculture, the action
ation of drawing a roller over the
of the ground with the view of
g down the clods, rendering it more
, and bringing it even and level; or
levelling the surface, as in grass lands.
a practice that becomes necessary
on the tillage and grass lands, and
s of much utility in both sorts of
lry. In the former case it is made
with different intentions, as for the
of breaking down and reducing the
and lumpy parts of the soil in pre-
it for the reception of crops. It is
great use in many cases of light
rendering the surface more firm,
nd solid, after the seed is put in.

K. (*Corvus frugilegus.*) The habits
earance of this common and widely
d bird, are so well known that de-
n is unnecessary. It is found in all
ded, temperate parts of Europe, but
bundantly in England and Ireland
ewhere.

s are omnivorous, devouring in each
the kind of food they can obtain in
atest quantity; but they feed princi-
pon worms and various insects, which,
he number of the birds themselves,
e consumed to an enormous extent.
gh there has always been a difference of opinion between farmers as to the question of their amount of usefulness, there can be no doubt that rooks are highly beneficial to the farm, by keeping within due bounds the turnip-fly beetle, the cockchafer beetle, wireworm beetle, crane fly, slugs, grubs, &c. which prey upon and injure the cultivated crops.

The rook lays four or five eggs of a pale greenish ground colour, blotched over with dark greenish brown, one inch eight lines long, by one inch two lines broad. The whole length of an adult male is about nineteen inches and a half. The female is frequently two inches shorter than the male, and has less brilliancy in her plumage. There are many varieties of the bird, and instances have occurred of perfectly white rooks. (*Yarrell's Brit. Birds*, vol. ii. p. 91.; *Quart. Journ. of Agr.* vol. ii. p. 306.; vol. ix. p. 464.)

ROOT. In botany, that part of the central axis of a plant which is formed by the descending fibres, and whose function is to attract liquid food from the soil in which it is mingled. It differs from the stem in not having leaves or buds upon its surface, and in its tendency to burrow under ground, retreating from light; nevertheless, some kinds of roots are exclusively formed in air and light, as in the ivy, and other such plants;

colour of the flowers.) In botany, the English name for the well known and universally cultivated flower of the genus *Rosa*. It is an extensive family, but all of the species love a stiff soil. No roses will thrive in shallow poor ground. Standard roses are obtained by budding them upon vigorous stocks raised from the seed of the hedge or dog-rose, managing the stocks in the same way as fruit stocks. Their heads must be pruned occasionally, to prevent their rambling. The dwarf roses in flower borders should be pruned in January, down to a foot high, cutting out the old and dead wood. They will produce finer flowers. Roses bear their flowers upon wood of the last year. Only the China roses flower upon the shoots of the same year. Roses continue blowing a long time, if the fading flowers are cut off, instead of being allowed to seed. The following roses are very hardy and beautiful, and might satisfy any person who was not an amateur:—Provence, white and red. Moss Provence, white and red. Damask. Velvet striped. Maiden's blush. Monthly roses, white and red. Yellow, double and single. Rose de Manx. Austrian briar. Sweet briar. Chinese. Multiflora. Lady Banks. Hardy climbers are, the Ayrshire rose, single and double. Boursalt, red and crimson. Reversa, elegans. Rosa sempervirens, three sorts. Lady Banks yellow rose. Rosa ruga.

As it would be impossible to give a standard list of the most improved cultivated kinds, owing to the number of superior sorts raised annually from seed, and many of the varieties being annually lost, going out of repute, or entirely changing

late botanical writer
up a considerable po
to name. (*Paxton's*
Shrub.; Smith's Eng

ROSE-COLOUR
tor roseus, from *past*
man: this bird wa
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seen in company w
This beautiful bird
visiter to our shor
wings, and tail ar
violet blue; the feat
gated so as to form
back, rump, breast,
rose colour. The w
is eight inches and
Birds, vol. ii. p. 52.)

ROSE, JOHN,
gardener of his time
time Switzer publis
1718. He wrote,

1. The English Vineya
making Wine in France.
This first appeared at the
dener in 1672. 12mo. 2.
This is mentioned by Swit
seen. (*G. W. Johnson's H*

ROSE, GUEL
Rose.

ROSEMARY.
From *ros*, dew, and
account of its mariti
implying " the dew
are three varieties
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the one in general
thrives best on a
which there is a mix
other calcareous ma
the plants are self-

g any of the spring months, or by
s during the summer. But the finest
s are raised from seed, which, indeed,
by layers, is the only mode of pro-
ing the gold and silver-striped va-
s practised. The sowing must take
in March or early in April. (*G. W.*
on's Kitch. Gard.)

SEMARY, THE WILD. See AN-
EDA.

SE-ROOT. (*Rhodiola.*) The moun-
rose-root (*R. rosea*) is an indigenous
nial plant, found growing in the fis-
of alpine rocks or maritime cliffs. The
is thick and rather fleshy, much di-
at the crown; the cuticle grey and
th like satin. When recently dried,
whole has an agreeable scent, resem-
rose-water. The herbage is succu-
smooth, and glaucous, about a span
Cyme of many yellow flowers with
h anthers. (*Smith's Eng. Flor.* vol. iv.
6.)

SIL. A provincial term applied to
which is neither light nor heavy, being
dium between sand and clay; it is
times written rosills.

SIN. A well-known substance, pro-
by the distillation of turpentine.
ESIN.

T. In farriery, a disease in sheep
ther animals, in which both the liver
ungs are affected, and there is com-
a dropsical tendency. Its ravages
iefly, however, confined to sheep, and
ost commonly closely connected with
of moist food, or placing these ani-
in low, wet situations, every way
n to their natural habits; for sheep,
state of freedom, seek the most ele-
, dry, and heathy situations — an in-
which long imprisonment and do-
cation has not yet eradicated: every
r is aware with what tenacity his
adhere to the very highest portions
field. It is only when we force them
habit low grounds, and situations
n to their habits, that they thus be-
diseased. In a state of nature too,
browse upon the heath plants, and
with avidity at certain periods salt
gs and salt exudations, facts which
not entirely escaped the notice of
rn flockmasters. Thus the argali or
sheep of Siberia, which are the pre-
d origin of all our domestic sheep, are
about the size of the fallow deer, on
mmense chain of mountains reaching
gh the middle of Asia to the Eastern
They are found in small flocks,
over the highest elevations. As the
pproaches, they move downwards
plains, and exchange their food from the mountain plants to grass and other vegetables. They are so partial to salt, that they scrape away the earth in considerable quantities in the neighbourhood of saline places in ordere to procur it. All animals in fact seek salt with the greatest avidity. The shawl goat of Thibet (*Dr. Macculloch*); the rein deer of Norway (*Von Brech*); the gyall, or bos frontalis of Aracan (*A. B. Lambert*); the horses and mules of Mexico (*Dr. Paris*); the cattle of Buenos Ayres; the Merino flocks of Spain (*Lord Somerville on Sheep*, p. 97.); the sheep of Flanders, whose owners *deem its use an effectual prevention of the rot* (*Minutes of the Salt Committee*, p. 119.); all are fond of salt, and there is very considerable reason to believe that by the use of this valuable condiment, the ravages of this dreadful disease might either be very materially modified, or perhaps entirely prevented.

Many years since, Ellis, in his *Practical Husbandry*, recommended the use of salt, mixed with wort, in which had been boiled sage, penny-royal, wormwood, shepherd's purse, comfrey, &c. as a prevention of the rot; seven or eight spoonsful was the dose, once a week after April, whenever the weather was wet.

More than three centuries since, Fitzherbert, the earliest of the English agricultural writers, alluded to this dreadful disorder in his "Boke of Husbandry," and in his section entitled "What thynges rotteth Shepe," he says, "It is necessary that a shepherde shoulde knowe what thynge rotteth shepe, that he myghte kepe theym the better. There is a grasse called sperewort, and hath a longe narrow leafe lyke a spere heed, and it wyll growe a fote hyghe, and beareth a yellowe floure in lowe places where the water is used to stande in wynter. An other grasse is called peny grasse, and growethe lowe by the erthe in a marshe grounde, and hath a leafe as brode as a peny or two pence and neuer beareth floure. All manner of grasse, that the lande floudde runneth ouer, is very evylle for shepe, bycause of the sande and fylthe that stycheth uppon it. All moorish grounde and marsche grounde is yll for shepe. The grasse that groweth upon falowes is not good for shepe, for there moche of it wede, and ofte tymes it commeth uppe by the rote, and that bryngeth erthe with it, and they eate both, &c. Myldewe grasse is not good for shepe, and that ye shall knowe two wayes: one is by the leaves on the trees in the morninge and specially of okes; take the leaves and putte thy tongue to them, and thou shalt fele like hony uppon them. And also there wyll be many kelles upon the grasse, and that causeth the myldewe, wherefore

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ould appear to confirm the very common suspicion that it is not *the grass* which rots the sheep, but the gaseous or aqueous vapours which emanate from such places, more copiously as the weather becomes warmer in the summer; but then *against* such a conclusion we have the fact well known to owners of the water meads, that when sheep are soiled even upon fine dry elevated soils, (such as never render sheep rotten,) with the *second* crop of grass from water meads — that then the sheep become as equally rotten, as if they d been pastured on the very meadows from nce the grass was carried. It would seem, therefore, that there are more watery matters, or other sources of disease in the second crop than in the first.

That the grass of the second crop varies very materially in its chemical composition from that of the first, has been clearly shown by the analysis of the late Mr. George Sinclair. He found that rye-grass (*Lolium perenne*) at the time of flowering, taken from a water-meadow that had been fed off with sheep till the end of April, afforded of nutritive matter 72 grains. The same grass from the meadow that had not been depastured in the spring, afforded 100 grains. The same weight of this grass, taken from a rich old pasture that had been shut up for hay about the same time, afforded of nutritive matter 95 grains. That from the rich pasture that had not been depastured, afforded 120 grains. (*Hort. Gram. Wob.* p. 384.) And in the great majority of instances, the aftermath of the upland grasses is considerably less rich in nutritive matters than that of their first or spring crop.

Such then are the supposed causes, symptoms, and treatment recommended for the cure of this disease. For the cure, both turpentine and common salt seem to have sometimes been successfully used. But the effect of salt seems to be much more decided when employed as a *prevention* rather than a cure. As a preventive too, the use of aromatic vegetable substances seems to be excellent. It is the kind of prevention also which might be supposed to be efficacious from following the order of nature, and observing the habits of the sheep in their wild state, browsing as they invariably do upon the aromatic plants, and the shoots of mountain shrubs; and never descending to live upon the rank and watery grasses of the valleys, until compelled by the severity of the weather. Every farmer is aware with what avidity they consume such domestic herbs — the parsley for instance — as abound in essential oils. An attempt has indeed been recently made to cultivate this herb in the fields as feed for

The symptoms of the rot, and of some of its most decided remedies, have been thus described by Dr. Brown of Boston (*Mag. of Nat. Hist.* vol. v. p. 98.), "It cannot, I conceive, be demonstrated that in this disease the bile is thrown back upon the system, and mingles with the circulating fluid; for in the early stages there is no obstruction to the bile; and in the latter, what little is secreted is intercepted by the flukes on the hepatic side of the gall-bladder. The eye, which some persons take to be an index to the bilious condition of the system, has really not that 'tinge of yellow and jaundiced-like appearance' at the commencement of the disease. On the contrary, the peculiar whiteness of the eyes is the first symptom which guides the shepherd to the unwelcome truth. If the bile ducts be carefully examined in the earliest stage of the complaint, there will be found a few flukes in the duct which conveys the bile from the gall-bladder to the intestine, but none in the gall-bladder, and none beyond it, a sound liver, no 'tubercles,' no 'abscesses,' and withal a fine fat healthy-looking carcass. If it be in the latest stage when the examination is made, the gall-bladder will be found filled with flukes instead of bile: and the animals will be seen making their way up those channels which convey the bile from the liver to the gall-bladder, arresting it in its course, and pressing forward and enlarging the biliary tubes. Thus, when but few of these animals have possession of this viscus, its function is not materially impaired; the parenchyma, or substance of the liver, is unaltered in appearance; the mucous channels, which convey the bile to the gall-bladder, and from

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nd Hungerford, *never rot the*
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ROT IN TIMBER. It has been noted, that wood saturated with common salt is never subject to this disease. Mr. Bethel has proposed a plan for its prevention, by saturating the wood with coal-tar. Mr. Ryan uses for the same purpose a solution of corrosive sublimate (muriate of mercury). Sir W. Burnet employs a solution of muriate of lime. (*Quar. Jour. Ag.* vol. vi. p. 145.; vol. xi. p. 127.) See **Dry-Rot.**

ROTATION OF CROPS. The order in which different crops are made to succeed each other. It was only towards the middle of the last century, that the importance of a scientific rotation of crops began even to attract the farmer's attention. Previous to that period we search in vain in the works of agricultural authors for the slightest notice of such a theme. The writers before those days, as Arthur Young noticed, recited courses of husbandry, good, bad, and execrable, exactly in the same tone as matters not open to praise or censure, and unconnected with any principles that could throw any light on the arrangement of the farm, or its more successful cultivation. And yet it is on this difficult part of the farmer's business being scientifically pursued, that much of the profits and advantages which he is to derive from his land for a course of years must depend. Arthur Young, the most popular and the most rapid of observers, saw the importance of this difficult inquiry in its true light: he correctly enough told the farmers of his day, that whenever very good or very bad husbandry is found on arable land, it is more the result of a right or wrong ar-

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The farmer too is
tain crops never pros
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'our to understand, if possible,
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e, has long engaged not only
of the most sagacious farmers,
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these it has been regarded
points of view. First, it has
ed, that as each plant has pe-
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till that such impure water
be more grateful than clear
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that certain plants and trees
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nonly planted the elm as the
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every farmer is aware, amongst
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eplace old quick-hedges with
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There are some soils for in-
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nerica, for instance, have pro-
nt wheat crops for even twenty
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of the lower portion of the
Thames have yielded alternate
at and beans from time imme-
by the addition of manure, the
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r a series of years. There are
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eadily be remembered by the
rmer, which do not seem to
assimilate entirely with this mode of removing the difficulties of the case.

The other way of explaining the reluctance with which a crop follows another of the same description is, by supposing that each kind of plant has some peculiar and essential ingredient which it absorbs from, and in a great degree exhausts the soil, and that it is, therefore, only after a lapse of some time, when that ingredient or those ingredients are restored by the application of manure, or by other modes, that the same plants can be again profitably cultivated. To a great extent this theory is not only a very plausible but a very probable and reasonable explanation of the difficulty. Thus the farmer is well aware that certain soils on which red clover formerly grew very successfully once in four years, will now only yield any profitable degree of produce of the same plant once in eight or once in twelve years. The excretory powers of the plant in this instance, therefore, are useless in explanation of the difficulty; for according to that theory, the excretory matters which long were successfully dissipated or absorbed by other plants in the course of four years, should do so in our age just as well as in a former period. But if we admit what has been not only sometimes, but very often clearly proved to be the case, that the soils which are thus reluctant to produce red clover, are now totally exhausted of sulphate of lime (gypsum)—that moreover, every fair average crop of this valuable grass contains from one to two hundred pounds weight per acre of this salt—and that by dressing the land with this manure, in almost *exactly the same proportion* and quantity as that which is contained in the clover, that then the land will again grow the very same crop once in four years; when these and other similar facts are proved, the very strong probable conclusion to which we must arrive is apparent, viz. that the clover had gradually exhausted the land of an essential ingredient which only needed to be restored to it, to enable the clover again to flourish with its wonted vigour. And this is not a solitary instance: thus marine plants will only grow successfully in inland situations, where common salt is added to the soil. The sun-flower and the nettle need in an equal degree the assistance of saltpetre. The presence in the soil of phosphate of lime (the earthy salt of bones) is equally essential to the vigorous growth of almost all the grain crops.

Then again, there are other facts of a different nature well known to the farmer, which appear to lead us to the same conclusion; for instance, every cultivator is vestigations, seems, at least in many instances, to be the case. Thus, M. Saussure, in his chemical researches, has shown by the results of his analysis, that the ashes of the plants of peas (*Pisum sativum*), when green and in flower, contain only 17·25 per cent. of phosphate of lime, but that, when ripe, they yield 22 per cent. And again, that the ashes of plants of vetches (*Vicia faba*), which yielded only 13·5 per cent. of the same salt when in flower, contain 17·75 per cent. when they are ripe. The same result was obtained from other plants: the *Solydago vulgaris* for instance, which yielded 8·5 per cent. of phosphate of lime when first in flower, contained 11 per cent. when ripe. The turnsole (*Helianthus annuus*), which afforded only 6 per cent. when flowering, contained 22·5 per cent. when ripe. The wheat plant, which held 10·75 per cent. in flower, contained 11·75 when ripe. The ashes of the straw of wheat were found to yield only 6·2 per cent. of this essentially present salt, but its *seeds* held 44·5, and its *bran* 46·5 per cent. of it. M. Vauquelin obtained a result somewhat similar in his examination of the ashes of the oat plant; the seeds affording him 39·3 per cent. of phosphate of lime, but when he burnt the whole plant, seed and stalk together, he then found only 15 per cent.

The evidence, therefore, in favour of the absorbent theory, is certainly rather stronger than that in support of the excretory mode of explaining the phenomenon. Yet, in all probability, both causes may contribute to produce the effect. Davy, the chief of modern chemists, adopted the former mode of explaining the reluctance with which a crop grows for two years successively on the same land. (*Lectures*, p. 357.) Changes of

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			Acres.
1. Turnips	-	-	- 20
Fallow	-	-	- 20
2. Barley	-	-	- 20
Oats	-	-	- 20
3. Seeds	-	-	- 20
Tares fed off		-	- 20
4. Wheat	-	-	- 40

There are endless variations, however, of this system, varying in their course from that practised in some of the heavy rich Essex soils of a two-shift system: viz. 1. wheat; 2. beans; 3. wheat, with an occasional fallow. And that more extensively used in the hundreds of that great agricultural county, of a five-shift system of fallow: 1. oats; 2. clover, dunged; 3. wheat; 4. beans; 5. wheat. To the nine-shift system of husbandry sometimes practised, which is about the longest course with which I am acquainted, viz.

20 acres fallow, or turnips manured.
20 acres oats or barley.
20 acres clover.
20 acres wheat well hoed.
20 acres winter tares, sheep-fed.
20 acres wheat, hoed.
20 acres seeds, sheep-fed.
20 acres, 15 of beans and 5 of peas, dunged.
20 acres wheat, hoed.

The following course, which takes in every valuable crop, without in any instance violating the rules that science directs, seems to me the best, and is recommended by a Norfolk farmer for most clays not too wet. Say for a farm of 350 acres — 100 acres of green crops, such as cabbages, turnips, rape, and tares, adapting the green crops to the nature of the land; 50 acres of peas or beans; 50 acres of barley or oats, laid down with clover; and 100 acres of wheat.

You will by this course have every year 200 acres of corn, 50 of clover, and 100 of green crops, thus saving your land from exhaustion by too frequent repetition of crops of the same genus. And white crops will in no instance succeed each other. The wheat stubbles are in this way sown with green crops to be followed by fifty of barley and fifty of beans or peas; the barley sown with clover and followed by wheat, which will thus be 50 acres on clover, and 50 on the bean or pea stubble, taking care that the 50 acres of green crops, followed by beans or peas, when next coming in course for green crops, shall be sown with barley and clover, as by this means the clover comes only once in seven years.

In whatever point of view, therefore, the farmer examines the rotation of crops best adapted to his land, the more highly interesting does the investigation appear. Long observation and the practice of ages
have convinced the best Eng
vators that sooner or later the s
of or exhausted of something ess
luxuriant produce, by a repetiti
same crops; that the richest mea
dually decrease in their produce;
become "clover sick;" and it is
pretty generally suspected, that t
in many districts gradually gettin
turnips. To the examination, th
this great question, let every far
tribute his mite of practical obse
it is a theme whose investigation
yielded a rich harvest to Engl
culture, for amongst its fruits
numbered the introduction of tu
mangel-wurzel, and other green c
examination led to the adoption of t
shift system, and the banishment
which for ages rested on the misera
of one crop and a fallow. It is idle
fore, to contend that nothing more
effected by change of crops; for th
rience of all periods is against so indo
so erroneous an assumption. Let th
only remember what has been accom
by the mere introduction of the
plant; what thousands of acres ha
brought into cultivation by its me
how many mouths are fed by the i
fertility of the land produced by th
tion of that four-shift system of rot
which it is the first crop. Let hi
to mind what superior crops are n
duced by the adoption of new s
novel courses, to those which a centu
tenanted the lands of merry Engla
he will then see abundant reason f
and for an energetic perseveran
course of discovery, which has alre
dered such an abundant harvest to
cellent cultivators of our soil. (*Bri*
Mag. vol. v. p. 319. See M. Bousin
the "Rotation of Crops," *Quar. Jo*
vol. x. p. 251.; Mr. Morton, *Jour. R*
Soc. vol. i. p. 388.; Mr. Towers, *Ibid*
also *Quar. Jour. Agr*. vol. xi. p. 51
Com. Board Agr. vol. iv. p. 150.)

ROWAN-TREE. (*Pyrus au*
The quicken tree, or mountain-ash,
sometimes called, is a handsome
slow growth, with a tough, cross-
not very hard wood, indigenous
mountains, woods, and hedges. Th
are pinnate, scarcely a span long, co
of leaflets, uniform, serrated, smoot
flowers, which appear in May, are
rous, in corymbose panicles, with
downy stalks; their petals are
and exhale a slight almond-like sm
fruit is globose, scarlet, very juicy, a
bitter. They are eagerly devoured b
of the thrush kind. The fruit, als

RUNT. A name given to a small kind of black cattle brought from Wales and Scotland. See CATTLE. It is also a term applied to several species of pigeons; as the Leghorn, Spanish, and Friesland runt.

RUPPIA. (Named after H. B. Ruppius, a German botanist.) The sea ruppia, or tassel pond-weed (*R. maritima*), is an indigenous aquatic plant, found growing in salt-water ditches in various parts of Britain. The herbage is submersed; the green flowers appear in August and September. (*Smith's Eng. Flor*. vol. i. p. 237.)

RUPTURE-WORT. (*Herniaria*) There are two indigenous species of this uninteresting genus of herbaceous plants. The smooth rupture-wort (*H.glabra*) grows on gravelly or sandy ground. The root is tapering, somewhat woody, and perennial. Stems prostrate. Leaves obovate or elliptical, stalked, and with the calyx quite smooth. Flowers small, green, in dense clusters. The herbage is rather saltish, astringent, and diuretic; the juice is said to remove specks from the eyes. The hairy rupture-wort (*H. hirsuta*) is a more rare species, and has the leaves and calyx hairy, and the stem is always rough. (*Smith's Eng. Flor*. vol. ii. p. 8.)

RUSH. (*Juncus;* Linnæus derived the name from *jungo*, to join; in allusion to the first ropes being made from rushes.) This is an extensive genus of coarse plants, many of them aquatics, which are common on most wet lands. Rushes always intimate a deep rich soil, and thrive best in land which is too cold and wet for other plants. The growth of these plants may be easily prevented by under or surface draining, which will prevent the stagnation of water on the soil: and by the application of saline or cal-

ture; 5. Of rye an
agriculture; 6. Of
maize and the vine
silk-worm, and the
principal portion of
debted to a paper i
Agr. vol. vi. p. 497.,
sian statesman.

The region of ice
Nova Zembla, part of
and those extreme
the empire which ex
Ocean. This region
night of three month
destitution of vegeta
circumstances render
permanent habitatio
mestic animals.

2. The mossy reg
frozen ground is c
greyish moss, and t
of the following regi
brushwood and fir.
by nature with an a
it habitable to man,
deserts stretch from
shores of the Whit
Ocean; peopled by
madic tribes of L
Ostiaks, and other a
bers are gradually d

3. The region of
"By degrees the d
wood of the mossy
until we come to
where the hand of
turbed the majestic
Along the banks of
spots unincumbered
shoots up with ast
the lingering frosts

ed people, chiefly dependent
for support. It would be
rk with precision the southern
this region, as it falls gra-
e next."

on of barley, and the begin-
alture. "On account of the
the summer, and the early
sts, barley is the only grain
altivated here, but with great
kinds of vegetables may be
aturity. The inhabitants are
as, Lirians, and others, having
tions; but from the insigni-
ir agriculture, they have re-
zing, fishing, and the chase,
ber, &c. In some parts, how-
overnments of Archangel and
to be found a very superior
ed cattle. The southern limits
may be said to extend nearly
Yarensk in the government
Nature here assumes an im-
immense forests, vast rivers,
dows, are here flourishing in
stible luxuriance of primitive

on of rye, flax, and of settled
extends from the limits of
outhward, to the middle of
nt of Tchernigov, or to the
ee of northern latitude. The
scow may be called the me-
Russian climate, and is ex-
ourable for all agricultural
wards Siberia the seasons are
clement: while to the west-
the Dnieper and Dwina, they
hat about Grodno and Bay-
and pears grow in the open
opean part forming one im-
but little diversified by hills
rable elevation, the local dif-
nate is not considerable, and
from the forests, bogs, and
the soil. Agriculture in this
ost without exception con-
e most primitive and unim-
called the *Trekpolnia* or
tem. In the Baltic provinces,
siderable progress has been
troduction of improved rota-
"

ion of wheat and fruit. "It
nferred from this appellation
oductions of the soil do not
last-mentioned region, but
ey are much more abundant
the climate is more favour-
growth. This region may be
to Yekatermoslav, or to the
degree of latitude. Several
n, as buckwheat, millet, &c.
are cultivated here with much greater success than in the last described region. The cultivation of tobacco, although it exhausts the soil, is rapidly spreading. Hemp is also found to thrive better than in more northern situations; but the chief object of the agriculturist is the breeding of cattle. Studs of horses and sheep farms exist here as separate establishments, but the breeding of horned cattle is generally connected with husbandry, and on a much larger scale than in the northern provinces. Bee-hives are also a source of no small profit, especially to the peasants. On a great portion of this district, called *steppes*, which is composed of a hard and arid soil, devoid of trees, a miserable kind of cultivation is adopted, called the *perelog* plan, which consists in sowing corn on fresh land, until its productive powers are exhausted, and then abandoning it for another portion of the waste." See STEPPES.

7. The region of maize and the vine. "It produces also all those crops common to the last described. The vine, as it is well known, thrives only in certain climates and situations, and Indian corn is not to be considered as an exclusive product, but rather as a distinguishing feature. This region includes Bessarabia, the new Russia, the territory of the Don Cossacks, the government of Astracan, and the Caucasus. It consists chiefly of steppes, partially used as pasturage, and partly unproductive. The Crimea belongs rather to the next region. The hilly parts of Bessarabia are fruitful and well supplied with wood. The low lands are steppes, which towards the Danube are covered with reeds, and the air unwholesome. The government of Cherson presents a vast plain intersected by deep narrow ravines or dells; the soil is hard, exposed to frequent droughts, and consequently to bad harvests, besides which it is at times (as well as other parts of the seventh region), subject to the ravages of the locust. The government of Voronesch and the territory of the Don Cossacks are steppes, all capable of cultivation; that of Astracan has a sandy soil, affording scanty pasturage, and the vine is cultivated in the Asiatic manner by irrigation, which renders its fruit unfit for wine. The northern part of the Caucasus is principally sandy, interspersed with saline tracts and rivulets. Breeding of cattle is carried on to great advantage by its Nomadic tribes. The principal defect of this region is the almost total absence of forests, and the great difficulty of rearing trees: thus for want of wood, the inhabitants are obliged to burn reeds, *Buyan* (high grass), straw, and *Kizyak* (dried cow-dung), which practice

then the beginning of vegetation, where nothing but pasturage for cattle is found; then follow the corn-fields; below them flourishes the vine and the mulberry, while still lower, especially in the Persian provinces, grow cotton, rice, and other southern productions, which require artificial irrigation, an operation familiar to the inhabitants of Asia. The olive thrives chiefly in the western part. The sugar cane has been planted, and is spreading in some of the low and rich lands about Kura. Silk may be said to be indigenous to the country."

RUST. In agriculture. See Mildew.

RUSTBURN. A provincial name for the weed rest-harrow.

RUTA BAGA. See Turnips.

RYE (*Secale cereale;* Germ. *roggen, dut rog*). This species of grain is much more hardy, but incalculably less valuable in every respect than wheat. It has been cultivated from time immemorial, and is supposed to be a native of the Caspian Caucassian desert. With us it is very little used as an article of food compared with wheat and oats, though in the north of Europe, and in Flanders, it forms a principal article of human subsistence, but generally mixed with wheat, and sometimes also with barley. The grains consist of 65·6 of meal, 24·2 of husk, and 10·2 of water. The preparation and culture of rye are essentially the same as for wheat; but the same quality of soil is not equally suited to each. Rye grows most luxuriantly for feeding when sown on hazel mould, but any poor dry sandy soil is fit for its production. It is sown either broadcast or in drills, in the autumn or spring; but the spring variety is that most hardy and most generally cultivated. The pro-

green food for sheep
able for its early pr
ing a flow of milk in
is highly esteemed fo
thatching and litter
stuff horse-collars. (*L*
Doyle's Pract. Husb.)

RYE-GRASS or
lium perenne). Ther
ference of opinion
and comparative val
produces an abunda
easily collected and
most kinds of soil u
different managemen
perfection, and produ
growth a good supp
which is much liked b
have no doubt upheld
in practice, and will p
to come continue it
many farmers. Bu
rye-grass is very in
plant impoverishes th
if the culms, which
touched by cattle, a
seed advances towar
spike of the *Lolium p*
lyx shorter than the
ceolate. The varieti
very numerous, such
grass (var. *tenue*);
spiked rye-grass (var.
rye-grass (var. *ramo*
(*Russellianum*); Whi
worthiensis); Stickney
panicled rye-grass (
flowered rye-grass (*m*
rye-grass (*viviparum*)
a strong tendency to

ed such; and it is only of late years
y other species of the natural grasses
en tried as a substitute for it in
; artificial pastures. One peck of
ss with fourteen pounds of clover
e is generally considered sufficient
ing artificial pastures. Rye-grass,
ot more than three years old, flowers
econd week of June, and ripens the
about twenty-five days after: as
nts become older they flower much
ometimes so late as the beginning of
. (*Sinclair's Hort. Gram.*) See
s.

riety called the Italian rye-grass was
ime since brought prominently into
and is well spoken of. See notices
the *Trans. High. Soc.* vol. iv. p. 28.,
Lawson, vol. vi. p. 478., by Captain
on. Sir John Hall (*ibid.* vol. v.)
nishes some memorandum of experi-
n growing different varieties of rye-
One species of rye-grass, the bearded
(*Lolium temulentum*) is poisonous.
annual, and flowers in July. The
downy and fibrous; the culm leafy,
, about two feet high, with leaves of
t green, rough in the under disk.
ke is a span long, and roughish. The
f the flowers linear, flattish, many-
rising above the spikelets. The
are six, with the outer valve of the
elliptical, concave, with a dorsal
The seeds are elliptical, flattened, and
ed with a furrow along its upper
(*Smith's Eng. Flor.* vol. i. p. 174.)
RNEL.

YT (Arab. a subject). The name
the cultivators of the soil in India.
NDOSTAN.

S.

CHARINE. A term applied to
ibstances as contain sugar. The
n which this substance is abundant
general highly nutritious and useful
attening of animals. See MOLASSES
GAR.

KS. The term sack, in the sense of
is found in all the European and
Asiatic languages. The utility of
well-made sacks for holding grain
er produce of the farm must be self-
; and a number proportioned to the
of the crops and amount of pulse,
c. conveyed to market, should al-
kept on the farm, stored away in
y airy place.

FRON. (*Crocus sativus.*) The
a of this purple crocus are of a deep
colour, and when in quantity have a peculiar and very characteristic odour; they are used in medicine, chiefly as a rich yellow or orange-colouring matter. Saffron is now chiefly imported from the south of Europe, especially Spain; it was formerly much cultivated in this country in the vicinity of Saffron Walden, in Cambridgeshire.

Saffron is often largely adulterated with the petals of other plants, especially with those of the marigold. The English saffron is superior to that brought from Spain. It should never be compressed into cakes, but the stigmata left in a dry shrivelled state, or, as it is termed, hay saffron. Where the stigmata are pale the saffron is bad. Saffron, as a medicine, is of little value. See CROCUS.

SAFFRON, THE MEADOW. See COLCHICUM.

SAGE, GARDEN. (*Salvia officinalis.* From *salveo*, to be safe, on account of the sanative properties with which it was supposed to be fraught.) Sage is now used principally in culinary preparations. There are several varieties, as, 1. The common green. 2. Wormwood. 3. Green, with variegated leaves. 4. Red, with variegated leaves. 5. Painted, or parti-coloured. 6. Spanish, or lavender-leaved. 7. Red. A dry, moderately fertile soil, is best suited to their growth, in a rather sheltered situation. If the soil is rich, or super-abounding in moisture, they grow luxuriantly, but are apt to perish in winter. Sage is propagated by cuttings of the young shoots from the sides of the branches, sometimes also by rooted offsets, and likewise by seed. The cuttings may be either of the preceding or same year's growth; if of the first, they may be planted in April, but of the latter, not until the close of May or middle of June. The shoots of the same year are usually employed, as they more readily emit roots, and assume a free growth. The outward and most robust shoots should be chosen, and cut from five to seven inches in length. All but the top leaves being removed, they must be inserted by the dibble almost down to these, in rows six inches apart each way. Sage was formerly much used in medicine, but time and observation have diminished its celebrity. The line "cur moriatur homo cui salvia crescit in horto," is no longer an adage. (*G. W. Johnson's Kitchen Garden.*) See CLARY.

SAGE, JERUSALEM. (*Phlomis fruticosa*, from *phlogmos*, a flame, the down being used for wicks.) A hardy evergreen shrub, native of Spain and Sicily; growing three or four feet high, and blowing a yellow flower from June to September. It grows well in any soil, and may be pro-der, which is mixed with water and strained through a sieve. The sago is deposited from the fluid, and after two or three washings it is fit for use, and is called in this state, when dried, *sago-meal*. For the European market it is made into a paste and granulated, and is known in the trade under the name of pearl sago. The consumption of sago has undergone an almost incredible increase within the last twenty years, which is wholly ascribable to the reduction in the interval of the oppressive duties by which the article was formerly loaded. Sago has latterly been brought prominently into notice as food for domestic animals usually reared upon the farm, particularly horses and calves. Experience having decided in favour of its wholesomeness and economy, it will no doubt very soon become a general and staple article of food on all farms that rear young stock. From its emollient and nutritive properties, it appears to be admirably adapted for calves while on milk; for cows sometimes before and after calving; for young horses in winter, instead of much dry corn, or none at all, as is too frequently practised; and for young pet lambs, whose mothers have either died or forsaken them, in which events a serious encroachment is apt to be made on the milk intended for the calves. Sago seems peculiarly well adapted for horses for fast work, and for sporting dogs, since it is found to leave the wind unaffected; and with regard to fowls, the whole class of them might be rendered by it much more white in flesh and delicate for the table, than the food usually allowed them on farms.

Sago is most commonly used in a gelatinous state, and it is easily reduced to that

son's Domestic Econ
It is only moderatel
chiefly of starch; ye
may be termed the
of the Mollucca isla
of Science; Quart.
p. 136.)

SAINFOIN or S.
dysarum Onobrychis.]
introduced to the far
plant brought its Fr
foin along with it;
which it was before
England, is become ol
sainfoin are recumbe
in length; leaves pi
flower-stalks axillar
than the leaves, each
ing spike of handson
flowers. The fruit
single-seeded, toothe
ribs. Sainfoin is a
cultivation as fodde
barren, especially cha
in open situations. I
well except the soil or
sainfoin is not gene
country; it is most
on the Cotswold Hi
soils of Surrey, Dor
Its nature, qualities
similar to those of Lu

SAINT JOHN'S-
WORT.

SAINT PETER'S-
WORT.

SALAD, CORN.

SALLOW. The co
species of *Salix*, whic
under the name of o

LOW-THORN. (*Hippophäe*, from
a horse, and *phao*, to destroy; in
ce to the supposed poisonous qua-
f the seeds.) The species are mostly
ntal trees or shrubs growing in any
n soil, and may be readily increased
ers or cuttings of the roots. The
n sallow-thorn or sea buck-thorn
amnoides) is a bushy rigid shrub,
t or more in height, with hard wood,
aight spreading leafy branches, each
ating in a thorn. The shrub is
ve, being found growing wild on
liffs on the eastern coast of England.
aves are linear-lanceolate, scattered,
ous, one inch and a half long, on
talks, dark green on the upper side,
ly dotted, beautifully silvery as well
beneath.

MON. (*Salmo salar*; Fr. *Saumon*;
lmon.) This well-known fish belongs
mily, which frequents both salt and
waters, quitting the former in the
for the purpose of depositing its
in the gravelly beds remote from the
of rivers. Towards autumn, they
resort to the ocean. The largest of
lmonidæ is that at the head of this
namely, the common salmon, (S.
It is found in all the Arctic seas,
e it enters the rivers in spring, at
nt periods, according to their con-
for spawning. It is curious that
issuing from lakes always yield earlier
than other rivers; but the northern
are the earliest. The female ascends
vers before the male, and the *grilse*,
ng fish, that have never spawned
ascend earlier than the old fish. As
awning season advances, they ascend
n impetuosity which is surprising,
ming all difficulties, stemming rapids,
aping up cascades of ten or twelve
height, in order to gain, instinctively
ted, the shallow upper pools, where
eposit the spawn. They turn up the
with their noses, working up the
; they then come together in the
which they made, and both male and
shed the spawn and milt into it at
me time. After this process they are
condition, the female being known as
and the male as a *kipper*, and unfit
e table. They do not recover their
condition until they return to the
ater, at the mouth of the river, and
tely to the sea. These fish are
t in great numbers in the British
d islands, and varying in weight from
to seventy pounds. The London
t is principally supplied from the
and Irish rivers.

mon fry, when they attain to about five or six inches in length in May, are called *smelts*. When they have grown to fifteen or sixteen inches they are called grilse or grilses. Among the varieties of the salmon, are the salmon trout (*S. trutta*), the great grey or lake trout (*S. ferox*), the phinock (*S. phinoë*), and the salmon fry (*S. Samulus*). It was long supposed the fish called *Parr* was a distinct species from the salmon; but Mr. J. Shaw of Drumlanrig, Dumfriesshire, has fully disproved this opinion, and established the fact, that the parr is the salmon in the second year of its growth. Salmon have been preserved in ponds and fresh-water lakes; but they never attain the size of the sea salmon. If this experiment is intended to be tried, it should be recollected that if pike be in the lake, the numbers of the salmon will be speedily reduced. (*Blaine's Ency. of Rural Sports*.) See Fish Ponds.

SALSIFY. (*Tragopogon porrifolius*.) An ornamental plant, which, when grown in the kitchen garden, succeeds in any common soil. It is sown and treated in the same manner as carrots; the flavour of the root is mild and sweetish.

SALT, COMMON, *as a manure*. (Germ. *salz*; It. *sale*.) This salt is a compound of chlorine and a metal, the base of soda, called *sodium*; or, in chemical language, salt is a chloride of sodium. It is too well known to require description; but it may be proper to state that it dissolves equally well in cold and in hot water.

It would be, perhaps, difficult to name any other substance in the catalogue of modern fertilisers, whose powers have been so often and so warmly disputed as common salt; and for this controversy many reasons may be assigned. It has been generally employed with little scientific accuracy, and in far too loose a manner, for any reliance to be placed upon the majority of the reports which have been furnished to us; and for many years a prohibitory duty rendered it inaccessible to the farmer—an impost which has not very long been removed, and which yet was the occasion of a great variety of blundering trials miscalled experiments. The duty on salt was, indeed, one of long continuance. It originated as a war tax, in the ninth year of the reign of William III., and was not removed until after many an arduous debate, in the end of that of George III. The price of salt, in consequence of the duty, was raised from 6*d*. a bushel to more than 20*s*.; and was, therefore, during the continuance of the tax, too expensive a fertiliser to be employed by the English farmer; and it was only after being for a century and a half lost to agriculture, that it was again presented, in 1823, unshackled with duties, to seed, and every grub, but that these heaps were then converted into so many parcels of the most fertilising manure; the good effects of which, especially upon potatoes and carrots, were very decided. It was well known, too, that a single grain of salt placed upon an earthworm speedily destroyed it; that if brine were poured upon the lawn, all the earthworms were immediately ejected from that spot; and that if it were sprinkled about over a portion of the grass, to this salted portion all the deer, sheep, or the horses of the park, constantly repaired in preference to any other part of the field. Salt evidently, therefore, destroyed weeds and worms, and rendered grass more palatable to live stock; and, upon consulting the old agricultural writers, it was found that the notices of salt as a manure were many and important; and that salt had been employed in various agricultural operations from a very early period. Thus it is referred to in *St. Luke*, xiv. 34. Virgil reprobates a salt soil. Cato, 150 years B.C., commends it for cattle, hay, straw, &c.; as does Virgil, lib. 3 v. 394. The early German farmers knew of its value for sheep; and, for the same purpose in Spain, it has been employed from the earliest ages. In 1570, Conrad Heresbach commends it as being a certain prevention of the "murrain or rotte." In 1653, Sir Hugh Platt speaks of salt as a fertiliser in his usual visionary manner, and details the result of a very successful experiment on a "*patch* of ground" at Clapham; from which some late writers upon the uses of salt have led their readers into great blunders, by stating that this experiment was performed on an *acre* of land.

James Pringle and
therefore, promotes t
the animal and veget
in all cultivated soil
xlvi. p. 557.) The
M. Macaire (*Ann.*
xxviii. p. 402.), with r
of vegetables, impart
ation as to the use
moting the putrefact
stances in the soil; s
by this gentleman tha
matter of a plant is
those of its own speci
by its presence in t
putrefaction of the
assists in removing
and, in so doing, the
composes, certainly a
the plant which prod
aware that this hyp
puted: we therefore
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teriorated by one cro
advantage.

2. It destroys ver
which are thus co
3. It is a direct const
plants; and it has be
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bles afterwards grow
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common salt. (Mr. G
Essay on Salt as a
plants contain it in
tions. 4. Salt acts o
as a stimulant. Dr. P
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He added to phials,

as remarkable, however, that
well as all those that died in
olutions, seemed to flourish *at*
an those which were growing
er, and that that which had
f salt, and that which had one
ntinued to live after the plants
ter were dead. (*Nat. Philos.*
) That vegetable substances
of being stimulated by che-
s, is well known. A solution
water will make certain seeds
h would otherwise rot in the
a mixture of camphor, &c.,
d to be very beneficial in re-
y to cuttings of various ex-
g delayed on their passage.
ves vegetables from injury by
itions in the temperature of
re. That salted soils do not
lily as usual when salt is ap-
, is well known; and that salt
ps of turnips, &c., from injury
(Davis Gilbert, Esq., *Young's*
xvii.), is equally well estab-
writer has often witnessed
n garden, in the case of cab-
wers, &c. (Johnson's *Essay*
—68.)

nders earth more capable of
moisture of the atmosphere—
f the first importance, since
hich absorb the greatest pro-
oisture from the atmosphere
he most valuable to the cul-
affords," said the illustrious
method of judging of the pro-
of land." (*Agric. Chem.* p.
ARTHS, *antè*, p. 409.

e picking of scalings of the salt
ually to be obtained by the
very low rate, and from its
ure of common salt and gyp-
te of lime), it is excellently
manure for the grasses, such
cern, sainfoin, &c.; and, as
ive the chemical analysis, for
ion of the cultivator, of the
marine and fossil salt makers.
le of the Lymington marine
onsists, according to the ana-
enry, of—

	Parts.
f magnesia -	- 29
d sulphate of magnesia	- 18
e of lime and magnesia	- 127
of lime -	- 216
of soda (sea salt)	- 610
	1000

scale of the fossil salt refiners
h, two specimens were examined by Dr. Henry; the first was composed of—

	Parts.
Common salt - -	- 950
Carbonate of lime -	- 10
Sulphate of lime - -	- 40
	1000

The second variety was composed of—

	Parts.
Common salt - -	- 100
Carbonate of lime -	- 110
Sulphate of lime - -	- 790
	1000

Salt, it should be remembered, *rarely causes the wheat plant to grow larger or taller*, but it fills up the ear better, and brings the weaker plants forward. Mr. Sinclair informs us, that "salt appears to lessen the produce of straw, and increase the weight of grain." I have never been able in my experiments, nor in any I have witnessed (with salt alone), to observe any increased quantity of straw, even in cases where there was an increased produce, by means of salt, of six bushels of wheat per acre. The salt should be applied some time before sowing the seed, not less than ten, and not more than twenty bushels per acre. In my own experiments upon a light gravelly soil, at Great Totham, in Essex, the use of this quantity of salt per acre (in 1819) produced an increase of five bushels and a half per acre. The following statement of the result of some trials in 1820, on a light and gravelly soil, will show how important may be the result to the country at large by its judicious application. I regret that incessant employment of a very different nature has hitherto prevented my continuing these experiments.

Produce per Acre.	Bushels.	lbs.
No. 1. Soil without any manure for four years - -	13	26
2. Soil manured with stable dung to the previous crop (potatoes) - -	26	52
3. Soil with five bushels of salt per acre, and no other manure for four years -	26	12

The testimony of a plain Essex farmer corroborates these results. "The soil," says Mr. James Challis of Panfield, "that I described to you to be of rather a loose hollow description, had a dressing of salt in November, after the wheat was sown, about fourteen or fifteen bushels per acre: it produced at the rate of six bushels per acre more than that which was not dressed, and it may be stated to be 1*l.* per load of forty bushels better in quality." (*Essay on Salt*, p. 45.)

It is a custom in most counties of England, to apply salt and water as a steep to prevent the ravages of the disease in wheat, called smut; the value of this is known to almost every farmer. Recent experiments have suggested, that it may even be of use, when employed in larger quantities, as a preventative of mildew; the most dreadful of the numerous diseases to which the cultivated grasses are exposed. The experiments of the late Rev. E. Cartwright strongly evidence, that when salt and water are sprinkled with a brush upon diseased plants, it effects a complete *cure*, even in apparently the most desperate cases. (*My Essay*, p. 49.) "The proportion, one pound to a gallon of water, laid on with a plasterer's brush, the operator making his casts as when sowing corn, is instant death to the fungus." The time and expense fling. It appeared, in the course inquiries made by the Board of ture, that a Cornish farmer, Mr. and also the Rev. R. Hoblin, were tomed to employ refuse salt as a and that their *crops were never* *the rust or blight.* See Mildew.

The following table contains of the experiments made at 1818–19, by the late Mr. George with his usual scientific accuracy. direct the farmers' attention to as containing a mass of valuable ation.

The soil on which these made was sandy, and the plots tained thirty-six square feet; the wheat was drilled into the soil 5th, and reaped August 2d, 1818.

Kind of Manure and Mode of applying it.	Manures, omitting Fractions. Quantity per Acre.				Prod
	Dung in Tons.	Salt in Bus.	Lime in Bus.	Oil Cake in Bus.	Bus.
Spit manure applied previous to sowing the seed	45	- -	- -	- -	49
Salt and spit manure dug in salt mixed with seed	45	44	- -	- -	73
Salt mixed with soil four inches deep before sowing	- -	44	- -	- -	91
Salt ditto ditto ditto	- -	5½	- -	- -	77
Salt sown with seed	- -	5½	- -	- -	73
Salt combined with manure, dug in four inches deep	45	5½	- -	- -	75
Salt and manure: salt sown with seed, manure dug in	45	5½	- -	- -	95
Salt and manure: salt applied to the surface	45	5½	- -	- -	82
Salt simply applied to surface	- -	5½	- -	- -	60
Salt and manure: salt applied to the surface	45	44	- -	- -	55
Salt simply applied to surface	- -	44	- -	- -	77
Salt and lime mixed, and applied with the seed	- -	5½	121	- -	66
Salt and lime mixed, and applied before sowing	- -	5½	120	- -	68
Salt and lime mixed, and applied on the surface	- -	5½	120	- -	54
Lime applied with the seed	- -	- -	120	- -	53
Lime applied to the surface	- -	- -	120	- -	57
Salt, lime, and dung mixed, and applied as manure	90	5½	120	- -	62
Long dung dug in as manure	41	- -	- -	- -	71
Salt and long dung mixed, and applied as manure	41	22	- -	- -	71
Lime and long dung mixed, and applied as manure	41	- -	120	- -	34
Salt and long dung mixed, and applied as manure	41	44	- -	- -	- -
Oil cake mixed, and applied with the seed	- -	- -	- -	5½	48
Oil cake applied as common manure	- -	- -	- -	5½	73
Oil cake and lime applied as common manure	- -	- -	120	5½	74½
Salt and oil cake mixed, and sown with the seed	- -	5½	- -	5½	60½
Salt and oil cake mixed, and applied as manure	- -	5½	- -	5½	74½
Salt, oil cake, and manure, applied as manure	90	5½	- -	5½	74½
Salt, oil cake, and manure: the salt and oil cake sown with the seed, manure previously dug in	90	5½	120	5½	55½
Salt, oil cake, and lime, applied as manure	- -	5½	120	5½	71
Salt, oil cake, and lime, sown with the seed	- -	5½	120	5½	35½
Salt, oil cake, and lime, applied to the surface	- -	5½	- -	5½	66
Salt applied to the soil in preceding spring	- -	62	- -	- -	44½
Salt applied to the soil in preceding spring	- -	31	- -	- -	36½

The following experiments demonstrate the efficacy of salt on barley and oats. In 1820, on a good alluvial soil, at Heybridge in Essex, in a field of barley, the two experiments were —

	Bushels.
d with 6 bushels of salt per 20 loads of earth and stable turnip time, produced per - - - -	65
d with 20 loads of dung and - - - -	60

ie year, at Sproughton in Suf-
indy barley soil, belonging to
: —

	Bushels of Barley.
t any manure, produced - - - -	30
d with 16 bushels of salt in March - -	51

ing table contains the results
xperiments, made in 1819, by
George Sinclair, at Woburn,
f salt to the barley crop. The
previous year, carried a crop
ind was composed of three
us sand: —

and Mode g it.	Quantity per Acre.		Produce.	
	Bushels of Salt.	Bushels of Lime.	Bush.	Weight per Bushel.
r.				
nanure of - -	- -	- -	12	lbs. 43½
the seed -	55	- -	20	43¾
the seed -	5½	- -	20	42¼
ore sowing	33	- -	28½	44¼
ore sowing	11	- -	28¾	43
ore sowing	5½	- -	23½	43
lt applied t - -	33	60	9	42½
t applied t - -	11	60	22	42½
efore sow- - -	16½	30	13½	43
and sown - -	- -	60	18¼	43¾
with soil owing -	- -	60	10¾	43¼
r.				
any ma- - -	- -	- -	28¾	33
ed -	44	- -	17¼	30½
the soil	44	- -	27	27

experiments upon oats, the
alt applied was evidently too
Legrand states, that in his ex-
on barley, "it gradually ad-
effects to sixteen bushels, and
diminished to forty bushels,
ion was stopped." (*Hollings-*
pp. 5—10).

re for Grass Land, Meadows,
s been used in all parts of
h varying success. It always,
eetens the herbage. It has
d at the rate of six to sixteen
acre, and where the primary
en the destruction of the old
irty to forty bushels have been
mployed on the same extent
has the effect of completely
orm-casts on lawns, &c.

In a letter with which I was favoured from Mr. Collyns, of Kenton, Devonshire, 1826, he says — "One of my neighbours writes me, in using salt as a manure on grass land, I have found the salted portions not to be affected by severe frosty nights, when every blade of grass on the unsalted portions has been in a frozen state. I observe, too, that it is destructive to every kind of grub and worm; and I am convinced, where it has been used with judgment, that it has not failed. Another intelligent neighbour," continues Mr. Collyns, "whose farm is almost entirely a light black sand, writes, 'I have found salt answer my most sanguine expectations for barley, oats, potatoes, and turnips, both as to the increased quantity and improved quality of the crops, of which I can now give ocular demonstration: my barley and oats, which used to yield me only fifteen to twenty bushels per acre, now yield from forty to forty-five. My wheat is certainly much improved in quality, but I expected more in quantity. I have had thirty-five bushels of wheat from an acre dressed with ten bushels of salt; and from the same field last year, after the same quantity of salt, 140 bags of potatoes per acre. This year again, dressed with ten bushels of salt, I have not more than twenty bushels of wheat per acre, but the quality very superior indeed, and the root of clover in it very fine and luxuriant. In every field I have salted, I find the grass very much superior to any produced before the use of salt.' I have since," adds Mr. Collyns, "gone over his farm, and am astonished at the verdant pasturage, in what used to be coarse and rushy meadows. In this arable land, he never got more than ten bushels of wheat per acre until he used salt; so that this is also a decided improvement."

In Suffolk, according to a statement furnished to me by Mr. Broke, of Capel, near Ipswich, — "In the month of April, 1821, six bushels of salt manure were applied to half an acre of red clover; the soil good turnip land, not sharp; extent of the field ten acres. The salted clover at first looked very yellow, and apparently injured, but it soon began to recover, and when mown, the increased produce was, at the very least, 10 cwt. per acre; and the aftermath proportionally good; the cattle eating it down closer, and in preference to any other part of the field."

With Potatoes. — There have been various experiments made with salt as a manure for potatoes. The author of this work in 1817, on a gravelly soil, at Great Totham, in Essex, made the following trials: —

	Bushels.
1. Soil simple, produce per acre	120
2. Soil with 20 bushels of salt in September	192
3. Soil with stable manure, 20 loads in the spring of the year	219
4. Soil with 20 loads of manure and 20 bushels of salt	234
5. Soil with 40 bushels of salt alone	192½
6. Soil with 40 bushels of salt and 20 loads of manure	244

The Rev. Edmund Cartwright, of Hollenden House, in Kent, in 1804, made various important trials of salt as a manure for potatoes. The soil on which the experiments were made consisted of three-fourths sand. (*Com. Board of Agr.* vol. iv. p. 370.) See Potatoes, *antè*, p. 1012.

"Of ten different manures," said this agriculturist, "salt, a manure hitherto of an ambiguous character, is (one only excepted) superior to them all. The effect of the mixture of salt and soot is remarkable." The writer of this witnessed the same result on carrots, at the rate of sixteen bushels of each per acre.

Vermin. — With regard to the destruction of vermin by means of salt, we may safely assert, that there is, perhaps, no agricultural use of common salt more undoubted. The effect, too, is direct, and the result immediately apparent. For this purpose, from five to ten bushels per acre are sufficient. The agriculturist need be under no apprehension that the salt will destroy his crop, for twenty bushels of salt per acre may be applied to young wheat with perfect safety: I have seen even twenty-five bushels used with advantage. See Insects.

In reference to Weeds. — Salt has been of late years used at the rate of from twenty to forty bushels per acre, to kill weeds and to cleanse fallows, with great advantage; it also, in the large proportion we have named, will destroy coarse, sour grass, &c.; and though, for a time, all vegetation is destroyed, yet in a short period, a much superior turf is produced. If the cultivator can collect weeds, parings of turf, ditches, banks, &c., of the most foul description, and spread evenly on the surface of the heap half a bushel of salt to every ton of the collection, he will find every weed, in the course of a few weeks, killed and dissolved away. This plan I have long followed myself, on a light gravelly soil; and upon spreading this salted mixture, at the rate of fourteen or fifteen loads per acre, its beneficial effects can be traced to an inch. I have principally used it as a dressing for turnips and oats.

In the Garden. — Salt has been employed by the gardener for many purposes; most commonly on lawns, at the rate of bushels per acre, to prevent worm-ca and on gravel walks in a larger propor to kill weeds; it may be employed, h ever, as a fertiliser in gardens with de advantage. I have witnessed the res the following experiments made by brother, Mr. George Johnson, at Grea tham; and I the more readily give t place here from knowing with wha they were made: —

The soil was composed of —

Stones and gravel	
Vegetable fibre	
Soluble matter	
Carbonates of lime and magnesia	
Oxide of iron	
Animal and vegetable matter	
Alumina	
Silica	
Loss	

Windsor beans were sown on it —

Soil treated with 20 bushels of sal acre	bu
Soil simple	

Onions —

	tons.
Salt, 20 bushels, manure 20 tons per acre	3
Manure	2

Carrots —

1. Soil without any manure	13
2. Soil with 20 tons of manure	22
3. Soil with 20 bushels of salt	18
4. Soil with 20 bushels of salt, and 20 tons of manure	23

Parsnips —

1. Soil with 20 tons manure, and 20 bushels of salt	6
2. Soil with 20 tons manure	6

Early Potatoes —

1. Soil simple	
2. Soil with 20 bushels of salt	

Beets —

1. Soil simple	
2. Soil with 20 bushels of salt	
3. Soil with 20 tons of salt, and 20 tons manure	
4. Soil with 20 tons manure	

In preventing clubbing in th some of the brassica tribe, Mr. found salt highly useful; he state observations on this disease rea Horticultural Society of London, 16, 1821: — "Some cauliflow planted upon a light silicious so had previously been manured with

table manure, and over one-third of
ted space was sown salt, at the rate
ty bushels per acre, immediately be-
nting in July, 1821. The previous
d been brocoli. Fifty-four plants
set on the two-thirds unsalted, and
-six on the one-third salted: the re-
s been, that of the fifty-four unsalted,
have been diseased and unproduc-
ut of the twenty-six salted only two."
re is little doubt, but that salt might
uch more extensively employed by
s than at present. A very small quantity
t added to the water in which flowers
laced, adds considerably to their dura-
There are many bulbous-rooted flowers
a flourish best in the immediate vicinity
sea. Mr. Edwin Greville remarked, in
that some common salt applied at the
of sixteen bushels per acre to a portion
ed of stocks, in his garden at Wyaston,
erbyshire, made them grow most de-
ly stronger and finer, and bloom much
perfectly than those growing in the
bed unsalted. "There was no pos-
y of error or doubt on the subject,"
y intelligent informant. I have given
xperiments of Dr. Priestley upon va-
plants vegetating in salt and water.
und that the use of salt materially
cted the existence of the plant. It is
mon custom with the importers of
plants, to dip cuttings to salt water.
the adoption of this plan, they al-
nvariably perished in the passage.
ong the many excellent communica-
with which I have been favoured on
e of salt in the cultivation of plants,
e from an eminent florist, near Pad-
n, Mr. Thomas Hogg. "From the
periments," he observes, "that I have
with salt as a garden manure, I am
repared to bear testimony to its use-
s. In a treatise upon flowers, pub-
about six years since, I remarked,
he application of salt, and its utility as
ure, was yet imperfectly understood.
a matter of uncertainty, whether it
irectly as a manure, or only as a kind
e or seasoning, thereby rendering the
more palatable food for plants. The
hat first suggested itself to my mind,
from contemplating the successful
re of hyacinths in Holland. This root,
h not indigenous to the country, may
id to be completely naturalized in the
bourhood of Haerlem, where it grows
iantly in a deep sandy alluvial soil;
ne great cause of its free growth, I
lered, was owing to the saline atmo-
e: this induced me to mix salt in the
ost; and I am satisfied that no hya-
will grow well at a distance from the sea, without it. I am also of opinion, that the numerous bulbous tribes of amaryllidaceæ, especially those from the Cape of Good Hope, ixias, alliums, which include onions, garlic, shalots, &c., anemonies, various species of the lily, antholyza, colchicum, crinum, cyclamens, narcissus, iris, gladiolus, ranunculus, scilla, and many others, should either have salt or sea sand in the mould used for them. I invariably use salt as an ingredient in my compost for carnations; a plant which, like wheat, requires substantial soil, and all the strength and heat of the summer, to bring it to perfection; and I believe I might say, without boasting, that few excel me in blooming that flower."

In the inundations of the sea, as in Friesland for instance, in 1825, various curious effects were produced by the salt water. The oak, the mulberry, pear, peach, and others with deep roots, did not suffer; neither did the asparagus, onions, celery, &c., for they were never finer, or more luxuriant. But the vines and gooseberries contracted a salt *taste;* and the apricots, apples, cherries, elms, poplars, beech, willows, &c., could not bear the over dose of sea-water. They pushed out a few leaves, but speedily perished. (*Turner's Sacred Hist.* p. 117.) Similar results were noticed, after an inundation of the sea, in the garden of the late Richard Gower, Esq., near Ipswich, in Suffolk, in November, 1824. In this instance a portion of the garden remained twenty-four hours under the sea-water. The asparagus beds were materially improved in their produce. The cherry trees, in the following year produced a numerous crop of cherries, which *tasted, however, so very salt that they could not be eaten,* although very fine in appearance. These trees all died in the following year, 1826. (*Johnson on the Fertilisers,* p. 374.)

SALT, WITH OTHER MANURES. — *Salt and Lime.* — With a mixture of salt and lime, a manure is gradually formed of a most powerful description. It promises now, through the successful example of Mr. Bennett, and Sir C. Burrell, to be very generally adopted. It is difficult to account for the neglect of this manure, on any other ground than the difficulties which were so long thrown in the farmer's way, by the long continued tax upon salt. That it is not a novel plan for enriching the land is quite certain. Glauber, a celebrated German chemist, one of the last of the alchemists, described it in the jargon of his craft nearly two centuries since; when he said — "The *Sal mirabilis* (common salt), as it is of itself, is, by reason of its corroding virtues, which it as yet retains, plainly unfit for the multiplication of vegetable, for that being so used would dwells at considerable length in his preface upon this mixture of salt and lime; "for the enriching of poor and barren land, it is the cheapest of all mixtures, and is most easy to be done; for any ploughman having but once seen it done may be presently able to manage it."

Salt and lime was used as a manure by Mr. Mitchell of Ayr, many years since, and he, not knowing what others had done with this fertiliser before his time, considered himself to be the discoverer. (*Aiton's Ayrshire*, p. 385.; *Sinclair's Husb. of Scotland*, p. 194.) He thus described his process: — "Take thirty-two bushels of lime, and slack it with sea-water, previously boiled to the saturated state. This quantity is sufficient for an acre of ground, and may be either thrown out of the carts with a shovel over the land in the above state, or made into compost with forty loads of moss or earth, in which state it will be found to pay fully for the additional labour, and is sufficient for an acre of fallow ground, though ever so reduced before. Its component parts are muriate and sulphate of lime, mineral alkali, in an uncombined state, also muriate and carbonate of soda. All the experiments have done well with it, but especially wheat and beans; and it has not been behind any manure with which it has been compared. There is one instance in which it was tried in comparison with seventy-two cartloads of soaper's waste and dung; and although this was an extraordinary dressing, yet that with this salt and lime manure was fully above the average of the field. Mr. Mitchell calculates that 3000 gallons of sea-water, boiled down to about 600 gallons, will slack sixty-four bushels of shell lime. (These 3000

yielded five bushels
than that portion
marl was employed;
remember, that the
Padstow Harbour i
cent. of carbonate of
experiments of the la
wright upon potatoe
nures, or mixtures
lime were found su
of potatoes to ninete
cations to the Board

Every farmer has
in the most inland
this most excellent
his farm, by means
parts of lime and on
and suffering it to re
shady place, or cove
or three months; a
some years since.
3d ed.) By this pr
position takes place,
soda are formed, th
becoming encrusted
another advantage t
adoption of this pro
ation of soda, viz. th
is one of the most de
absorbing substance
acquainted; and, in
it exists in a soil, t
has, in summer, mu
than it would otherw

I would especiall
the effect of a mixtu
attend carefully to
given, and not, as so
to use the mixed salt
before any decompo

astened by any simple process.
ıtè, p. 757.
'oot.—Salt has never been em-
other substances so extensively
I have used it for potatoes,
earth, ditch scrapings, and with
he most decided success; the
it has been thus applied being
or, both in appearance and in

ure of salt with soot produces
ıarkable effects, especially when
o ground prepared for carrots.
lair found that when the soil,
produced twenty-three tons of
acre, the same soil, fertilised
ture of only six bushels and
lt, and six and a half of soot,
tons per acre. (*My Essay on*
) Mr. Belfield describes the
equally beneficial for wheat.
) And Mr. Cartwright found,
he soil, without any addition,
acre 157 bushels of potatoes,
g the same land with a mix-
ty bushels of soot and eight
alt, made it produce per acre
(*Com. Board of Agr.* vol. iv.
nson on Fertilisers, p. 408.)
G. See Beef, Bacon, Brining
Iam, Swine, &c.
their uses to vegetation. That
ne substances exist in almost
es, was an early observation
natural philosopher. The sa-
aline taste perceivable in the
ed by the combustion of these
very plainly indicated the fact.
h the skill of the chemist did
enable him to accurately dis-
tween the salts, the alkalies, or
rths contained in plants, with
le accuracy, yet the progress
has long since surmounted a
ficulties, and has detected a
ety of salts in plants. A salt,
bered, is a substance produced
ination of an acid with a base,
an earth, an alkali, or a me-
: the class of salts, therefore,
gly numerous (they have been
t about 2000), and includes
nces which at first sight do not
tled to such a name; thus the
e carbonic acid with the earth
is an oxide of a metal, forms
onate of lime, or *chalk*, *marble*,
ric acid and lime form the salt
lime (gypsum), with phosphoric
hate of lime (earthy matter of
many other earthy salts look
anical eye as little like salts as

The farmer must avoid, in entering into this examination, the common error of supposing that the saline substances found in plants are not their essential constituents or food, but are merely there by chance; that their presence is unattended with benefit, and their absence totally unproductive of injury; for such is a most erroneous conclusion. Not only are certain salts, the phosphate and sulphate of lime, and the carbonate of potash, for instance, invariably present in certain plants, but without those salts are present in the soil in which they grow, they will not maintain a healthy vegetation. Under the head Earths, Gases, Water, I have endeavoured to show how essential those substances are to vegetation, and what a great part they perform in the support of the farmer's crops; but still it will be found, that when a soil is carefully composed of all the pure earths discovered in plants, watered in abundance with pure water, and supplied with all the gases of putrefaction and of the atmosphere, that still all these are not sufficient by themselves to support a single ordinarily cultivated crop; but then it is found that where such a soil is supplied with various saline substances (for instance, with the various saline matters draining from a dunghill), that then every difficulty is removed. Neither must the cultivator suppose, that when saline substances are mixed with the soil, that then the plant growing upon it absorbs those salts as a matter of necessity, united with the moisture contained in that soil, without having the power of rejecting or separating it from its solution; for such an assumption has been proved to be contrary to the fact by several very accurate experiments. M. Saussure, for instance, found that plants had the power, when placed in saline solutions, foreign to their habits, of separating them from the water in which they were dissolved. These are researches fraught with instruction to the cultivator. He dissolved (says Dr. Thomson, *System of Chem.* vol. iv. p. 319.) the following salts in water, in such proportions that each solution contained $\frac{1}{100}$ part of its weight of the salt — muriate of potash, muriate of soda (common salt), nitrate of lime, sulphate of soda (Glauber salt), muriate of ammonia (sal ammonia), acetate of lime, sulphate of copper (blue vitriol). In each of these solutions he put plants of *Polygonum Persicaria*, or of *Bidens cannabina*, furnished with their roots. The Polygonum grew for five weeks in the solution of muriate of potash, nitrate of lime, muriate of soda, and sulphate of soda, and its roots increased in them as usual. It languished in the solution of sal ammoniac, and the roots made no progress. It died in eight or nine days in the solution of acetate of lime, and in less than three days in the solution of sulphate of copper. When such a number of plants of Polygonum were put into the solutions as to absorb one half of each in two days, the remaining half was found to have lost very different proportions of the salt which it had originally contained. Supposing the portion of salt at first in solution to be 100, the following table exhibits the quantity of each which had disappeared when one half of the liquid was absorbed —

	Parts.
Muriate of potash - -	14·7
Muriate of soda - -	13
Nitrate of lime - -	4
Sulphate of soda - -	14·4
Muriate of ammonia - -	12
Acetate of lime - -	8
Sulphate of copper - -	47

The Bidens absorbed pretty nearly the same proportions, but in general did not vegetate so long as the Polygonum.

When various salts were dissolved at once in the same solution, and plants made to vegetate in them, it was found that different proportions of the salts were absorbed. The following table exhibits the results of these trials, supposing, as before, the original weight of each salt to have been 100, each solution contained $\frac{1}{100}$ part of its weight of each salt —

		Parts.
1.	Sulphate of soda - -	11·7
	Muriate of soda - -	22
2.	Sulphate of soda - -	12
	Muriate of potash - -	17
3.	Nitrate of lime - -	4·5
	Muriate of ammonia -	16·5
4.	Acetate of lime - -	31
	Sulphate of copper -	34
5.	Acetate of lime - -	8
	Muriate of potash - -	17
6.	Nitrate of lime - -	17
	Sulphate of copper -	34
7.	Sulphate of soda - -	6
	Muriate of soda - -	10
	Acetate of lime - -	0

These experiments succeeded nearly equally with other plants, as the *Mentha piperita* and the Scotch fir. When the roots were cut or removed, the plants absorbed all solutions indiscriminately; on examining the plants, the salts absorbed were found in them unaltered. It being thus clearly established that plants possess a discriminating power, and that they do not absorb saline solutions merely because they happen to be dissolved in the soil, it next becomes an object of interest, as an illustration and guide for the operations of agriculture, to ascertain what found by the researches of the commonly cultivated plants. the conclusion of our examinatio that certain salts are found in only in certain plants, and that t substances exist in them invaria soils and situations, and that wit presence the plant languishes an supports a sickly existence, we almost driven to the conclusion, are as essentially the food of plan of the other substances with wh abound.

For a lengthened period, the alkaline salt, carbonate of potash, obtained from plants. Procured at their combustion, in iron pots, i obtained its name. Dr. Thomson *of Chem.* vol. iv. p. 187.) has given of the quantity of potash obtaine 100 parts of the following plants —

	Ashes.
Sallow - -	2·8
Elm - - -	2·36727
Oak - - -	1·35185
Poplar - -	1·23476
Hornbeam - -	1·1283
Beech - -	0·58432
Common nettle -	10·67186
Common thistle -	4·04265
Fern - - -	4·00781
Cow thistle - -	10·5
Great river rush -	3·85395
Feathered rush -	4·33593
Stalks of Turkey wheat	8·86
Wormwood - -	9·774
Fumitory - -	21·9
Trifolium pratense -	
Vetches - -	
Beans with their stalks	

In general, adds Dr. Thomson, times as much ashes are obtained shrubs, and five times as much from as from trees. Equal weight of the b of trees produce more ashes than the and the leaves more than the br Herbs arrived at maturity produc ashes than at any other time. Gree tables produce more ashes than dry salt which is obtained by the combu plants, although chiefly composed, consist wholly of potash: there are salts mixed with it; these are usual phate of potash, muriate of potash, of lime, phosphate of lime, &c., but bear in general but a small propor the potash.

Perhaps the most copious table alkaline and other salts obtained combustion of various plants, has given by M. Saussure in his chemi searches on vegetation. He obtained 100 parts of the ashes of the —

	Parts.
ak (*Quercus Robur*) May 10.	47·
ember 27.	17·
young oak, May 10.	7.
to	7.
od of oak	38·6
f ditto	32·
to	7·
yers of ditto	7·
wood of ditto	51·
vood of ditto	24·
m ditto	66·
poplar (*Populus nigra*),	36·
ember 12.	26·
azel	26·
ed in cold water	8·2
litto, June 22.	22·7
ember 20.	11·
tto, May 1.	24·5
to	12·5
ulberry, November	21·
rnbeam, November	22·
orsechestnut, May 10.	9·5
to, October 5.	82·
as (*Pisum sativum*) in flower	49·8
	34·25
etches (*Vicia Faba*) before	
, May 23.	55·5
wer	55·5
July 23.	50·
to	69·28
ower, raised in distilled	60·1
msole, June 23.	63·
ower	43·25
ripe	11·
nth before flowering	60·
wer, June 14.	41·
ripe	10·
	44·16
aize	69·
rley	20·
to	29·
	1·
r (*Pinus Abies*), raised on	16·
r, raised on granite	15·
f pine	15·

elin found 20 per cent. of pot-
shes of the oat, and from his
it is probable that potash ex-
in combination with the acetic
acids.

al alkali soda, or carbonate of
l in almost all the plants which
rowing in the sea, or on the
reach of its influence. The
lkali which these produce, is
greater, in proportion to that
y plants, natives of inland
s, 100 parts of the salsola soda
parts of ashes, and these con-
rts of soda and common salt.
, the vegetable marrow and
instance, derive great benefit from the application of soda to their roots. Soap-suds are used as an excellent liquid manure by many gardeners.

Sea-weed, kelp-soda, barilla, and the common washing soda of the shops, have all been used successfully as saline manures; and the well-known fertilising mixture of salt and lime, after it has remained undisturbed for some time, contains chloride of lime and soda in abundance. Sea-weed abounds with a strange mixture of alkaline salts, and there is no green manure more powerful in its effects than this, especially when it is ploughed in as fresh as possible. M. Gaultier de Claubry found in the *Fucus saccharinus* and in the *Fucus digitatus* (which is much used in Scotland as a manure) the following substances — saccharine matter, mucilage, vegetable albumen, oxalate of potash, malate of potash, sulphate of potash, sulphate of soda, sulphate of magnesia, muriate of soda, muriate of potash, muriate of magnesia, carbonate of potash, carbonate of soda, hydriodate of potash, silica, phosphate of lime, phosphate of magnesia, oxide of iron, oxalate of lime. In the islands of Guernsey and Jersey they employ the ashes of the sea-weeds, which they call *vraic*. Half a bushel strewed over a perch of ground in winter or the beginning of spring is sufficient. It gives a full ear to the corn, and prevents it from being laid. (*Com. Board of Ag.* vol. i. p. 216.)

Phosphate of lime, which is composed, according to the experiments of M. Berzelius, of phosphoric acid 100 parts, and lime 84·53, abounds in vegetable substances. It forms the basis of bones, from which, for the purposes of experiment, it is commonly procured. Obtained in this way, it is always in the form of a white powder, without either taste or smell; is insoluble in water, and unaltered by exposure to the atmosphere. Phosphate of magnesia is composed of phosphoric acid and magnesia; is a salt, soluble in fifteen times its weight of water. These two salts have been found in a variety of vegetable substances by MM. Vauquelin, Saussure, and other able chemists. See Bones.

There is little doubt but that these salts are absorbed from the soil by the plants. Almost all cultivated soils contain them in some form or other. And of the value of their addition to the soil in almost every form, there is considerable evidence. Thus, phosphate of lime abounds in all the richest animal manures, such as in bone dust and the richest excrements of animals; and, again, it is found by the Cheshire graziers, that the earthy salts of bones obtained from the size-makers, after most of the oily matters are removed by the action of steam, and hardly any thing but the salts of lime remain, are quite as fertilising to their pastures as when used in their fresh state, abounding with animal matters.

Sulphate of lime, or gypsum, is another salt, which is invariably found in and promotes the growth of certain plants.

It must, I think, be regarded as one of those salts which constitute the food or constituents of plants. It is always present in the clover, lucern, and sainfoin, and in smaller proportions in the potato and the turnip. See GYPSUM.

That it is a food for plants was the opinion of Sir Humphrey Davy; he remarked, when speaking of gypsum and the alkalies, "It has been generally supposed that these materials act in the vegetable economy in the same manner as condiments or stimulants in the animal economy; and that they render the common food more nutritive. It seems, however, a much more probable idea, that they are actually a part of the true food of plants, and that they supply that kind of matter to the vegetable fibre, which is analogous to the bony matter in animal structures. Thus, those plants which are most benefited by the application of gypsum, are those which always afford it on analysis. Clover and most of the artificial grasses contain it, but it exists in very minute quantity only in barley, wheat, and turnips." (*Ag. Chem.* p. 19.) And it is noticeable, that most of these remarks apply to the phosphate of lime (which can hardly be regarded as a stimulant), since it is not even soluble in water; it is also worthy of observation, that the same salts of lime (the phosphate and the carbonate) which Davy thus supposes to be placed in plants to add to their strength and solidity, are precisely those salts which for that very purpose, are placed in the bones of animals. They thus, as it were, mutually nourish each other. The very phosphate of lime, which in the dissolving bone dust is absorbed by the plant, again becomes in the food of animals a material for the formation of other bones.

The carbonate of lime (chalk) is the most universally present of all the salts contained in vegetables. It is composed of carbonic acid 45 parts, lime 55 parts. It is in minute proportions, soluble in water, and more so if the water is saturated with carbonic acid gas; hence it is readily absorbed by the roots of plants. It exists in vegetables in very varying proportions; thus, the ashes of the perfect oat plant, straw and seed together, were proved by M. Vauquelin to contain more than five per cent. of this earth. (*Ann. de Chem.* vol. xxix. p. 19.) In 32 ounces of seeds of wheat, M. Schraedar found 12 grains of carbonate of lime; and in the same quantity of seeds of rye 13·4 grains; 24·4 grains in seeds of barley; 33·75 in those of the oat; and 46·2 in the same weight of the straw of rye. It is most commonly, although not always found, in vegetables with carbonate of magnesia. These were found together by M. Saussure in the ashes of the following different substances.

He obtained from one hundred parts the ashes of the

Leaves of oak, gathered in May -
Ditto, September - - -
Bark of the oak - - -
Wood of oak - - -
Soil from wood of oak - -
Wood of poplar - - -
Wood of hazel - - -
Wood of mulberry - - -
Wood of hornbeam - - -
Plants of pease, in flower - -
Ditto of vetches, in flower - -
Ditto, raised in distilled water -
Wheat in flower - - -
Ditto seeds, ripe - - -
Ditto, straw - - - -
Ditto, bran - - - -
Oat seeds - - - -
Barley seeds - - -
Ditto, chaff - - - -
Leaves of Rhododendron ferrugineum, raised on limestone - -
Ditto, raised on granite - -
Leaves of fir, raised on limestone -
Ditto, raised on granite - -

Now, these two soils (the granite limestone) contained carbonate of the following proportion:—

	Granite.
Carbonate of lime	1·74
Alumina	13·25
Silica	75·25
Petroleum	
Iron and manganese	9·
	99·24

Carbonate of lime has also been in the sap and white matter of the the elm by M. Vauquelin; in the wormwood (more than 50 parts in by Kunsmuller; in the flowers of nica, by M. Chevalier; in the M. Einhof; in the red bark of St. in Peruvian bark, and in the wood quingania, by M. Fourcroy. therefore, so universally in plants, be no doubt of the fact, that this fulfilling then some wise and salutary pose; not fortuitously, but with design; by chance, but by the regulation rangement of their Divine Architect.

action of saltpetre or nitrate of pot- pon vegetation is not so easily ex- e as that of many other salts; and me remark applies to that of cubic or nitrate of soda.

rate of potash, which is composed of acid 54·34 parts, and potash 45·66 enters into the composition of a few it is true, but in the greater number, those of the farmer's crops, on which ne soils its application produces such iant effects, its presence cannot be ed, even in minute proportions. Some however, do contain it in consider- uantities. Thus, it has been found in mmon nettle, the horse radish, and the lower. M. Chevalier found it in the opodium olidum; M. Vauquelin in the of the deadly nightshade; M. Che- in woad; Dr. John in the Mesembry- mum crystallinum. M. Boullion Le- e made various plants, such as the ower, vegetate in soils which did not in any saltpetre: upon examining them ices of saltpetre were discernible, but watering them with a weak solution de its appearance in them as usual. Nitrates.) The presence of cubic (nitrate of soda) which is composed ric acid 62·1, and soda 37·9, is still rare in plants; it has only been ted in barley.

salts formed with the vegetable acids ng in the juices of plants, are rather rous. Oxalate of potash for instance in the Oxalis acetocella, and several ; oxalate of lime in rhubarb, pars- nnel, squills, tormentilla, deadly night- , and spinach. Nitrate of lime is con- in the onion; malate of lime in the leek, wake-robin, mignionette; and e of potash in rue, the garden purslane, rtians, lilac, madder, &c.

ere is, perhaps, no saline substance that to so great an extent in marine plants, which has been used for so long a d and to such an extent for those grow- inland situations, as common salt. Salt.) A substance which not only nds in all plants growing on the sea- , but always exists in smaller propor- in many of those growing in upland ets. Thus, Mr. G. Sinclair obtained 1450 grains of wheat chaff from Bed- hire, ashes 50; common salt 2¾: from parts of the seed, ashes 10; common But from the same crop, which had dressed with 44 bushels of common per acre, he obtained from 1450 parts e chaff, ashes 40; common salt 4: and 1450 parts of the seed, ashes 10; com- salt ¼.

mmon salt is found generally in minute proportions in most cultivated soils. Davy detected in 400 grains of a good silicious soil from a Tonbridge hop garden, nearly 8 parts of common salt.

Besides being in small proportions a direct food for plants, common salt also seems to perform several other services to vegetation, and the same remark probably applies to other salts; for instance, when applied to the soil in small proportions it certainly promotes the putrefaction of its organic matters. See Salt.

And again, salt in common with several others appears to excite or stimulate the plant, when applied to it in proportions not too excessive; a fact first noticed by Dr. Priestley.

Another use of common and other salts to vegetation is the preservation of the plant from injury by sudden transitions in the temperature of the atmosphere: salted soils only freeze in intense frosts. I have repeatedly witnessed in the case of culinary vegetables, such as cabbages, brocoli, &c., that while the produce of the unsalted portions of the ground were half killed by the frost, the salted portions have totally escaped. Many salts have also the property of retarding the evaporation of the moisture of the soil, others absorb it from the atmosphere, or are of the class of deliquescing salt: such are the common salt, chloride of calcium, chloride of magnesia, cubic petre, or nitrate of soda, &c., which, in consequence, when they are used as fertilisers, they increase this property, so valuable and so essential to all cultivated soils. Thus I found by some experiments upon a rich soil near Maldon in Essex, worth 42*s.* per acre, that 1000 parts dried at a temperature of 212°, absorbed in eighteen hours, by exposure to air saturated with moisture at a temperature of 62°, 25 parts. But 1000 parts of the same field which had been dressed with twelve bushels of marine salt per acre, under the same circumstances, gained 27 parts; and 1000 parts of the same soil, which had been dressed with six bushels per acre, gained 26 parts. The attraction of some saline substances for the moisture of the atmosphere is very considerable. I found that 1000 parts of refuse salt manure, dried at 212°, absorbed in three hours by exposure to air saturated with moisture at 60°, 49½ parts. 1000 parts of the sediment, or pan scratch of the salt makers, gained 10 parts; 1000 parts of Cheshire crushed rock salt, 10 parts; 1000 parts of gypsum, 9 parts. Chloride of calcium is so powerfully deliquescent, that it absorbs sufficient moisture from the air to dissolve in it, and form a solution. Dr. Marcet found that 288 grains in 124 days and LIME); for by the slow action carried on for three months by these substances on each other, this salt and soda are produced by the decomposition; and it is not improbable that when these salts are present in the juices of plants, that by this means the attractive powers of their leaves and roots for aqueous vapour may be increased. Davy alludes to these essential, yet too little understood powers of absorption possessed by vegetables, when he says (*Lectures*, p. 207.), — "In very intense heats, and when the soil is dry, the life of plants seems to be preserved by the absorbent power of their leaves; and it is a beautiful circumstance in the economy of nature, that aqueous vapour is most abundant in the atmosphere when it is most needed for the purposes of life, and that when other sources of its supply are cut off this is most copious."

Of the salts of ammonia, as I have in another place remarked (*On the Fertilisers*, p. 322.), carbonate of ammonia has been detected in the *Chenopodium olidum* by Messrs. Chevalier and Lasseigne; and it probably exists in other plants which are distinguished for their powerful disagreeable odour. (*Ann. of Phil.* vol. xii. p. 231.) Muriate of ammonia has been found in woad by M. Chevreul. (*Ann. de Chem.* vol. lxviii. p. 284.) The salts of ammonia are in general exceedingly fertilising in their effects upon vegetation. Soot owes part of its efficacy to the ammoniacal salts it contains. The liquor produced by the distillation of coal contains carbonate and acetate of ammonia, and this liquid of the gas makers is a very good manure. "In 1808," says Davy (*Lectures*, p. 342.), "I

which contain them
able forcing or st
from their decompo
upon vegetation.
Dr. Belcher (*Com.*
p. 416.) upon the co
watering them with
of ammonia, the p
forwarder than plan
lar circumstances,
water; and he also
ments of Mr. Greg
one half of a grass
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nials in support of t
the salts of ammoni
Handley (*Journ.*
p. 46.).

Of the mode in w
upon plants, a late
ganic chemistry, b
with observations,
cheerfully and cordi
stand these remark
must remember that
according to the a
drogen 74 parts, a
26 parts. "The ni
mals," he observes,
atmosphere, as amm
gas, which is capabl
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volatile salt. Amm
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atmospheric air *hitherto made have*
o demonstrate the presence of am-
although, according to our view
. Liebig), it can never be absent. If
d of rain water contains only one
of a grain of ammonia, then a field
0 square feet must receive annually
s of 80 lbs. of ammonia, or 65 lbs. of
n; for, by the observations of Schub-
ich were formerly alluded to, about
0 lbs. of rain fell over this surface in
onths. This is much more nitrogen
s contained in the form of vegetable
en and gluten in 2650 lbs. of woad,
bs. of hay, or 200 cwt. of beet root,
are the yearly produce of such a
but it is less than the straw, roots,
ain of corn which might grow on the
urface would contain. Experiments
in the laboratory of Giessen, with the
t care and exactness, have placed
ues Liebig) the presence of ammonia
n water beyond all doubt. It had
o escaped observation, because no
ought of searching for it. All the
ater employed in this inquiry was
d 600 paces southwest of Giessen,
the wind was blowing in the direc-
the town. When several hundred
of it were distilled in a copper still,
e first two or three pounds evapo-
ith the addition of a little muriatic
very distinct crystallisation of sal
iac was obtained: the crystals had
a brown or a yellow colour. Am-
may likewise be always detected in
ater: crystals of sal ammoniac were
d by evaporating in a vessel with
ic acid several pounds of snow, which
athered from the surface of the
in March, when the snow had a
f ten inches. The inferior layers of
hich rested upon the ground con-
a quantity decidedly greater than
which formed the surface. It is
of observation, that the ammonia
ed in rain and snow water possessed
nsive smell of perspiration and animal
ents — a fact which leaves no doubt
ting its origin." — "The products of
stillation of flowers, herbs, and roots
ater, and all extracts of plants made
dicinal purposes, contain ammonia.
nripe transparent and gelatinous pulp
almond and peach emit much am-
when treated with alkalies. The
which exudes from a cut vine, when
ated with a few drops of muriatic
lso yield a gummy deliquescent mass,
evolves much ammonia on the addi-
f lime. Ammonia exists in every
f plants, in the roots (as in beet root),
stem (of the maple tree), and in all blossoms and fruit in an unripe condition." — "Putrid urine is employed in Flanders as a manure with the best results. During the putrefaction of urine, ammoniacal salts are formed in large quantity, it may be said exclusively; for, under the influence of heat and moisture, urea, the most prominent ingredient of the urine, is converted into carbonate of ammonia. The barren soil on the coast of Peru is rendered fertile by means of a manure called *guano*, which is collected from several islands of the South Sea. The soil itself does not contain the smallest particle of organic matter, and the manure employed is formed only of urate, phosphate, oxalate, and carbonate of ammonia, together with a few earthy salts." (*Organic Chem.* p. 69—82.) This is, however, hardly a correct statement of the composition of the guano. The salts of ammonia do *not* form the chief ingredient of this fertiliser, as will be readily seen by the farmer from the result of an analysis by Mr. Hennell. See GUANO.

Of the presence of ammonia in rain water collected at a distance from great towns, I have, I confess, several doubts. Why it should be found to exist in rain, and not in the insensible moisture of the atmosphere, I cannot well understand: the fact of its being detected in the *lower* layers of snow, and not in its upper portions, appears to me to prove that the ammonia detected in it ascended from the earth into it as it rested on the ground, and not that it descended with it from the atmosphere. Has ammonia ever been detected in rain collected on the summits of great elevations, or even on the surface of the ocean? Is it not, too, notorious to every chemist, how difficult it is to render chemical vessels absolutely free from minute quantities of foreign substances? Did not Davy, from an inattention to this fact (and he was the most cautious and the most skilful of chemists) — did not even Davy once feel convinced that pure water might be converted into common salt by the agency of galvanism? But if I doubt the existence of ammonia in all the situations where it is supposed to exist by M. Liebig, still more do I doubt the correctness of his explanation of the fertilising effects of gypsum when applied to the soil — effects, be it remembered, produced on only three or four crops, and these the only cultivated crops of the farmer *in which sulphate of lime* or *gypsum is found as a constituent portion* in very sensible proportions. If the explanation of this distinguished German philosopher was the correct one, gypsum would be a manure for almost every crop of the farmer; for sulphate of am-facture of sal ammoniac; soluble sulphate of ammonia and carbonate of lime are formed, and this salt of ammonia, possessing no volatility, is consequently retained in the soil; all the gypsum gradually disappears, but its action upon the carbonate of ammonia continues as long as a trace of it exists. The decomposition of gypsum by carbonate of ammonia does not take place instantaneously: on the contrary, it proceeds very gradually, and this explains why the action of the gypsum lasts for several years." (*Ibid.* p. 89.)

I cannot therefore recommend the farmer to adopt the able conclusions of M. Liebig without considerable caution: hardly any thing retards the progress of science more than erroneous theories. Fortunately, however, the farmer can in all cases patiently and successfully examine and apply the valuable facts of the skilful chemist without mystefying himself with not always intelligible doctrines. It is very probable that plants have the power of decomposing ammonia, and of assimilating the nitrogen which it contains, in the same way as there is little doubt the hydrogen of water is assimilated by them; but we have no direct evidence of the facts, and the best course, therefore, will be to regard them not as absolute chemical truths, but merely as of the class of what may be perhaps denominated scientific probabilities.

Some of the other compounds of chlorine, the old class of chlorides of the chemist, have been tried, as fertilisers with very doubtful success; for although at first the seeds which had been steeped in them germinated with a considerably increased ra-

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chloride of calciu
chloride of calciu
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used the chlorine
base lime. Such
with which I am a
uses of the saline
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luable than it at
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of the action and
bodies as the food
he will find excee
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1. The prickly saltwort (*S. Kali*) is an nual, common on the sandy sea-coast, wering in July. It is used like many hers of its genus, to furnish alkaline salt r the manufacture of glass. The stem is ry bushy, armed in every part with rigid, ominent, channelled, spinous leaves, dited and membranous at the base. The ower is reddish, solitary, with five leafke bractes; the seed-vessel a turbinate, inged capsule, filled with spiral seed.

2. Shrubby saltwort (*S. fruticosa*), which a shrub far less common than the former. e stem reaches to a yard high, with any upright leafy branches: the leaves e small, evergreen, alternate; the flower en with yellow anthers; and three small cave membranous bractes. The seed is ck and reniform. This plant is not unthy of a place in gardens or shrubberies, re it is evergreen and tolerably hardy, ing without care for many years. The es contain some alkaline salt, and have herbaceous, rather acrid taste. (*Smith's . Flor.* vol. ii. p. 18.)

ALTWORT, BLACK. See SEA-KWORT.

ALVING or SMEARING sheep is rted to in various districts, for the purof preserving the fleece from the ts of weather, destroying injurious ins, and preventing cutaneous diseases. ixture of damaged butter, hog's lard, , and Gallipoli oil, is found to be the t efficacious salve. Tar stains and ls the colour of the wool. See SHEEP.

AMPIRE. (*Crithmum*, derived from *he*, barley; in allusion to the singularity he seeds.) These are curious plants, succeeding well under any cultivation. dy or gravelly soil is best for them, a plentiful supply of water, to which a soda should be added. There is only indigenous species. The sea sampire *maritimum*) is a perennial, common on rocky sea-shores and cliffs. The root ranched and creeping. The stem is t a foot high, ascending and leafy. leaves are twice ternate, on sheathing stalks: the leaflets are lanceolate, acute, y. The flowers are in dense umbels, e with yellow anthers. The herb es an old-fashioned English pickle, but e are many plants generally preferred the same purpose. Some serious accis have occurred from a custom which ails of pickling sampire in copper pans; aving it to cool. No mischief results pickle is not left in the pan to cool. *s Eng. Flor.* vol. ii. p. 22.; *Paxton's Dict.*)

AMPIRE, THE MARSH. See TED GLASSWORT.

SAMPIRE, PRICKLY. (*Echinophora*, from *echinos*, a hedge-hog, and *phoreo*, to bear, the involucrum being covered with stiff spines.) The sea prickly-sampire (*E. spinax*) is said to be indigenous, growing on the sandy sea-shore, although not found by any recent botanist. It is a perennial, flowering in July. The herbage is glaucous, finely downy, copiously branched and spreading in every direction two or three feet. Leaves rigid, doubly pinnatifid, with spinous awl-shaped entire segments. Flowers numerous, white or pale flesh-coloured. Root spindle-shaped, long and fleshy, reported to be eatable, having the flavour of parsnip, with a stimulating and diuretic quality. (*Smith's Eng. Flor.* vol. ii. p. 37.)

SAMPLE. A small quantity of a commodity exhibited at public or private sales, as a specimen. Wool, wine, corn, seeds, and indeed most species of agricultural produce and merchandize that can be conveyed in small bulk, are sold by sample. If an article be not at an average equal to the sample by which it is sold, the buyer may cancel the contract, and return the article to the seller. (*M'Culloch's Com. Dict.*)

SAND. (Germ.) Finely divided silicious matter constitutes common river and sea sand: particles of other substances are often blended with it, and sometimes it becomes calcareous from the prevalence of carbonate of lime.

Sand is often employed as a manure by the cultivator of the poor hungry clays, especially if he can obtain calcareous sand; thus from a very early period the Cornish farmers have been used to employ, extensively, the sea-sand of Padstow Harbour, (which contains 64 per cent. of carbonate of lime), for the same purpose, carrying it from the sea-shore, either in carts, or even on horses' backs, some miles up the country. This privilege they enjoy free from any toll to the proprietors of the shore, under a grant from Richard, Duke of Cornwall, confirmed by another of the 45th Henry III., in 1261, and supported by the statute 7th James I. c. 18., which declares this sand "to be very profitable for the bettering of land, and especially for the increase of corn and tillage within the counties of Cornwall and Devon." This valuable employment of sea-sand is, however, at present, of necessity, confined to the lands situated within a few miles of the seashore; and yet, according to Dr. Paris, 54,000 single-horse cart loads of this calcareous sand are annually consumed by the farmers in the neighbourhood of Padstow Harbour. The farmers of Norfolk employ a similar description of sea-sand in the fertility of a soil by such a dressing is observable for twenty years, or even longer—for it improves its very staple. (*Johnson on Fertilisers*, p. 63.) See EARTHS, MIXTURE OF SOILS.

SANDERLING. (*Calidris arenaria.*) A small wading bird, which is pretty well known on most of the sandy sea-shores of Great Britain and Ireland, where it is usually found at the edge of the water, in company with the purre, but not so plentiful as its companions. They feed on small shrimps, sea-worms, and slender crustacea. In the summer plumage the male has the back black, the under surface of the body and wings pure white; legs, toes, and claws black. In winter the plumage of the upper surface of the body is a very light ash grey. The whole length of an adult bird is about eight inches. (*Yarrell's Brit. Birds*, vol. ii. p. 427.)

SANDPIPER. A name applied to different species of the genus *Tringa*, but properly restricted to the *Tringa hypolecuus* of Linnæus, which is the type of the subgenus *Totanus*. Mr. Yarrell, in his elegant work illustrating the British birds, describes ten species of sandpiper as frequenting our islands.

SANDWORT. (*Arenaria*, from *arena*, sand; referring to the sandy situation in which most of the species are found.) This is an extensive genus of herbs, of humble growth, with numerous slender stems, opposite, mostly narrow, entire, undivided leaves, and small, white or reddish, inodorous flowers with coloured anthers. Nine indigenous species are now included in our English flora, but it is necessary to notice the principal one only, namely, the

nicle. The herb
somewhat aromati
vulnerary qualitie
(*Smith's Eng. Flo*
SANICLE, YO
TERWORT.
SAP. In bota
sorbed by the ro
undergoes the first
mistry of the plant
formed as the abs
wards into the ste
veyed to the leave
the influence of lig
portion of its wate
change, and, being
and stem, it is a
animals; all the
from it. Changed
juice, it is assimila
of the plant. In
of little except w
gaseous matter in
bonic acid; but as
of the stem it d
meets with in its
new properties,
reaches the leave
from its state whe
The course taken
through the stem,
tissue included w
it is all permeable
the central part of
up with solid matt
it usually happens,
the course of the s
part of the wood,
It is not certain
kind of tissue the

tant means by which the sap is con-
ed. (*Brande's Dict. of Science; Knight's*
t. Papers; Quart. Jour. of Agr. vol. vii.
54.) See Alburnum.

AUCE-ALONE. See Treacle-Mus-
D.

AVIN. See Juniper.

AVOY CABBAGE. See Cabbage.

AW-DUST. The refuse or waste
der obtained from saw-pits, after any
d or timber has been separated or cut
ider by the saw. If fresh oak saw-dust
cattered on gravel walks it effectually
ents the growth of weeds, and when
ed with blood and quick-lime it forms
xcellent manure for the garden. This
stance has lately been brought pro-
ently into notice as an adjunct to other
ures. There can be no doubt of its
ulness when made into compost with
escent manures, saline substances, and
nic matters. A compost of this kind,
ch has been well mixed and decom-
ed, and turned over with the spade at
per time, will produce an excellent crop
urnips.

AW-FLY. Amongst the many enemies
erves Mr. George Newport in a valuable
e essay printed by the Entomological
iety, and which should be in the hands
very farmer) which the agriculturist
ts with in the cultivation of one of the
t valuable products of his lands, the
mon turnip, is a species of saw-fly, or
thredo Athalia centifoliæ, Panz.

he devastations of this insect have been
ied to such an extent during the last
summers, as very materially to affect
interests of the farmer, and hence it
become a matter of importance to him
its habits should be closely investigated,
rder that some remedy may be devised
the purpose of checking its injurious
gress. It was not until recently that
insect attracted the attention of na-
lists in this country; and hence it has
ained undescribed as a British species
l within the last few years. But it has
er been entirely a stranger to the agri-
urist, although its appearance in num-
sufficiently great to occasion injury to
crops, has been at such uncertain and
ant periods, that when it began, about
summers ago, to commit serious mis-
f, it was then almost entirely unknown
he agriculturists of the present day. It
however, too well known to some of
er cultivators, who had not forgotten
astations committed by it in this
about twenty years ago, when it
ally, or perhaps even more destruc-
an it has been during the past three
four summers. In 1783 also its numbers were incalculable, and it produced so much injury to the turnip crops, that whole districts were obliged to be ploughed up.

In its larva state it was known to farmers at that time, as it is also at the present, chiefly from its colour, and designated accordingly by the terms *black palmer*, *black canker*, *black slug* or *caterpillar*, *negro* or *nigger*.

The perfect insect (Mr. Newport continues) first makes its appearance about the middle of May, after the continuance of dry warm weather, and this usually happens to be a little before or at the time when the early crops of turnips, in some parts of the country, are just appearing. It is, therefore, at this period that the fly is able to commit the greatest mischief, by the female depositing her eggs on the young leaves, and which, if the weather continues warm and dry for a few days, become hatched, and the crops are soon destroyed. The period of the year and the temperature of the season greatly influence the growth of the insect in its larva state. Thus, if the season becomes cold and wet, the hatching of the eggs is either retarded or the eggs are not developed at all, or the young larva perishes. But if the weather continues fine, the eggs are hatched in about a week or five days, and the larva passes through its changes rapidly. There appears to be at least, two broods of this insect during the year. From the eggs deposited in May and June, the perfect flies are developed in July and August; and the broods produced from the last laying of eggs make their appearance in the perfect state about the month of May in the following year. It is in the larva state only that the insect is really injurious; and it is to this state, therefore, and to the previous embryo condition, that we ought chiefly to direct our attention, with a view of preventing its ravages. Very many experiments have been tried by various agriculturists with the view of accomplishing this object, but scarcely any have yet been attended with even a moderate share of success. Wood ashes, coal ashes, salt, unslaked lime, and quicklime scattered over the plants have been found ineffectual. One of the best remedies is turning a few dozen ducks into the field, with a boy to watch them and to drive them to some water to drink occasionally. This practice, however, injures the ducks, which become greatly emaciated, and suffer much from diarrhœa, although they will ultimately recover. One thing is particularly objectionable in the cultivation of the turnip, when attacked by these larvæ; which is the practice of hoeing the crops, or thinning them. By doing this a very large quantity water, the effect thus produced upon the development of the embryo would be similar to that of unfavourable weather; that, in fact, the larvæ would either not be developed or would perish soon after they have made their appearance. The difficulty appears to be in watering the turnips unless the seeds were drilled in, as is done by some cultivators. A fire engine and hose might, perhaps, be successfully employed. I may also direct the attention of the farmer to papers on this subject by Mr. Yarrell, inserted in the *Trans. Zool. Soc. of Lond.* vol. ii. p. 50.; by Mr. Curtis, *Journ. of Roy. Agr. Soc.* vol. ii. p. 364.; by Mr. Milburn, *Journ. of York. Agr. Soc.* p. 49.

SAW-WORT. (*Serratula*; from *serra*, a saw: the leaves are edged with cutting teeth.) A genus of plants belonging to the natural order *Compositæ*. There are two indigenous perennial species, namely, the common saw-wort (*S. tinctoria*) and the alpine saw-wort (*S. alpina*). The former grows in groves, thickets, and grassy pastures, flowering in July and August. The root is woody; stem erect, straight, two or three feet high, angular, striated, solid, and reddish; leaves pinnatifid, somewhat lyrate, with fine copious bristly serratures. The flowers are corymbose, handsome, of a purplish crimson. The seeds are furnished with a bristly, unequal, yellowish, not feathery coronal. This plant gives a yellow colour to wool, for which purpose it is much used in Sweden. The alpine saw-wort inhabits the fissures of high rocks, and the stem is only from three inches to a foot high. Leaves undivided, distantly toothed, cottony beneath, very white; and the lower leaves on longish channelled footstalks. Flowers few in a

of a round leafy s
or purple, frequer
SAXIFRAGE,
SAXIFRAGE,
Saxifrage.
SAXIFRAGE.
Saxifrage.
SCAB. A con
to sheep, which, li
horses, and dogs, a
subject, is the effe
sects belonging to
these insects alway
ease. In the hum
obtains its food fi
disease, but is not
cure of scab, howe
the destruction o
whether infusions
arsenic, appear to
safer and more effe
the disease and be
application of a m
ointment should be
That for bad cases
mon mercurial or T
down with three ti
The other, for or
contain five parts
mercurial ointment
p. 536.) See Shee
SCABIOUS.
the itch; the comm
that disorder.) So
well adapted for o
border. The herb
increased by divis
seed. The seeds of
require sowing in t
are three indigenou
viz. the devil's bit

ɔurple. Sheep and goats are said to his herb; but its bitter and nauseous ɪr is not agreeable to domestic cattle. ɪmall scabious (*S. columbaria*) is a less ıon species, attaining to the height of e or eighteen inches. The leaves lowers are smaller and more delicate the last. (*Smith's Eng. Flor.* vol. i. 4.)

ABIOUS, THE SHEEP'S. See ɪP's-Bɪᴛ.

ALD CREAM. Provincially cream l by heat, or clouted cream. See ʏ, Mɪʟᴋ, Bᴜᴛᴛᴇʀ, Lᴀᴄᴛᴏᴍᴇᴛᴇʀ, &c.

ALE. A provincial term signifying read or scatter about manure, gravel, *Scales* in botany are any small pro- s resembling minute leaves, generally ɔver one another.

ALLION. See Oɴɪᴏɴ.

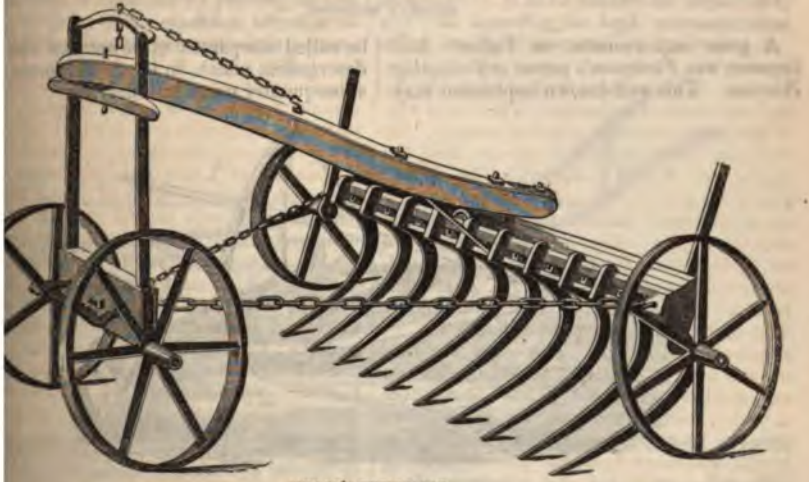
APE. In botany a stem rising from oots, more frequently from a rhizome derground stem, bearing nothing but owers. The iris is an example.

ARCEMENT. A country term sig- ɪg the small pedestal or off-set, left at ısis in constructing earth fences.

SCARIFIER. A tillage implement for stirring and loosening the soil, without bringing up a fresh surface. Under the same head may be included the grubber, the cultivator, and the scuffler, all of which act on the combined principles of plough and harrow at the same time. Some of these implements have wheels, by the raising or lowering of which the tines or prongs may be made to sink more or less into the earth. See Hᴀʀʀᴏᴡ.

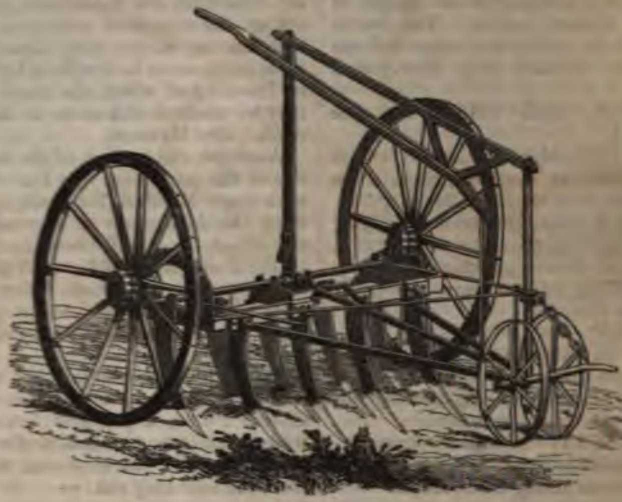
Amongst the earliest of the many varieties of this implement that I am acquainted with (says Mr. J. A. Ransome, in his work upon the *Implements of Agriculture*), was one which the late T. Cooke used, attached to the frame-work of his drill, the coulters and apparatus of which, being removed, gave place to a bar, or head, suspended by joints to the axle, on which a row of strong tines was fixed.

On a similar plan to this, but working on a plough carriage, another invention by Robert Fuller, a practical farmer of Ipswich, came into operation, and worked exceedingly well. Its character will be seen from the following cut: —



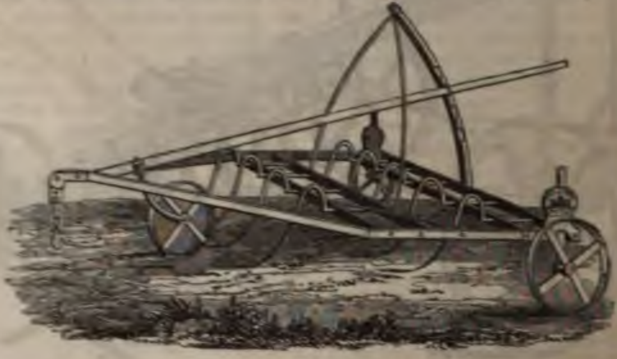
FULLER'S EXTIRPATOR.

ddell's Scarifier is held in deservedly repute in Suffolk (where it originated) he eastern and midland counties, where ıow in very general use. It is an im- ent of immense power, and well cal- ed to supersede the extensive use of lough, otherwise indispensable in the ation of strong land, and we are in- l to believe with better effect. There e no question that in a general way a tilth may be obtained with Biddell's ier than with any plough; and, for this reason, strong tenacious clays and even many of the better loams, though dry at the surface and apparently in good order for ploughing, frequently turn up coarse and "loamy." In the early part of the spring, the combined action of frost and the atmosphere may probably in time effect what a scarifier would do at once, viz. reduce the clods to a comparatively fine mould, without which the hope of a good barley crop is but slender. There is no reason why the process of scarifying should not prove equally beneficial to the turnip or any other crop. Indeed, some are of opinion that what is usually called a *stale* furrow, in contradistinction to a newly ploughed one, is more favourable to the germinati after-growth of a plant like the turni a sowing on soil freshly turned up.



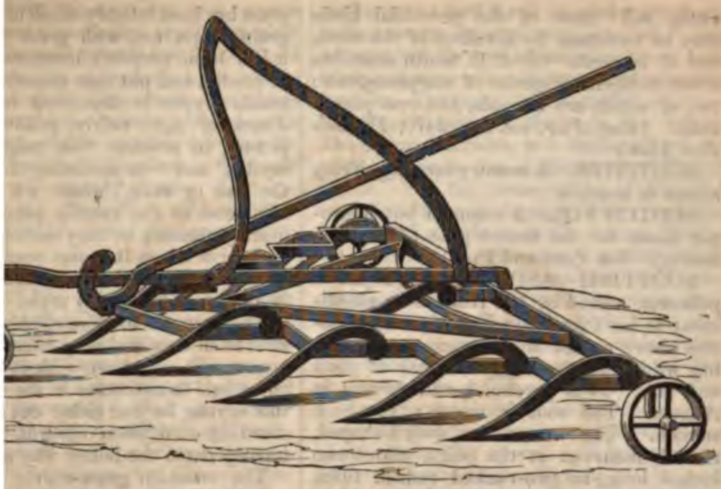
BIDDELL'S SCARIFIER.

A great improvement on Fuller's Extirpator, was *Finlayson's patent self-cleaning Harrow*. This well-known implement may be called the parent of several of description, which, in improved for subsequently come into use.



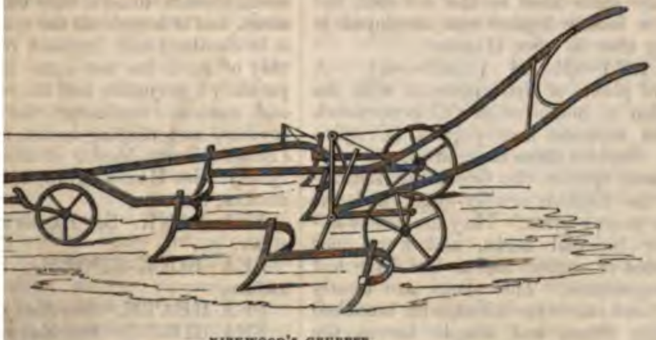
FINLAYSON'S HARROW.

Wilkie's parallel adjusting Brake is very nearly allied to the implement last mentioned: its chief improvement consists in the triangular adjustment of the teeth or prongs, and the facility with which they may be completely thrown out of work; whereas, with Finlayson's harrow this can only be partially done, the hind teeth of the latter still retaining some hold of the ground, even though the first row be lifted up. This we are aware has been represented as an advantage, inasmuch as the slight hold retained by the back row of tines the implement from running on the heels, when turning at the end stetches on hilly ground. We se in this as an argument in favour of plement of the kind. Indeed we ar disposed to give the preference to Wilkie's brake, which, by a parall ment of the frame in which the fixed, can, either at the turnings action, be elevated or depressed



WILKIE'S PARALLEL ADJUSTING BRAKE.

Grubber, in its operation,
embles those last described;
r to them in working. The
is obtained by pressing on the
ts of the machine, whether in
is so simple and yet so powerful in its effect as to regulate the depth of the tines to the greatest nicety; or, in cases of obstruction, to throw them out of work altogether. It is an admirable implement, and well deserving the high commendation which has been bestowed on it.



KIRKWOOD'S GRUBBER.

HZERIA, THE MARSH
palustris, named in honour of
mes Scheuchzer, German bo-
erennial native, but very rare
in marshes and wet spongy
g in June. The root is creep-
mooth, with a lax, white, shin-
Stem erect, wavy, a span high,
ose; leaves few, cylindrical,
wers about five, in a terminal
brownish green, accompanied
lanceolate bractes; the seed
les, the size of a pea, coria-
wrinkled. (*Smith's Eng. Flor.*
)

A term signifying twenty pounds, in speaking of the weight of cattle or swine.

SCORING. A provincial term signifying the glossing or making the furrow-slice in ploughing or turning land up, by the plough acting as a trowel. It is sometimes written scowering.

SCORPION-GRASS (*Myosotis*, from *myos*, a mouse, and *otos*, an ear; fancied resemblance in the leaves.) All the perennial species of this genus are very beautiful, especially the well-known Forget-me-not (*M. palustris*). They grow best in moist places, or by the edges of ponds or ditches; they may also be grown in pots among alpine plants. The annual species like a dry sandy soil: most of the perennial kinds may be increased by divisions of the roots, and all by seeds. Sir J. E. Smith describes seven indigenous species of scorpion-grass; two of which are annuals, the rest perennials. (*Eng. Flor.* vol. i. p. 247.; *Paxton's Bot. Dict.*)

SCOTCHES. A country term signifying scores or notches.

SCOTCH FIR. A common but improper name for the Scotch pine (*Pinus sylvestris*). See PINE and FIR.

SCOTTISH ASPHODEL (*Tofieldia palustris*, named by Mr. Hudson in compliment to his friend Mr. Tofield). The species above named is indigenous and growing wild near the boggy margins of pools and rills. It is perennial, and flowers in August. The root is woody; the herb smooth. The leaves are sword-shaped, ribbed, incurved at the point, about two inches long, in two-ranked radical tufts. Stem solitary, four or five inches high, bearing a small oblong spike or head of greenish white, inodorous flowers. (*Smith's Eng. Flor.* vol. ii. p. 198.)

SCOURING. See PURGING.

SCUD. Provincially to clear with a spade or spittle.

SCUFFLER. An implement of somewhat the same kind as the scarifier, but which is mostly lighter and employed in working after it. See HARROW.

SCURVY-GRASS (*Cochlearia*). A genus of plants of little interest, with the exception of horse-radish (*C. armoracea*), and the common scurvy-grass (*C. officinalis*). Besides these there are three other indigenous species, the Greenland scurvy-grass, the English scurvy-grass, and the Danish scurvy-grass. They are either annual or biennial herbs, and were once celebrated as antiscorbutics, but have lost their reputation. The plants are mostly smooth and rather succulent, with branched spreading stems, and simple leaves, the radical ones stalked and most entire. Flowers white, or pale purplish.

The common scurvy-grass is cultivated in gardens for its leaves. It flourishes best in a sandy moist soil, but will succeed in almost any other, especially if abounding in moisture. The situation must always be as open as possible. It is propagated by seed, which should be sown as soon as it is ripe in July or June, for if kept from the ground until the spring, they will entirely lose their vegetative power, or produce plants weak and unproductive. The sowing is performed in drills eight inches apart, and half an inch deep. (*G. W. Johnson's Kitchen Garden.*)

SCYTHE. This implement for mowing grass has been latterly much us
grain crops, and with great
it has been properly mounte
or cradle, and put into expert
cradle-scythe is described i
Journ. of Agr. vol. iv. p. 35
p. 346., in articles "on rea
scythe," and "on mounting t
the bow or rake," which we
commend to the careful peru
literary farmer, as they conta
formation which it seems poss
on the entire subject of whic
in a clear and masterly style.

Drummond's iron-handled
sidered in Scotland very effect
mower will cut down with it
and a half to two acres in the
this scythe he can either cut
standing corn when *upright*, o
he may deem the better way a

The common grass-scythe
and barley also very well w
but the mower will perceive hi
lay down evenly and at right
the standing corn, for the co
the binders, a heavy crop of
this scythe, even if furnished

The Hainault or Flemish
favourite Belgian implement
corn, appears to be a very effi
ment, but although all the tria
it in Scotland and England re
ably of it, it has not come in
partially; prejudice and the re
and custom rendering the
scythes, and reaping-hooks, m
(*Doyle's Pract. Husb.*; *Willich*
cyclo.) See HAY-MAKING, RE
SICKLE, &c.

SEA BANK. See BANKS a
MENT.

SEA BUCK-THORN. S
THORN.

SEA-HEATH. See HEATH

SEA-HOLLY. See ERYNG

SEA-KALE. See KALE.

SEA-LAVENDER. See T

SEA-MUD or OUSE. Thi
deposition from salt-marshes a
shores, is found to possess ver
properties, and to be a useful
the soil where it can be obtai
quantity. See ALLUVIUM and W

SEAM. A provincial term
any fatty substance, as tallow,
lard. A seam of corn is also a
eight bushels, and a seam of wo
load, or about three hundred wei

SEAM PRESSER. See Ro

SEA-MILKWORT. (*Glaux*,
kos, grey, in allusion to the co
leaves.) The common sea-mil

salt-wort (*G. maritima*), is a pretty indigenous perennial plant, growing dantly in muddy salt-marshes. It is cultivated in open sandy loam, and is ased from seeds. The stem is erect, three ur inches high, densely clothed with ic-oblong, entire, smooth leaves, pale neath; saltish to the taste. Flowers ry, solitary, nearly sessile, flesh-co- d. (*Smith's Eng. Flor.* vol. i. p. 336.)

A-PARSNIP. See Samphire, The KLY.

A-SAND. See Sand.

A SHELLS. All marine shells where can be obtained in sufficient quantity, a durable and lasting addition to the See Oyster Shells.

A-WARE. A term frequently applied weeds thrown up by the sea in many ions, and which is collected and made f as manure and for other purposes. nsists principally of the *Quercus ma-* and various species of *Fuci*, and has the names of sea-wrack, ore weed, sea- , &c. See Kelp.

A WEED. See Kelp.

A WRACK-GRASS. See Sea- and Grass-Wrack.

DGE. (*Carex*, from *careo*, to want, pper spikes being without seeds.) s a very extensive genus, the species ich are uninteresting; part of them tives of marshy situations, while a rive on dry sandy eminences: they reely, by which they are increased. oots are, perhaps without exception, nial, mostly creeping; sometimes and tufted only; herbage grassy; imple, generally with thin finely ser- and sharply cutting angles, without or joints. Leaves linear, pointed, oughish, with similarly cutting edges; bases more or less tubular and sheath- membranous at the summit, often ed; the upper ones becoming bractes. E. Smith enumerates and describes s than sixty-two indigenous species of *es.* (*Paxton's Bot. Dict.; Smith's Eng.* vol. iv. p. 77.) See Reed.

DGE BIRD, or SEDGE WAR- R. See Warbler and Black-headed ING.

ED is the reproductive part of a resulting from a change effected in ules by the process of impregnation: tains the embryo or rudiment of a plant. As soon as the pollen is in- ced into the ovule, its foramen, which reviously open, closes, its integument ns, its pulpy contents consolidate, he embryon is seen between its coty- s, or in some other position, when are absent as an organised body. The seed is nourished by a placental canal attached to the axis of the seed vessel; but when it is fully formed and capable of sustaining a separate existence, it separates from it. The point of attachment and separation constitutes the scar, or hilum. The forms, surfaces, and character of the testæ of seeds are different in different plants. For the preservation of the seed from insects and decomposition, and for food for the embryo, seeds contain fecula, saccharine, oily, and gummy matter within their coverings, and sometimes acrid poisonous principles. In their coverings they also contain mucilage, oil, both fixed and volatile, and other principles which man makes subservient to his use, either as diet or condiments, or other purposes. Seed is a form of reproductive matter peculiar to flowering plants, its equivalent in flowerless plants being the sporuli. It is commonly and very justly remarked, that as the seed is the part intended by nature to multiply the races of plants, in this respect it resembles the egg, and like it long retains its vitality.

The period for seed-sowing is most important to the operations of the agriculturist. Nature has provided special contrivances for ensuring the dispersion of seed and its migration from place to place; such, for instance, as being discharged with force by the sudden explosion of the case or seed-vessel in which it is generated; having membranous wings that render it buoyant, and being provided with many other means to avoid destruction. But this idea, although to a certain extent true, is frequently misapplied to seed-vessels, as in the instance of the dandelion, the ash tree, the sycamore, &c.; in these latter cases, the part to which the name of seed is given is a true pericarp, or seed-vessel. On the other hand, many kinds of seed-vessels, such, for instance, as those of corn, of labiate and boraginaceous plants, &c., are miscalled seeds, or naked seeds.

The choice of the seed intended to be sown is an object of greater importance than many farmers seem to imagine. It is not sufficient that the finest grain be chosen for this purpose, unless it be likewise clean from weeds. In procuring seed, it should be a rule with the farmer to purchase or reserve such as is the most full, plump, sound, and healthy, whatever the kind may be, as it is perhaps only in this way that crops of good corn can be ensured. And this practice is still more obvious from the circumstance of its being in some measure the same with plants as with animals, that the produce is in a degree similar to that from which it originated. See Grasses,

Barley, Wheat, Oats, Temperature, &c.

The usual quantity of seed applied per acre for the ordinary crops of th
farmer when either broadcast, dr
dibbed, is as follows:—

		Time of sowing.	Broadcast.	Drill.	Di
Wheat - -		Sept. to Dec. -	2½ to 3½ bush.	2 to 3 bush.	1½ to
Oats - - -		Feb. to April -	4 to 6 . -	3½ to 4½	2½ to
Barley - -		Feb. to May -	3 to 4	2½ to 3½	
Rye - - -		Aug. and Sept. -	2½ to 3½	2 to 3	
Beans - -		Nov. to March -	3 to 4	2½ to 3½	2 to
Peas - - -		Jan. to March -	3½ to 4½	3 to 4	3
Tares - -		Aug. to March -	2½ to 3	2 to 2½	
Buckwheat - -		May - -	2 to 2½	2	
Clover, Red - -		March and April -	12 to 16 lb.	10 to 14 lb.	
———, White	Mixed seeds	Ditto - -	3 to 4		
Trefoil		Ditto - -	2		
Red Clover		Ditto - -	2		
Rye Grass		Ditto - -	1 peck		
Turnips - -		May to Aug. -	2 to 3 lb.	1½ to 2 lb.	
Mangel-wurzel -		April and May -	- -		
Potatoes - -		March to June -	- -	20 to 25 bush.	

The quantities here given are those common throughout the island. But from the general custom in Flanders, and from the extensive practice which I have witnessed on the farms of Mr. Hewitt Davis and other excellent farmers, I am inclined to think that these quantities may be considerably reduced. As in most cases it is usual to have on the land many more seedling plants than the soil can properly mature, thinner sowing has the effect of producing stronger, healthier, and more prolific heads; and I am still inclined to this opinion in favour of thinner sowing, notwithstanding I am aware that such excellent agriculturists as Lords Leicester and Western practise, and strongly recommend, thick sowing.

As to the season for sowing, only general directions can be given. It is a highly important subject, much too little attended to in general: for instance, in the north of England, they are frequently sowing weeks earlier than in the south; and yet it must be evident, as summer arrives earlier in the last-named portion of our island, that the practice in the south should be reversed; as by so doing a longer period is allotted for the perfection of the crop.

SEED-LIP. A sort of basket, in which the sower carries the seed he is about to scatter over the ground.

SEEL. A term provincially applied to time or season in respect to crops, as hay seel, or hay time, and barley seel, or barley seed time, bark seel, barking season, &c. It is sometimes written *seal.*

SEG. A country name for a castrated bull.

SEGRIM, or SEAGRIM, the name provincially applied to the weed ragwort.

SEGS. A local name for sed
rices).

SELF-HEAL. (*Prunella.*) T
mon self-heal, or slough-heal (*P.*
is an indigenous perennial plant,
mon in meadows and pastures. T
are a span high. Leaves ovat
stalked. Flowers numerous, deep
blue, in dense, solitary, erect,
spikes. (*Smith's Eng. Flor.* vol. iii.

SEPTA. In botany, the partitio
divide the interior parts of a fruit.

SEPTEMBER. The ninth mon
year. *Farmer's Calendar.*—The
being now generally in, with the
of barley, the farmer's year may
be completed: but his work is nev
no sooner is one harvest finished
must prepare his ground for anoth
plough your fallows for the last tim
end of this month is the period
cultivator's main crops of wheat m
to be sown. Plough your bean,
clover lays, or stubble, for this cro
the heavy soils with lime; from
eighty bushels per acre will be
quantity. Look now to your seed
change your seeds frequently, and
sible, procure it from a colder, po
than your own, and free from
seeds of weeds. Prepare a steep f
seed wheat. There is none better th
made with common salt, so stron
swim an egg, and then drying the
rolling it in lime. Sow, however,
as you have steeped; otherwise le
seed spread thinly over a wooden f
it will heat, and lose its vegetative
This is a very old recipe; John Wa
mentions it as a preventive of the
more than 150 years since. Dibble

, it employs your poorer neighbours
l their children, and the saving of seed
early equal to the additional expense of
our; you are more certain also of a
d plant. There are few soils where the
ble or the drill cannot be easily em-
yed. Many farmers reserve all their
nure for their wheat. If you follow this
tem, you must now carry out the com-
st, and spread it on your land; if you
d any additional supply, rape-cake
wder, at the rate of six or seven cwt.
r acre, answers very well: bones do
o; but gypsum is worthless for this and
other corn crops. Sow your first crop
winter tares early in the month; some
mers mix it with either wheat, rye, or
nter barley; but the advantage is ques-
nable. Stock will reject the young corn,
d much waste ensues. Drill a little ma-
re with the seed; there is no crop which
ays the farmer better for any good or-
nic manure he may add to it than the
ch; it not only increases the bulk of
p, but pushes it forward, and brings it
ch nearer to the time when feed is
rcest; if the tares are (as they should
to be succeeded by turnips, the land
be more ready for them. Look well to
r live stock; wean the early foals; the
n is now commonly put to the ewes about
middle of the month for stock lamb.
not use the same ram more than two
rs, or you will be breeding in and in.
your sheep to kill lice; prepare a wash
them; add to a sufficient quantity of
er to dip one hundred sheep two pounds
rsenic and nine pounds of soft soap;
the mixture for a quarter of an hour.
end to the swine. In this month, the
s should cease farrowing till March, for
g pigs suffer much from cold. The
r should be kept from the sows from
e till November. After they have been
he stubbles send them into the woods;
corns or beech mast are plentiful, they
be half fattened before the end of the
on, and their health much improved.
farmers who live near the few remain-
forests of the south of England pay
h attention to this: they engage with
gular swineherd, who takes under his
ge the swine of a district, erects a tem-
ary shed for himself and his charge deep
he forest, sleeps with them by night,
nly returns with them when the acorns
exhausted. Where there are woods,
e is commonly fern to be had, collect as
h of this as you can for litter; it adds
r stock of dung, and this is a stock
cannot be too much increased; if the
ator has but an abundance of this, he
hardly err much in his farming; on all occasions, therefore, collect every kind of vegetable matter that will enlarge this supply; it adds to your own riches, while it employs the poor labourers: to this end, closely cut and rake your stubbles, form your stubble-walls in your farm-yard, and do this as soon after harvest as you can, before the straw becomes half rotten. If you have access to peat, heath, tanner's refuse bark, or saw-dust, spread them in as dry a state as possible over your yards; they all help to absorb the richest or liquid portions of the excrements of cattle. With regard to the *form* of dung-yards there is some little difference of opinion. "Some theorists," said Blakie, "recommend the yards to be made so concave as almost to amount to a well shape; others, again, assert that dung-yards should be formed convex, and assign as their reason that farm-yard dung should be kept dry. Practical experience points out that a yard a little hollowed is the most common and best shape." Plough your winter fallows; lay them up in ridges, that the frost may penetrate, and destroy grub and other vermin. Keep the hoe at work in the late turnip fields, if possible the horse-hoe. Look to and clean your poultry-houses: feed your geese—remember that Michaelmas is at hand.

GARDENER'S CALENDAR. *Kitchen-Garden.*—*Angelica*, sow. *Aromatic*, and *pot-herbs*, finish gathering. *Artichokes*, break down. *Asparagus*, plant forcing beds, weed, &c. *Balm*, plant. *Beans*, earth up, &c., *e.* *Beet, red*, may be taken up as wanted *e.* *Borage*, sow, thin advancing crops. *Borecole*, plant *b.* *Burnet*, plant. *Cabbages*, sow *b.*, plant, earth up advancing; red are ready for pickling. *Cardoons*, earth up. *Carrots*, advancing. *Cauliflowers*, prick out, draw earth to advancing. *Celery*, earth up, plant. *Chervil*, sow. *Coriander*, sow. *Corn salad*, sow. *Coleworts*, plant out. *Cucumbers*, attend to, sow *b.*, ridge out *b.* *Cress, American*, sow *b.*; *water* ditto, plant. *Dill*, sow, earthing up attend to. *Endive*, plant, attend to, blanch, &c. *Fennel*, plant. *Finochio*, earth up. *Herbary* requires dressing *b.* *Hoeing*, attend to. *Hyssop*, plant. *Jerusalem Artichokes*, take up as wanted *e.* *Kidney Beans*, earth up advancing *b.* *Lettuces*, plant out *b.*, sow. *Leeks*, plant *b.*, attend to advancing. *Melons*, attend to. *Mint*, plant. *Mushroom beds*, make; *spawn*, collect. *Nasturtium berries*, gather as they become fit. *Onions*, sow *b.* for transplanting in spring; attend to those advancing; gather for storing. *Potato*, take up for storing. *Orach*, sow. *Pennyroyal*, plant. *Pot majoram*, plant. *Peas*, hoe, &c. *Parsley*, cut down. *Radishes*, sow *b.* *Rhubarb*, sow. *Sage*, plant. *Savory*, borders which are vacant, to prepare them also for receiving roots and plants next month. Transplant peonies, flag irises, monk's-hood, Fraxinella, and such like plants, to part their roots, and remove each root to its destined position. Transplant evergreens. Plant cuttings of honeysuckles, and other shrubs; hyacinth and tulip roots for early spring bloom; and box by slips or roots. Mow grass lawn and walks, clear away flower stems, and trim flowering plants.

Sow seeds of bulbous flowers, if not done last month.

General Monthly Notices. — In the Latin and Roman Calendar this was the seventh month, and hence its name, from *Septem*, seven, and *Imber*, a shower of rain, this being the commencement of the rainy season. It had only sixteen days assigned to it in the Alban Calendar; these were increased to thirty by Romulus, to thirty-one by Julius Cæsar, but Augustus reduced it to its present number. The ancient Saxons called it Berst Monath, or Barley Month; and after the introduction of Christianity into our island, it was denominated Halig Monath, or Holy Month, from the religious ceremonies then performed in it. It was the Hertsmaand, or harvest month of the Dutch Republic.

This may be said to be the commencement of the sportsman's year, partridge shooting beginning on the first of the month, and on the same day the foxhound is let loose after the "cubs." As the wild flowers depart from the woods, the huntsman's voice begins to enliven the scene. A few flowers, however, still continue to bloom in our gardens: the late-flowering Crocus (*C. serotinus*), about the 9th of the month; the

ciduous, simple, s
serrated, seven-lobe
ers white, numerou
rymbose, downy pa
fruit, which is not
hawthorn, become
wholesome after th
or when, like the m
a kind of putrefact
prefers its flavour t
latter is now beco
Eng. Flor. vol. ii.
Flor. vol. ii. p. 335.)

SESSILE. A b
leaves without foot
close upon the stem

SETACEOUS
shaped like bristles.

SETON. In far
stituted of a numbe
and passed throug
needle, for the pur
issue.

SETTER. (*Ca*
ful shooting dog, w
crouch to the gam
two principal vari
English and the Iri
in size the usual
found of every colo
red dog, of very c
powers, and excell
(*Blaine's Encyclo.*

SETTERWORT

SETTLEMENT
settlement of a pau
several ways.

1. *By birth.* — Th
ment of a person,
weakest evidence o

in wedlock have the same settlement
ir parents, being referrible in the first
ıce to that of the father. If neither
a settlement, then the place of birth is
ild's settlement, being so *primâ facie*
cases till another is found. (*Rex* v.
n, 6 T. R. 653.)

Settlement by marriage. — A woman
s the settlement of her husband.
f he has not a settlement, then she re-
her own. (4 *Burn's Just.* 26th ed.
.)

ettlement by apprenticeship. — By the
W. & M. c. 11. s. 8., a person who is
denture bound apprentice for seven
and shall inhabit in any parish, such
ticeship and inhabiting shall be
d a good settlement. (*Rex* v. *Linkin-*
3 B. & Adol. 418.) Parish appren-
dentures are exempted from the
duties.

ettlement by hiring and service. — This
f acquiring a settlement, which was
e most fruitful source of litigation,
abolished, for by the 4 & 5 W. 4.
. 64. it is declared, that from and
he 14th of August, 1834, no settle-
hall be acquired by hiring or ser-
by residence under the same hiring
rvice. Previous to this act, under
tute 3 W. & M. c. 11. and 9 & 10
c. 30., it was enacted, that any un-
d person legally hired for, and re-
g in such service for the space of one
year, acquired a settlement.

ttlement by renting a tenement. — By
. 4. c. 57. it is enacted, that no per-
ll acquire a settlement in any parish
nship by or by reason of settling
renting, or paying parochial taxes
tenement not being his or her own
ty, unless such tenement shall consist
eparate and distinct dwelling-house
ding, or of land, or of both, *bonâ fide*
by such person in such parish or
ip at and for the sum of 10*l.* a year
least for the term of one whole year;
nless such house, building, or land
be actually occupied, and the rent
or one whole year.

foregoing are the chief means by
a settlement is acquired in a parish.
are, or were, other modes, which are
ne degree incidental to these, but
effect has been much narrowed by
s wholesome statutes; such are those
yment of parochial taxes, by the en-
nt of a legal or equitable estate, by
g a parochial office, by acknowledg-
f the parish, by certificate, relief, non
against an order of removal.

ACK. A provincial term applied to
ste corn left in the fields; also to the stock turned upon the stubble after harvest; and likewise to such grounds as lie open as common fields.

SHALOT or ESCALOT. (*Allium ascalonicum.*) Having a stronger taste than the onion, yet not leaving, as it is said, the strong odour on the palate which that species of Allium is accustomed to do, the shalot is often preferred, and employed in stead, both in culinary preparations and for eating in its natural state. Each offset of the root will increase if planted in a similar manner to its parent. The planting may be performed during October or November, or early in the spring, as February, March, or beginning of April. The first is the best season, especially if the soil lies dry, as the bulbs become finer; but otherwise the spring is to be preferred, for excessive moisture destroys the sets. Mr. Henderson supports the practice of planting in autumn, and says "if the smallest offsets are employed for planting, they never become mouldy in the ground, and are never injured by the most intense frosts." (*Mem. Caled. Hort. Soc.* vol. i. p. 199.) They are to be planted six inches asunder each way, in beds not more than four feet wide, being usually inserted in drills, by the dibble, or with the finger and thumb. (*G. W. Johnson's Kitch. Gard.*)

SHAMROCK. The national emblem of Ireland. The term "shamrock" seems a general appellation for the trefoils, or three-leaved plants. There has been much dispute as to what is the true Irish shamrock; it has generally been considered to be the clover or *Trifolium repens.* A writer in the *Journ. of the Roy. Inst.* No. 3. advances abundant testimony in proof of the wood-sorrel (*Oxalis acetosella*) being the true shamrock. The curious in such matters will find the article quoted in the *Quart. Journ. of Agr.* vol. iii. p. 365.

SHARE OF A PLOUGH. That part which cuts or breaks the ground. See Plough.

SHARROCK, ROBERT, was born at Adstock in Buckinghamshire. He became prebend and archdeacon of Winchester, and rector of Bishop's Waltham and of Harewood in Hants. He died in 1684. Sharrock wrote,

1. The History of the Propagation and Improvement of Vegetables by the Concurrence of Art and Nature; written according to the Observations made from Experience and Practice. Oxford. 1660, without his name. 8vo. Again, Oxford. 1666 and 1672. 8vo., with the author's name. 2. Improvements to the Art of Gardening; or an exact Treatise of Plants. London. 1694. folio. 3. De Officiis secundum Humanæ Rationis dictatæ, &c. 4. Judicia de variis Incontinentiæ Speciebus. 5. De finibus Virtutis Christianæ. (*G. W. Johnson's Hist. of Gard.*)

SHAW. A country term applied to a wood that encompasses a close.

capable of clipping from fourteen or fifteen to twenty or twenty-five sheep in the day, and more are frequently done by very expert persons. Great care should be taken not to cut or prick the animals; but where this accident happens, in the northern parts of the kingdom, they touch the part with a little tar or sheep salve; and in Sweden it is often done with train oil and resin melted together. After shearing, the sheep should be turned into a warm dry pasture. See SHEEP.

SHEARLING. The name given to a sheep that has been once shorn.

SHEARS. A name applied to some instruments employed in agriculture. The shears used for sheep shearing are of very ancient origin: they were termed *forfex* by the Romans; and it appears that no improvement has been made on the instrument. In a collection of antique gems at Berlin, called the Stosch collection, is a gem bearing a representation of a newly shorn sheep, and the shears, which are exactly the same as those now used. Shears are also employed for clipping hedges.

SHEATH. In botany, the lower part of the leaf that surrounds the stem.

SHED. See CATTLE SHED.

SHEEP (*Ovis aries*, nat ord. *Ruminantia*.) Of the original breed of this invaluable animal, which is in modern farming almost equally important for furnishing the farmer with a dressing of manure, and the community at large with mutton, clothing, and other almost necessaries of life, nothing certain is known. Several varieties of wild sheep have by naturalists been considered entitled to the distinction of being consi-

grasses of our water
herd is aware that
after being for ages
them invariably to
the field in which
these facts tell the
ligible language that
pasturage, and, if p
occasionally aromati
conduce to the prosp
this view parsley ha
tivated. Then, ag
found to frequent al
line exudation are
the salt clay of som
lands to such an ex
are denominated *lic*
most skilful of the
never allow their sh
The female sheep g
one weeks, produce
than two at a birth
dance of strong tas
limited quantity of
temperate climates
which is annually r
countries the animal
In its wild state it h
these have nearly d
the breeds of domest
ticated sheep is kno
ferent names, accor
" The male" says M
ram or *tup*. While w
nominated a *tup*, or
and in some parts o
a *pur lamb*. From
until he is shorn he

lways taking its date from the time
ring. In many parts of the north of
d and Scotland he is a *tup lamb*, after
lved and until he is shorn, and then
hog, and after that a *tup*, or if cas-
a *dinmont* or a *wedder*. The female
e or *gimmer lamb* until weaned, and
gimmer hog, or *ewe hog*, or *teg*, or
ewe. After being shorn she is a
g ewe or *gimmer*, sometimes a *theave*
ble-toothed ewe, or teg; and after-
a *two-shear* or *three-shear*, or a *four*
ooth ewe or *theave*. In some of the
n districts, ewes that are barren or
ve weaned their lambs are called
yeld ewes. (*Youatt on Sheep*, p. 2.)

teeth of the sheep are in number
e as those of the ox, viz. eight incisor
ng teeth in the lower jaw, and six
eeth on each side, and in each jaw.

n the lamb is born he has either no
teeth or only two but before he is
old he has eight. The two central
these are shed, and again at two
d attain their full growth: when
two and three years of age, the
t incisors are shed, at three years
four central teeth are fully grown,
he has six complete teeth. That
itive breed of sheep were horned,
e direct evidence. (*Gen.* xxii. 13.:
vi. 6.) Immense flocks of this ani-
e in all ages of the world been kept
but more universally for their wool
s than for their flesh; for that is
any nations by no means a favourite
The Calmucs and Cossacks still pre-
of the horse and the camel; the
d who can procure other flesh rarely
t of the Merino; to the North Ame-
is still an object of dislike. English-
erhaps, consume more mutton than
ple of any other country, but the
r this is certainly of modern ori-
t has rapidly extended, as better
and sweeter kinds of mutton have
oduced.

imits will not allow me to describe
t variety of breeds of sheep which
to various countries, I shall, there-
nfine myself to a brief notice of
hich tenant our own islands, refer-
se of my readers who need further
tion to the valuable work of Pro-
Youatt "On the Sheep," and to
or Low's "Illustrations of the Breeds
nestic Animals," from whence this
is chiefly taken; there is also an ex-
essay upon the sheep by Mr. Ell-
Baxter's "Library of Agricultural
dge."

s I. — SHEEP WITHOUT HORNS.

ew Leicester Sheep, says Mr. Youatt, which comprehends the most excellent of Bakewell's own breed, and of Culley's variety or improvement on it, is precisely the form for a sheep provided with plenty of good food, and without any great distance to travel or exertion to make in gathering it. It should have a head hornless, long, small, tapering towards the muzzle. Eyes prominent, with a quiet expression; ears thin, rather long, directed backwards; neck full and broad at its base, gradually tapering towards the head, particularly bare at the junction with the head; the neck seeming to project straight from the chest, so that there is, with the slightest possible deviation, one continued horizontal line from the rump to the pole. The breast broad and full; the shoulders broad and round, no uneven or angular formation, no rising of the withers, no hollow behind the situation of these bones. The arm fleshy throughout, even down to the knee. The bones of the leg small, standing wide apart, no looseness of skin about them, and comparatively bare of wool. The chest and barrel deep and round; the ribs forming a considerable arch from the spine; the barrel ribbed well home; the carcase gradually diminishing in width towards the rump; the quarters long and full; the legs of a moderate length; the pelt moderately thin, soft, and elastic, covered with a good quantity of white wool, not so long as in some breeds, but considerably finer. The principal recommendations of this breed are its beauty, and its fullness of form. In the same apparent dimensions greater weight than any other sheep; an early maturity and a propensity to fatten, equalled by no other breed; a diminution in the proportion of offal, and the return of most money for the quantity of food consumed." (*Culley on Live Stock; Marshall's Midland Counties; Youatt on Sheep*, p. 111).

The Teeswater Sheep was bred originally on the banks of the Tees; it came from the stock of the old Lincolnshire, and like them it is nearly extinct. It was a tall clumsy animal, polled, and with white face and legs; they were crossed by the Disley sheep, because a smaller and a better breed, and few traces of them are now to be found.

The Lincolnshire Sheep.—Culley described the old breed of Lincolnshire sheep half a century since, as having "no horns," white faces, long, thin, and weak carcases; the ewes weighing from fourteen to twenty pounds per quarter, the three year old wethers from twenty to thirty pounds; thick rough white legs, large bones, thick pelts, and long wool, from ten to eighteen inches, and weighing from eight to fourteen pounds per fleece, and covering a slow-feeding coarse-grained carcase of mutton. (*Culley on Live Stock*, p. 111.) Culley, however, ran into the opposite extreme: if the Lincolnshire farmers bred only for the wool, he regarded only the mutton. A cross between the two produced a very profitable and much improved animal.

The Cotswold Sheep have been long celebrated for the fineness of their wool. In 1467, a flock of these sheep were carried into Spain by licence from Edward IV. Gervis Markham, in the time of Queen Elizabeth, describes them "as long-woolled, and large boned breed. Few of the original Cotswold breed, however, now remain: they have been gradually improved by crossing with the Leicester sheep, and it is this half bred Cotswold and Leicester which now chiefly tenants the Gloucestershire and Worcestershire farms. The old Cotswold sheep are described by Mr. Youatt, as being taller and longer than the improved breed, comparatively flat-sided, deficient in the fore-quarter, but full in the hind-quarter, not fattening so early, but yielding a longer and heavier fleece." (*Youatt on Sheep*, p. 340.) The mutton of this breed is well described by Mr. Ellman, as fine-grained and full-sized, but capable of great improvement by proper crossing. "The Cotswolds," he adds, "differ from the Southdown in several particulars: the skin of the Cotswold is much thicker than the Southdown; the head long and thin; ears wide and not too thin, having no wool but a tuft on the poll; wool below the hock considered objectionable. On the Cotswold they never allow two rams to run together." He thinks twin ewes have much more to do with getting twins than twin rams: both however should be attended to, as well as a still more important particular, their keep. (*Baxter's Lib. of Agr.*)

The Dartmoor Sheep.—"The short or rather middle-woolled sheep of Devonshire," says Mr. Youatt, "a few of which are still seen in South Devon, and on the greater part of the hills in the northern district, but most numerously on the forests of Dartmoor and Exmoor, are everywhere of nearly the same character, and betray on a smaller scale a great affinity with the Dorsets: having white faces and legs; some with and some without horns; small in the head and neck, and generally small boned; carcase narrow and flat-sided, weighing when fat from nine to twelve pounds per quarter; the fleece three or four pounds in weight in the yolk; wool short, with a coarse and hairy top." (*On Sheep*, p. 251).

The South Down Sheep.—The remarks of Mr. Ellman of Glynde, in Sussex, who has done more than any one to improve the race of South Down, are so practical and
that what he has done so well it is
to give in any other language: h
when speaking of this valuable breed,
head should be neither too long n
short, the lip thin; the neck neith
long nor too short, but thin next th
and tapering towards the shoulders.
Down breeders object to a long thi
it denotes delicacy. The breast sh
wide and deep, projecting forward
the fore legs; this indicates a good
tution, and disposition to feed. Th
ders should not be too wide betw
plate bones, but on a level with th
if the shoulder blades are wide on
the animal generally drops beh
shoulders. The chine should be
straight from the shoulders to the
ribs should project horizontally
chine, for the animal will then lay
on the prime parts; the sides
parallel; the rump long and broa
set on high, and nearly on a leve
chine; the hips wide; the ribs cir
barrel-shaped; the legs neither ver
very short; the bones moderat
(*Baxter's Lib. of Agr.* p. 570.)

Romney Marsh Sheep.—To
beginning of this century, Mr.
scribed "the pure Romney M
sheep as distinguished by thic
length of head, a broad foreh
tuft of wool upon it, a long and t
and carcase flat-sided; chine sha
ably wide on the loins, breast n
not deep, and the fore quarter
nor full; the thigh full and broad,
large; the tail thick, long, and
legs thick, feet large, the musc
bone large. Wool long and not
much internal fat, much hardi
quiring no artificial food during th
winter, except a little hay." (
Sheep, p. 334.) With all these
perties, however, the old Romn
sheep has been nearly obliterated
sional crossings with the Leice
which, by judicious management
care not to render the breed too
the introduction of too much of
cester), has produced a sheep p
sufficient hardiness for these bleak
yet producing more symmetry of
earlier maturity, and greater prop
fatten.

The Cheviot Sheep are a pecu
which are kept on the extensive
the Cheviot Hills. They are des
having "the face and legs generally
the eye lively and prominent; the
nance open and pleasing; the ear
with a long space from the ear to

ody long; and hence they are called
sheep,' in distinction from the black-
breed. They are full behind the
der, have a long strait back, are round
e rib, and well-proportioned in the
ers; the legs clean and small-boned,
he pelt thin, but thickly covered with
short wool: they possess very consi-
le fattening qualities, and can endure
hardship, both from starvation and
He is fit for the butcher at three
old, and at two when crossed with the
ster." (*Youatt on Sheep*, p. 285.; "On
ng the Mountain and Cheviot Sheep,"
r. Hogg, *Quart. Journ. Agr.* vol. i.
5.)

ss II. Horned Sheep.

e Dorset Sheep.—"Most of these,"
Mr. Youatt, "at least of the pure breed,
ntirely white; the face is long and
, and there is a tuft of wool on the
ead; the shoulders low and broad;
ck straight; the chest deep; the loins
; the legs rather beyond a moderate
h, and the bone small. They are, as
form would indicate, a hardy and
breed. They are good folding sheep;
mutton well flavoured, averaging,
three years old, from sixteen to twenty
ls a quarter. Their principal distinc-
and value is the forwardness of the
who take the ram at a much earlier
of the year than any other species,
hus supply the market with lamb at
me when it fetches the highest price.
sheep are principally bred within
le of twelve miles round Dorchester,
a considerable quantity of house
for the London market is produced.
her parts of Dorset the South Down
prevails; except in Portland and on
sandy heath soils near Warebone and
, where a poor small-horned breed
ils, with black muzzles, well adapted
his locality. Their meat is tender.
att on Sheep, p. 251.)

e Norfolk Sheep.—"A peculiar variety
ath sheep," says Mr. Youatt, "has been
in the localities of Norfolk and Suf-
from time immemorial. The carcase
ong and slender; legs long; face and
black or mottled; face long and thin;
ountenance lively, and expressive of
led timidity and wildness: taken alto-
r, there was more resemblance to the
in the Norfolk sheep than has been
ved in any other species. They were
pted to be improved by being crossed
the South Downs; but at length the
South Down was generally preferred
pure Norfolk, and, in consequence,
ace is now nearly extinct." (*On Sheep*,
7.)

The Merino Sheep. — This celebrated breed are, in Spain, divided into the *estantes*, or *stationary*, and the *transhumantes*, or *migratory*. The first are those which remain during the year in one place or farm: the last travel some hundred miles every year in search of pasture. They are thus described by Mr. Low in his excellent *Illustrations of the Breeds of Domestic Animals.*

"The stationary sheep consist partly of the larger sheep of the lower country, partly of mixed races, and partly of pure Merinos, who do not differ in any respect from the migratory sheep of that name, except in the method of treatment. The stationary Merinos are reared where the district or farm affords them sufficient food during the whole season. They are most numerous in the central countries, where the pastures are less apt to be scorched by the heats of the summer, as in Segovia, and the mountain ranges to north of Madrid.

"The migratory sheep have been reckoned to amount to ten millions, which is probably equal to half the whole number of the sheep of Spain. They may be divided into two great bodies: those which are to pass further to the eastward, to Soria, or even beyond the Ebro. These vast hordes of sheep break up from their winter cantonments, south of the Guardina, about the 15th of April, and proceed chiefly northward. The rams having been admitted to the ewes in the month of July, the lambs are born in November. In the course of their journey northward, they are shorn in large buildings erected for that purpose. The western, or Leonese division, crosses the Tagus at Almaray. The eastern, or Sorian division, crosses the same river further to the eastward, at Talavera, and in its course approaches the city of Madrid. Having reached their destination, they are pastured until the end of September, when they recommence their journey southward. Each of these journeys, of several miles in length, occupies about six weeks in travelling. The older sheep, it is said, when April arrives, know the time of setting off, and are impatient to be gone. In the ten or twelve latter days, increased vigilance is required, on the part of the shepherds, lest the sheep should break out. Some of them do so, and pursue their accustomed route, often reaching their former year's pastures, where they are found when the main body arrives; but, for the most part, these stragglers are carried off by wolves, which abound along the course which the migratory flocks pursue.

"These migratory sheep are divided into flocks of a thousand or more, each under the charge of its own mayoral, or chief

"When the sheep arrive at the esquilcos, or shearing-houses, which is in the early part of their journey northward, a sufficient number of shearers are in attendance to shear a thousand or more in one day. The esquilcos consist of two large rude rooms, and a low narrow hut adjoining, termed the sweating-house. The sheep are driven into one of the large rooms, and such of them as are to be shorn on the following day are forced into the long narrow hut as close as it can be packed, where they are kept all night. They undergo in this state a great perspiration, the effect of which is to soften the hardened unctuous matter which has collected on the fleece. They are then shorn without a previous washing, and the wool is left in the esquilcos, where it is sorted, and made ready for sale. By this arrangement 1000 sheep, or more, are shorn with only the delay of a day.

"The shepherds employed in tending these sheep amount to 50,000, which, supposing there to be ten millions of sheep, is at the rate of 200 to each shepherd. The number of dogs is calculated at 30,000. These shepherds form a peculiar class of men, strongly attached to their pursuit, and living in a state of great simplicity. Their food is chiefly black bread, oil, and garlic. They eat the mutton of their sheep when they die or meet with accidents. In travelling they sleep on the ground, wrapping themselves in their cloaks; and in winter they construct rude huts to afford shelter. They seldom, it is said, marry, or change their calling.

"The whole of this extraordinary system

in order that the
maturity. The sal
form a subject of
is indeed a sour
equal to what the
their state of matu
these extensive mi
preserve the finen
ceived to be an er
ing and rearing w
duce this effect t
place. In Spain i
flocks of stationary
of all the finenes
countries of Euro
never moved off
them, wool is pro
the migratory floc
is of great antiqu
the habits of this
people, that it is li
of those ancient a
the desire of chang
agitates the feeli
tracted country.
preserved the mo
sheep with jealous
tries at length we
Golden Fleece of
race is now sprea
Europe.

"The Merino b
to so many countr
period more recent
tish Islands. Geor
triotic agriculturist
of this celebrated
and means were

make direct application to the
overnment for permission to ex-
sheep from the best flocks. The
as at once complied with; a small
e flock was presented to his Ma-
the Marchioness del Campo di
' the Negretti flocks, esteemed to
st valuable in Spain; and in re-
Majesty presented to the Mar-
ight splendid coach horses. This
ed in England in 1791, and was
ly tranferred to the royal farms,
those previously imported were
f or destroyed.

he first change of these sheep to
and luxuriant pastures of Eng-
suffered greatly from diseases,
e all, the rot, which destroyed
f them; and from foot-rot, which
em to a grievous extent. By a
ge of pastures these evils were
; and, after the first season, the
became reconciled to their new
and their progeny seemed tho-
aturalized, and remained as free
ses as the sheep of the country.
was from year to year carefully
; that of the original stock re-
affected by the change of climate,
hat of their descendants little de-
could be detected either in its
pensities or its fineness.

most distinguished breeders of
t this time in England are Lord
nd Mr. Bennet, M.P. for Wilt-
rd Western's stock is either Saxon,
en crossed by Saxon rams; Mr.
is pure Spanish, and has under-
ressive improvement by selection
uals of the same blood. The num-
flock amounted at one time to
as subsequently reduced to 3500.
eated in the ordinary manner of
this country. Lord Western's, it
d, is managed more in the Saxon
ith respect to protection from the
Mr. Bennet's fine flock, not-
ing it had been thus acclimated,
n great numbers in a severe win-
years ago, proving that the race
et lived sufficiently long in Eng-
e perfectly inured to its cold and
climate. Other gentlemen have
Merinos direct from Saxony, and
ined at once the highest perfection
ce; but there is little reason to
at their experiments will be more
than those previously made. Me-
lately been carried in some num-
reland, and may perhaps prove
ntageous than some of the exist-
; but this will not show the great
he Merinos, but the comparatively little value of the races which they have supplanted."

The first impression (says Mr. Youatt) made by the Merino sheep on one unacquainted with its value would be unfavourable. The wool, lying closer and thicker over the body than in most other breeds of sheep, and being abundant in yolk, is covered with a dirty crust, often full of cracks. The legs are long, yet small in the bone; the breast and the back are narrow, and the sides somewhat flat; the fore-shoulders and bosoms are heavy, and too much of their weight is carried on the coarser parts. The horns of the male are comparatively large, curved, and with more or less of a spiral form. The head is large, but the forehead rather low. A few of the females are horned, but, generally speaking, they are without horns. Both male and female have a peculiar coarse and unsightly growth of hair on the forehead and cheeks, which the careful flockmaster cuts away before shearing time: the other part of the face has a pleasing and characteristic velvet appearance. Under the throat there is a singular looseness of skin, which gives them a remarkable appearance of throatiness, or hollowness in the pile: the pile, when pressed upon, is hard and unyielding; it is so from the thickness with which it grows upon the pelt, and the abundance of the yolk detaining all the dirt and gravel which falls upon it; but, when examined, the fibre exceeds in fineness, and in the number of serrations and curves, that which any other sheep in the world produces. The average weight of the fleece in Spain is eight pounds from the ram and five from the ewe: when fatted, these sheep weigh from twelve to sixteen pounds per quarter. The excellence of the Merino consists in the fineness and felting quality of their wool, and the weight yielded by each sheep; the ease with which they adapt themselves to the climate, the readiness with which they take to the coarsest food, their gentleness and tractableness. Their defects are their unprofitable and unthrifty form, voracity of appetite, a tendency to barrenness, neglect of their young, and inferior flavour of the mutton. (*On Sheep*, p. 148.; Dr. Parry on the Merino sheep, *Com. Board of Agr.* vol. v. p. 337.; Sir Joseph Banks on ditto, *Ibid.* vol. vi. p. 269.; Mr. Downie on ditto, *Ibid.* vol. vii. p. 61.)

The Irish Sheep have been much improved by the importation of English rams. Culley describes them as ugly and ill-formed. Bodies large. Legs long, thick, crooked, and of a grey colour. Faces grey. Heads long, large flagging ears, sunken eyes. Neck long, and set on below the

the wool rarely weighs more than one pound.

With regard to the profitable management of sheep, it is only possible to offer general suggestions to assist the farmer. I have alluded already to the advantages of varying the food of sheep, and I shall refer at the end of this article to various important testimonials in favour of the superior profit derived from keeping sheep dry and warm. In every case they should have access to dry food, and, if possible, occasionally to those lands where heath and other plants which are indigenous to upland soils are to be found: in all cases, too, they should have access to common salt.

The importance of salt to the general health of sheep is now, in fact, generally admitted. Every farmer observes that his cattle, horses, &c., are remarkably fond of licking the salt earth of the farm-yard, stables, &c. In Spain, they give their sheep salt with great regularity: 112 lb. in five months to 1000 sheep. I subjoin the statement of the late Mr. Curwen. He employed salt to his live stock daily for years: —

For horses he gave	- 6 oz. per day,
Milch cows -	- 4
Feeding oxen	- 6
Yearlings -	- 3
Calves -	- 1
Sheep - -	- 2 to 4 per week,

if on dry pastures; but if they are feeding on turnips or coles, then they should have it without stint. Some give it to live stock on a slate or stone, some lay lumps of it in the cribs or mangers. It is

without stint; a
sheep always con
on this particula
on any other on
one year let this
bour, who did
quently, after lo
night, gave up th

There are seve
ment of sheep to
allude. *Coupling*
rarely attended t
tion to this impor
added in one se
in the other; but
in arranging this
points which ma
able than those a
Mr. Ellman is of
is hereditary: " E
satisfied me that
twin would get d
lambs than other
just previous to
should not be kep
food should be
parturition. Cle
yards he very pr
greatest importan
trated at from e
In the performan
calculated that,
the deaths do no
sand. Mr. Ellma
ewes to each ram,
employed, only fo
remain with the e
rate lots.

Statistics. — T

: number was 25,589,754;
uccock estimated them at
. M'Culloch, in 1834, states
e 32,000,000; the value of
00*l.*; and that of the ma-
llen articles 21,000,000*l.*;
r of persons employed in
ing of these goods about
tt on Sheep; Low's Pract.
ls of Dom. Animals; Bax-
M'Culloch's Com. Dict.)
valuable papers upon sheep
h the agricultural periodi-
is place, only give a brief
re is a letter by Mr. T.
o Board of Agr. vol. iv. p.
ng Sheep warm when feed-
ws very clearly the advan-
being kept dry and warm
subject not nearly so well
s desirable; see also "On
Timber Clumps)," by Dr.
High. Soc. vol. vi. p. 332.;
' Feeding Troughs," by Mr.
urn. of Agr. vol. ii. p. 114.;
Sheds for Sheep," by Mr.
l. xii. p. 290.; "On Shed
Childers, *Journ. Roy. Agr.*
)—407.; "On the Improve-
e-woolled Breed," *Com. to*
ol. vi. p. 65.; the Rev. Ed-
ht "On feeding Sheep on
ır," *Ibid.* p. 405.; "On the
" *Trans. High. Soc.* vol. i.
: Flesh Fly and Maggot,"
Ibid. p. 325., and by Mr.
ol. iv. p. 221., and *Quart.*
ol. i. p. 210. "On salving
. J. Graham, *Ibid.* vol. ii.
ve is composed of 7 lb. of
butter, 16 lb. of palm oil,
oil: and by Mr. Harkness,
25. "On the Loupingill,"
l Mr. Laing, *Ibid.* vol. iii.
Foot Rot," by Mr. Hogg
Riddell, *Ibid.* p. 307., by
rt. Journ. of Agr. vol. ii.
Mr. Black, *Ibid.* vol. iii.
Blindness in Sheep," by
Trans. High. Soc. vol. iv.
Rabies," by Mr. Dickson,
61.; "On certain Diseases
ining, Scab, &c.)," by Mr.
urn. of Agr. vol. ii. p. 697.;
ı and Natural History of
Mr. Wilson, *Ibid.* p. 354—
ting Sheep," *Ibid.* vol. iii.
the acute Dysentery," by
vol. v. p. 411.; "On the
503., and vol. vi. p. 117.;
iognomy of Sheep," *Ibid.*
"On different Breeds, and
dressing Tups," by Mr.

Hogg, *Ibid.* vol. xi. p. 105—108; "On a peculiar Affection of the Liver in Ewes," by Mr. Buckley, *Journ. Roy. Agr. Soc.* vol. ii. p. 116. See FOOD, MEAT, MUTTON, WOOL.

SHEEP, DISEASES OF. *Apoplexy.* — Bleed copiously; then give two ounces of Epsom salts in a quarter of a pint of water.

Blackwater. — Keep the bowels open with Epsom salts; and give a tea-spoonful of elixir of vitriol, or sulphuric acid, diluted with seven parts of water, in an infusion of oak bark.

Blackmuzzle. — Mix an ounce of verdigrease (acetate of copper), four ounces of honey, half a pint of vinegar; simmer them together over a fire for ten minutes in an earthern pipkin. Apply it to the mouth on a piece of rag.

Cough, or *Cold.* — Bleed; give a solution of Epsom salts.

Diarrhœa. See CALVES, DISEASES OF.

Dysentery. See DIARRHŒA.

Fly. — Fly powder: Two pounds of black sulphur, half a pound of hellebore; mix them together, and sprinkle the sheep from the head to the tail with a dredging-box. Sheep wash: The farmer will find this an excellent recipe: Half a pound of powdered white arsenic (arsenious acid), four pounds and a half of soft soap. Beat these for a quarter of an hour, or until the arsenic is dissolved, in five gallons of water. Add this to the water sufficient to dip fifty sheep. The quantity of arsenic usually recommended is too large.

Foot Rot. — One drachm of verdigrease (acetate of copper), one drachm of blue vitriol (sulphate of copper), one drachm of white vitriol (sulphate of zinc), two ounces of water, two drachms of nitric acid, two drachms of butter of antimony; pare away the horn, and apply the lotion upon a feather to the part affected.

Redwater. See REDWATER.

Rot. See ROT.

Scab, or *Schab.* — Apply a lotion formed of one ounce of corrosive sublimate, four ounces of sal ammoniac, dissolved in four quarts of rain water. This is a powerful stimulant, and must be used with caution.

Ticks. See FLY.

Wounds. — Wash the part, and apply a lotion formed of vinegar one pint, spirits of wine one ounce, spirits of turpentine one ounce, Goulard's extract one ounce. If the wound be a recent one, it is better to stitch it up with separate ligatures, which can be easily withdrawn, and dress with cold water.

SHEEP-DUNG. See FARM-YARD MANURE.

perfect protection of the sheep, they have sheds all round them, under which the sheep may lie without injury from rain, snow, or any sort of moisture. These usually are termed *standing folds*, and are either formed about the homestead or on some dry rather elevated situation on the farms, having the bottoms well laid with some sort of material that is capable of keeping the sheep dry and clean. See FOLD, FOLDING, and HURDLES.

SHEEP-HOUSE. A slight wooden building constructed for the purpose of containing and protecting sheep in bad weather, &c. Houses of this kind are usually made low for the sake of warmth in the winter, being mostly a third part longer than they have breadth: they should also be sufficiently large for the quantity of sheep that they are to contain. The side should be lined with boards, and the bottoms be laid in an even manner with stone or some other material, that the litter may be well impregnated with the urine of the sheep. The sides exposed to the sun should be lined with moveable hurdles, that when it shines the whole may be laid open, to give due refreshment and afford the sheep an opportunity of feeding upon the pasture wherein they stand. They should be well and securely covered with some sort of proper material upon the tops. They are sometimes fixed in particular situations; but in other cases, which is the more improved method, so constructed as to be capable of being removed as they may be wanted.

SHEEP-PENS. The divisions made by the small moveable gates or hurdles which are set up to keep sheep in some particular spot. They are usually formed on a dry

plant, which grow
sandy fields and he
age is rough, with
sessile, several. S
or branched; with
gate blue flowers.
vol. i. p. 296.)

SHEEP'S SOR
sella.) A perennia
is found growing ab
fields and pasture
with some astringe
ing. The stem wav
bent. The flower
separate, in num
clusters. The le
above, but hastate i
stem. The acid w
oxalic, combined w
alate; but it is le
species *R. acetosa.*

SHELLDRAKE
is known under the
drake, sheldrake,
goose, &c., in diff
are two British spe
Brit. Birds as fr
islands: —

1. The ruddy shi
feeds on aquatic pl
sects, and the fry
colour of the plu
with a black ring r
the neck. The wh
about twenty-five i

2. The common
is one of the most
of our ornamental
visits our coasts in

Bannister says, that it is necessary to
for this emyloyment "a person who is
skilled in the nature and management
eep, and hath been brought up in that
oyment from his infancy; who is sober,
ent, and good-natured; qualities essen-
necessary in a shepherd, who, although
ay seem to lead a life of indolence,
contrasted with the more laborious
nts of the farm, need rarely to have a
te's time hang heavily on his hands if
ill be attentive to his business, which
furnish him with sufficient employment
ghout the day, particularly in the
ing season, or where there are two
at work; nor will he want opportunity
he exercise of his patience and good
er in his attendance on the sheep,
h is by nature an animal of great ob-
cy and perverseness, and hath often
the forfeit of its life to these innate
ities, where the shepherd was a man
morose and surly disposition."

IEPHERD'S DOG. See Dog.

IEPHERD'S NEEDLE. (*Scandix*
n Veneris.) This is a troublesome an-
weed, very common in cultivated fields.
root is tapering. Stems simple or
y, spreading, a foot high, leafy, fur-
d. Leaves light green, triply pin-
id, with linear, acute, smooth segments.
umbels are simple, small, mostly ter-
l, solitary or in pairs, with short rays,
road, cloven, white-edged bractes. The
is nearly smooth, with a bushy edge,
g a beak from one to two inches long:
ce the specific name. (*Smith's Eng.*
vol. ii. p. 46.)

IEPHERD'S PURSE. (*Thlaspi*,
thlao, to compress; the seed-vessels
ompressed.) This is a genus of worth-
plants, the principal species of which
e common shepherd's purse (*T. bursa*
ris), which occurs in almost every part
e globe. It is an annual plant, with a
ring, whitish root, having a peculiar
e-like scent. The herbage is rough,
prominent hairs. Stem branched,
, from six to twelve inches high. Ra-
leaves deeply pinnatifid. Flowers
l, corymbose, often tinged with purplish
n. Pouch inversely heart-shaped,
what triangular. Seeds about five or
e in each cell. Small birds eat the
s and flowers. (*Smith's Eng. Flor.*
iii. p. 172.)

HEPHERD'S STAFF. See Teasel.

HEPPECK. The provincial name of
ong or hay-fork.

HERARDIA. (Named by Dillenius in
ur of his patron W. Sherard, LL.D.,
l at Smyrna.) This is a genus of un-
esting plants. One species, the blue Sherardia, or little field-madder (*S. arvensis*), is indigenous. It grows in fallow fields, or among corn on a light or gravelly soil. The plant is annual; herbage generally hairy; stems several, branched, spreading, mostly decumbent, three to six inches long. Leaves whorled, pale green. Flowers pale purplish blue, in a sessile terminal umbel. (*Smith's Eng. Flor.* vol. i. p. 196.)

SHERDS. In gardening, fragments of earthen pots, &c.; employed to drain the soil supplied to potted plants, and also as underdraining for gravel walks.

SHIELD-FERN. (*Aspidium*, from *aspidion*, a little buckler; because of the form of the indusium.) One of the pretty and very interesting genera of ferns. A mixture of loam and peat, and a sheltered situation, are very suitable for them: they are multiplied by seeds or divisions. There are thirteen indigenous species: the fronds in some are evergreen, in most deciduous. See Fern.

SHIFTS. See Rotation of Crops.

SHIM. A tool of the tillage kind, used in breaking down and reducing the more stiff and heavy sorts of land, as well as cutting up and clearing them from weeds. They are made of different forms and constructions, to suit different purposes.

SHOODS. A provincial term applied to oat hulls.

SHOREWEED. (*Littorella*, from *littus*, the shore, in allusion to its place of growth.) The plantain shoreweed (*L. lacustris*) is a pretty little indigenous perennial sub-aquatic, flowering in June. It has no stem; but the root, which is fleshed and tapshaped, throws up many long, linear, channelled leaves. The flowers are barren and fertile on the same plant: they are whitish-green; the barren have long tremulous stamens. The plant is easily increased by seeds.

SHORT-HORNS. See Cattle.

SHOVELER. (*Anas clypeata.*) The blue-winged shoveler, or broad-bill, may be considered generally as a winter visiter to this country, but some remain every year to breed. They inhabit marshes, lakes, rivers, and muddy shores, selecting their food in shallow water by the instrumentality of their sensitive beak; the laminated sides of which, being abundantly supplied with nerves, enable them to retain the nutritious and reject the useless. They feed on some grasses and other vegetables, with worms, aquatic and other insects. In the adult male the whole of the head and upper part of the neck is green, the lower part of the neck is white; other parts of the body shaded with pale blue, white, dark brown, &c. The whole length of the bird is about and large insects. After having killed its prey, it fixes the body in a forked branch, or upon a sharp thorn, the more readily to tear off small pieces from it. It is from this habit of killing and hanging up their meat, which is observed also in other shrikes, that they have been generally called butcher-birds. In the old male a black oval patch extends across the head over the eye to the upper mandible, which is considerably curved; the head, neck, back, wing, and tail-coverts are pearl-grey; throat, sides of neck, breast, belly, &c., pure white; legs, toes, and claws black; whole length of the bird ten inches.

2. The red-backed shrike (*L. colluris*) is very similar in its habits to the grey shrike last described, but is much more common, and visits this country only in the summer. In the adult male the plumage of the head and neck are grey; back and wing-coverts fine chestnut-red. All the under surface of the body is very pale red. The length of the bird is about seven inches and a half.

3. The woodchat shrike (*L. rufus*). In size, in most of its habits, and in its mode of feeding, the woodchat resembles the common red-backed shrike, but is not so frequently met with. The forehead, round the eyes, and the back, wings, and wing-coverts, are black. Throat, breast, belly, &c., white. (*Yarrell's Brit. Birds*, vol. i. pp. 149—163.)

SHRUB. A small, low, dwarfish woody plant, resembling a tree, which, instead of one single stem, frequently puts forth from the same root several sets or stems. The most hardy indigenous shrubs are the box and ivy, which resist the severest winters.

baldia (*S. procumbe*
nial found growing
ceous soil on the
mountains of Scotl
Stems herbaceous,
three inches long, ro
upright hairs, like
Leaflets wedge-shap
inch long, bright g
in corymbose leafy
and hairy, the pet
plant is astringent, l
tribe. (*Eng. Flor.*
Bot. Dict.)

SIBTHORPIA.
Henry Sibthorp, M.
of botany at Oxford
thorpia, or Cornish
ropœa), is an indige
ing in shady places
lets in the south.
succeeds best in pe
ation, and is readily
The roots are woo
Stems prostrate,
branched, entangled,
minutely hairy, like
Leaves rather succul
alternate, rounded.
solitary, minute.
iii. p. 143.; *Paxton*

SICKLE. (Sax.
Lat. *secale.*) A to
corn is reaped.
Scythe, &c.

SIKE. A term
running water as i
furrow, and a gutter

SILICA. The ch
which forms almost

A country name for the shafts
tc.
R FIR. See Fir and Pine.
R-WEED, or Wild Tansy. (*Po-*
serina.) An indigenous peren-
which, according to Linnæus, in-
y under the surface. Although
id frequent in osier holts and
adows, it grows most commonly
stiff land, and is a sure mark of
ty of the soil. Root tapering;
eral, procumbent, trailing to a
nt, round, smooth, taking root at
where also they produce leaves
rs. Leaves from three to six
g, interruptedly pinnate, deeply
ly serrated, clothed most abund-
eath with splendid silvery hairs;
side deep green. Flowers large,
ow, the calyx hairy; and each on
nple stalk, mostly erect, blowing
mer. (*Eng. Flor.* vol. ii. p. 417.)
EFOIL.
N. A provincial term sometimes
groundsel, a troublesome weed
oils.
AIR, GEORGE. An able and
writer and experimentalist on
ial and other grasses. He car-
series of valuable researches on
e grass garden at Woburn Abbey,
direction of the Duke of Bed-
results of which he gave to the
his justly celebrated work, the
ramineus Woburnensis. He also
fragment of a work of Mr. Hol-
The Weeds of Agriculture. He
35, in the fifty-second year of his

AIR, SIR JOHN. An able
y celebrated farmer, and friend
lture, and the first President
oard of Agriculture. He was
hurso, May 10. 1754. His public
too extensive to recount in this
vere only closed by his death on
of December, 1835. His works
numerous; the chief are

f Agriculture. 2. Code of Health. 3. Ac-
Husbandry of Scotland. 4. Hints on Fle-
lture. 5. Hints on managing Merino Sheep
s. 6. Statistical Account of Scotland. 7.
of a Letter of M. Dombaste. 1821. 8. On
System of Circulation. 9. On the Corn
10. On Oil as a Manure. 1826. 11. Poli-
s. 1828. 12. An Inquiry into the Culture
the Potato. 1828. 13. On the Corn Ques.
14. On a Reduction of Taxation. 1830.
roving the Condition of the Labouring Poor.
n the Malt Tax. 1831. 17. On Irish Dis-
18. On his own Literary Labours. 1831.
Corn Laws. 1832. 20. On the Currency
n a Letter to Mr. Attwood. 1832. 21. De-
riculture. 1832. 22. Account of the Origin
hows and Agricultural Meetings. 1833. 23.
ened Political Revolution. 24. On the Pre-
the Corn Laws. 1833. 25. On Shell Marl
for Turnips. 1833. 26. Hints on Vegeta-
27. On the Importation of Foreign Corn.
On the Repeal of the Malt Tax. 1835. 29. Hints for the Consideration of the Friends of Agriculture. 1835. (*Quart. Jour. of Ag.* vol. vi. p. 569., vol. vii. p. 1.)

SISKIN. (*Carduelis spinus.*) The siskin or aberdivine, as it is also called, is a visiter to this country, arriving in flocks from the north in autumn, and continuing with us till April; sometimes alone, but more frequently in company with linnets and redpoles, twittering as they fly, apparently for the purpose of keeping together. In their flight siskins search the alder, birch, and larch for seeds as food. The general colour of the plumage is yellowish green, streaked with black. The whole length of the bird is four inches and five eighths. (*Yarrell's Brit. Birds*, vol. i. p. 496.)

SIT-FAST. In farriery, an ulcerated sore in which a part of the skin has turned horny; if it cannot be dissolved and softened by rubbing with mercurial ointment, it must have a mild blister applied, which will cause it to separate. It generally proceeds from a warble or little tumour resulting from the pressure of the saddle. See Galls and Back-Sore.

SIZE. See Glue.

SIZZING. A term provincially applied to yeast or barm.

SKEEL. A large milking pail, having two handles, formed by opposite staves, which rise above the rest. It also signifies a broad flat creaming or milk dish.

SKEGS. A kind of oat, sometimes cultivated as a crop in Nottinghamshire. It is the *Avena stipiformis* of Linnæus. See Oats.

SKEP. A coarse round farm basket. It is also provincially used to signify a beehive.

SKEYL. A country term implying to tilt, lean on one side, or throw up, as in unloading a cart.

SKID. The chain by which the wheel of a waggon is fastened, so as to prevent its turning round, upon descending a steep hill. See Drag.

SKIM COULTER. See Plough.

SKINS. See Hides.

SKOVES. Provincially reaps, shoves, grips, or bundles of grain: also unbound sheaves.

SKULL-CAP. (*Scutellaria*; from *scutella*, a little saucer, alluding to the form of the calyx.) Of this genus of perennial herbs there are two indigenous species, of which the principal is the common skull-cap (*S. galericulata*), which grows very frequently about the reedy margins of rivers, as well as in ditches and other watery situations; flowering in July and August. The root is creeping, herbage deep green, often tinged with a violet hue, more or less downy. Stem twelve or eighteen inches high, erect, of *S. galericulata*, of a delicate pink colour, nearly inclining to blue. From the plants of this genus being for the most part very handsome when in flower, they are well suited for ornamenting the front of the flower-border. They grow in any common garden soil, and increase readily by seeds and divisions; the shrubby species may be easily multiplied by young cuttings. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 112.)

SKY-LARK. See LARK.

SLATE. A well-known neat, convenient, and durable material for the covering of the roofs of buildings. There are many varieties of slate, and it likewise differs very greatly in its qualities and colours. In some places it is found in thick lamina or flakes, while in others it is thin and light. The colours are white, brown, and blue. Slate is so durable in some cases as to have been known to continue sound and good for centuries.

SLAUGHTER-HOUSE. See ABATTOIR.

SLEET. See SNOW.

SLOE. See BLACKTHORN.

SLOUGH-HEAL. See SELF-HEAL.

SLUG. A genus of molluscous animals, comprehending several species, which differ only in colour. Slugs infest gardens and fields, and are very injurious to the growing crops, hence it becomes essential to destroy them. Dry lime and slacked lime have been recommended, which, being dissolved by the dew and moisture of the atmosphere, act as a poison to these animals. But pulverised lime is not suitable to all soils, and may even prove injurious to some crops. Lime water appears to be preferable. But as many husbandmen may not have an op-

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e farmer has personally little to do with sale of his cattle, but custom and in- est induce him to consign them to a sman, who is acquainted with all the chers and dealers of the district, and with contractors. He sees at a glance what the state of the market; he can tell ether it is likely to rise or fall; and com- ring the lot which is entrusted to him h others, and with the market generally, knows what they ought to fetch. The smen are generally honourable men; y procure for the owner the value of his tle under all the circumstances of the rket, and although it may not always be much as the grazier had expected, it is re than he could have got himself, and is always sure of receiving his money. *uatt on Cattle*, p. 256.) See Sheep, se, Poultry, &c.

SMITH, SIR JAMES EDWARD, ., F.R.S., a distinguished naturalist, the der and first president of the Linnæan ety, was author and editor of many nical works; the principal of which are *lora Britannica*, in Latin, 3 vols. 8vo. —1828, and *Compendium*, an epitome e above; *Flora Græca*, 1800—1804, *English Flora*, 4 vols.; and *English ny*, 36 vols. 8vo. Having purchased celebrated Linnæan collection, com- g the epistolary correspondence of the Linnæus and his son, together with thing that belonged to those eminent relating to natural history or medi- he published, in 1821, two volumes correspondence of Linnæus with emi- naturalists. Dr. Smith also published rous tracts during the long space of -two years, and contributed largely to ientific journals of his day. He was at Norwich, December 2. 1759, and 17th March, 1828. (*Gents. Mag.* vol. . pt. 1. p. 297.)

UT. A disease affecting almost every es of corn, the grains of which become with a fetid black powder, instead of ining farinaceous matter. Wet sea- animalculæ, organic weakness, defi- y of the parts of generation, and other nstances, have been assigned as the ary causes of this disease, but all the s of experience are against the opinion these are more than contingencies aggravate the symptoms, and acce- the progress of the infection. That mut does not arise from a deficient dity is apparent, because it affects and oys the grain long before the sexual as are fully developed. Fogs, exposure tense sunshine when moist, or other spheric influences upon the ear after it been protruded, have been assigned as causes; but these cannot be productive of the mischief, for the disease has been observed during an early stage of the vegetation of the ear, and long before it has escaped from the leafy envelopes: this also dismisses the opinion entertained by some that the disease occurs after the grains are fully formed. It does not arise from the too abundant moisture of the soil, because I have universally observed that the driest parts of a field are as liable to bear an infected grain as the most wet; and we all know that an infected plant stands surrounded by others entirely untainted. Some persons have thought that insects are the origin of the disease; but the most accurate observations have refuted this opinion, and shown that the diseased grains may be an agreeable nidus for the larvæ, but that these always appear after the disease is matured. Upon examining some of the diseased grains, Mr. R. Somerville found upon them a minute insect, in form like a wood-louse (*Com. to Board of Agr.*), which I know from observation to be a species of the Acarus, and these he considered the cause of the disease. But this is a conclusion unwarranted by observation, for similar vermin are found upon the roots of the Brassica tribe that are affected with anbury; and, indeed, this genus of insects is invariably found upon decaying vegetable matter: it is their habitat.

Other persons have thought that the grains injured by the process of thrashing are most liable to the disease; but this is refuted by the fact, that it appears in some years, and is scarcely to be detected in others. The Rev. Dr. Hales bruised numerous grains of wheat of different sizes with a hammer, but the result cenvinced him that this opinion is erroneous. Wolfins thought it arose from a monstrosity of the embryo; but M. Cymen has shown that the male flowers of some plants suffer from smut as well as the female, and the former we know have no embryo.

Some farmers have considered that pigeons' dung induced the disease, but general experience is against this idea. Nor is the disease the consequence of any defect of the sap, for all the parts except the ear are healthy; and there are some plants, observes M. Cymen, having perennial roots, and which are vigorous, yet their seeds are annually attacked with this disease.

Having thus disposed of the several causes which have been erroneously assigned, I will now proceed to detail the more correct knowledge that has been accumulated respecting this plague of our corn crops.

usefully enumerated. *Uredo segetum* Pursh, n. 27.; *Chaos ustilago*, Lin. Syst. Nat. 1326, n. 4.; *Réticulaire des blés*, Bulliard's Fungi, vol. i. p. 90. plate 472. f. 2. *Reticularia segetum* Withering, iv. p. 388. *Charbon*, Tessier, Des Maladies des Grains, 299. Bulliard describes this fungus as globular, extremely fine, and attached to a fine elastic thread. They are exceedingly numerous, enveloping the seed and chaff of the plants they affect, and are, as well as their own still more minute seed, of an intense black colour, having a disagreeable fetid smell, which has been not inaptly compared to stale lobsters. Mr. Kirby tells us that Mr. Lathbury examined the dust of this fungus under a powerful magnifier, and found it consisted of numerous minute particles, uniform in shape and size, much smaller and blacker than those of the pepper brand, and less easily separable: they seemed to be contained in little irregular cells. This dust or seed is the food of a small shining black insect, the *Dermestes Ata* of Marsham. (*Linn. Trans.* vol. cxii.)

Chemical analysis has demonstrated that this fungus effects an entire decomposition of the vegetable particles of the grain it infects, the saline constituents remaining nearly unaltered in the grain. Parmentier, Cornet, Girot, Chantians, Fourcroy, and Vauquelin, have successively examined it, and the result of their researches is, that smutted grains of wheat are composed, 1st, of about one third their own weight of a green, butyraceous, fetid, and acrid *oil;* 2d, nearly one fourth of a vegeto-animal substance, perfectly similar to that which comes from *putrid gluten;* 3d, a *black coal,* one fifth of their weight, similar to that

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seed. These experiments are satis- and decisive; for, although they are accordance with the most prevalent s of farmers upon the point, yet pre- opinions are not always in accordance uth, and are never to be implicitly d until sustained by evidence, which pendent of prejudice, and more ac- than surmise.

R. Somerville, in a paper published *Communications to the Board of lture*, details experiments fully sub- ing the fact, that the disease is nicable to the crop from the parent He mixed some smutted grains with perfectly healthy, and kept them in for two months; after which, pre- to sowing, he rubbed them together n his hands. The sample was then into two equal parts, one of which ll washed with clear water three or nes, and then sown in a drill in his The other half was sown similarly, hout being washed or otherwise pre- The blades appeared above the sur- the same time, and during the first nths of their growth there was no difference in their appearance. Soon rds many of the plants from the un- seed were observed to have a darker re dirty green hue than those from d that had been cleansed with water. fference of colour by degrees became riking, and increased until the grain otruded from the blade, at which time many of the dark-coloured plants evinced symptoms of decay; and the whole of them, when fully developed, were found to be completely destroyed by the smut. The plants from the washed seed produced scarcely a single diseased ear. These results were not fortuitous, for the experiment afforded a similar testimony when repeated the next season.

The experiments of Mr. Harrup agree with the preceding. In these, wheat, consisting half of sound and half of smutted grains, was sown without being previously at all prepared, and this produced a crop of which nearly two thirds were smutted. Similar wheat, soaked for twelve hours in a saturated solution of common salt, and then mixed with quicklime, produced on the same soil, in the same situation, and in the same season, a crop in which not a smutted ear could be found. (*Nicholson's Journ.* vol. xiii. p. 113.)

Similar but more extended, and even more accurate experiments, were completed by Mr. Bevan, and are recorded in the ninth volume of *The Agricultural Magazine.* They give the result of his trials with various liquids as steeps for seed wheat. The wheat was grown on a sandy soil, at Leighton in Bedfordshire. The columns in the accompanying table which are marked A. contain the results from the sound grain that was sown; and those marked B. are the results from smutted samples.

Liquid employed	Specific Gravity of the Solution.	Number of smutted Ears in three Sheaves.		Bushels of good Wheat per Acre.		Cwts. of Straw per Acre.	
		A.	B.	A.	B.	A.	B.
on of potash - - - - -	1·357	1	81	21·6	13·6	36·6	29·1
muriate of potash - - -	1·097	3	218	20·2	10·1	36·0	21·1
nitrate of potash (saltpetre) - -	1·080	7	115	23·8	14·3	36·0	31·9
soda - - - - -	1·056	9	159	20·2	11·7	35·6	26·7
muriate of soda (common salt) -	1·089	- -	290	24·0	14·5	41·5	33·3
sulphate of soda (Glauber salt)	1·047	12	241	21·6	12·3	38·5	27·8
muriate of ammonia (sal ammoniac)	1·026	1	150	19·8	17·6	35·4	30·2
common soot - - - -	1·025	- -	123	20·8	11·4	34·8	25·3
lime saturated - - - -	1·003	- -	2	21·9	12·4	38·7	25·9
nitric acid (aqua fortis)* - -	1·016						
muriatic acid (spirit of salt) -	1·011	- -	136	20·7	16·1	35·7	34·1
sulphuric acid (oil of vitriol) -	1·050	- -		20·4	17·8	35·4	37·1
n its natural state - - - -	- -	6	323	20·3	14·7	35·7	31·0
ed in common water - - -	- -	None sown.	107	- -	18·3	- -	35·8

* The seed treated with this acid did not vegetate.

conclusion from these and many accordant experiments is, that wash- e seed is effective in preventing the nication of the disease to the crop ch it gives birth. If the washing was ntly repeated, or the cleansing made te, by passing a continual stream h the seed for some hours, it is pro- that simple water might be employed s purpose as effectually as any saline n. But as this would require more than is desirable, and as the salts, &c., employed are beneficial in other ways, by protecting the seed from vermin, and ministering to the future vigour of the plants, *steeps* are generally and very properly adopted.

The experiments of Mr. Bevan indicate that lime-water is the most effective of these preparations; and, if this be adopted, it may be prepared by mixing one pound of fresh lime with three gallons of boiling water, and the clear liquor then to be poured off and immediately used. In this

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vol. i. p. 90. plate 47 ater, pouring this off
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r *segetum*, I found that the effect of
common salt upon this fungus is not less
remarkable.

Mr. Tull, MM. de Lignerolle, Douat, and others, agree in recommending that the seed to be sown upon any farm should be frequently obtained from other soils; but, however beneficial this may be for securing other desired effects, I do not understand how it can prevent the occurrence of smut unless the seed is obtained from a crop and a district notably free from the disease. There is little doubt but that the method in which the disease is imparted to the plant is by its root imbibing the extremely minute seeds of the *Uredo* along with the moisture of the soil. This opinion is confirmed by the observation that the disease is most prevalent when the winter has been mild and the spring wet; for, in such seasons, the abundant moisture passing through the soil is most likely to convey the seeds to the mouths of the plants' radicle fibres.

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educed nearly one third, and
grain three sevenths. (Essay
hnson, *Quart. Journ. Agr.* vol.

(*Helix — Helicidæ.*) A well-known genus of molluscous animals, comprising a great many species. It is unnecessary for our purpose to describe the anatomy of the snail. The nervous system is extremely sensitive, as may be seen in the ventral disk, or foot, and lower tentacles. We may also mention their wonderful power of reproducing parts of the body that have been destroyed: even the entire head, when cut off, is after a time restored. They live throughout the winter in a torpid state, in cavities in the earth, which are covered over with a calcareous kind of wall, partly formed with its mucous secretion. The animal escapes from its cell in April, bursting its operculum, and again breathes as before its hybernation. The species of shell-snails are very extensive. In the garden, snails do much damage to the vegetables in cultivated grounds, biting off pieces of the leaves by means of a semicircular dentated horny plate which is affixed to the upper lip. To extirpate them, it has been recommended to strew the ground with lime and ashes, or salt. Snails seldom annoy farmers, unless it be under the hedges; and if they venture out into the middle of a field, the roller is a certain destructive implement to their fragile coverings. The red, or great vine snail (*H. pomatia*), formed one of the luxuries of the tables of the ancient Romans, and by peculiar feeding and other treatment was brought to attain an immense size. It is still an article of food in certain cantons of Switzerland and France, and some of the provinces of Spain and Portugal. This species of Helix was brought to England by the Howard family, and placed on the grounds in the neighbourhood of Box-hill, where it is still found; but it does not attain to the size it often displays in Italy. It is supposed to be a good article of food for the consumptive.

SNAKE, COMMON. (*Coluber natrix.*) A native reptile which is often found in bushy places, and in banks near water. It is from two to three feet long; the back is of a dusky colour, and the belly is beautifully variegated with black and bluish stripes. It has two rows of small serrated teeth, and is perfectly harmless; being destitute of the fang with which vipers and other venomous serpents are furnished, and which is both an instrument for wounding, and also a duct through which the poison secreted by the poison gland, and deposited in a bag at its root, is ejected into the wound it has made. The common or green snake, like its congeners, produces numerous eggs, generally dropping them on dunghills, where they are hatched by the warmth of the sun. It feeds on small insects, frogs, and vegetable substances;

from old walls in rich, dense, flowery festoons. Leaves alternate, stalked, ivy-like, of a deep shining green, often tinged with violet, and, like every other plant, quite smooth. Flowers solitary, on long axillary stalks, small and very elegant, variegated with violet and blue. (*Eng. Flor.* vol. iii. p. 131.) See Fluellin and Toad-flax.

SNELZEWORT YARROW. See Yarrow.

SNIPES. (*Scolopax.*) A genus of wading birds which are well known. The snipes proper have a straight beak, the nasal furrows extending to near its point, which is a little inflated externally, so as to extend beyond the lower mandible. The point is soft and very sensible. Some of these frequent moors, others open fields or swampy marshes: many of the species are common in Britain, especially during the summer, and sometimes throughout the year. They seldom exceed four ounces in weight, and are, together with their long bill, from ten to twelve inches in length. The breast and belly are white, the back is covered with long feathers, beautifully variegated with black and reddish brown spots.

The British species described and figured by Mr. Yarrell, the most recent writer on ornithology, are the great or solitary snipe (*Scolopax major*), the common snipe (*S. gallinago*), the jack snipe (*S. gallinula*), Sabine's snipe (*S. Sabini*), and the brown snipe (*Macrorhamphus griseus*, Selby and Gould). The marine snipes will be found noticed under the head Sandpipers. (*Yarrell's Brit. Birds*, vol. ii. p. 597—624.; *Mag. Nat. Hist.* vol. ii. p. 143.)

SNOW. In meteorology, the congelation or freezing of vapours in the atmosphere.

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NOWFLAKE. (*Leucojum*, from *leukos*, te, and *ion*, a violet; in reference to the ur of the flower, whence also the Eng- name.) This is a genus of hardy bulbs, wing to the height of twelve or eighteen hes, and producing spikes of pretty white ers, like the snowdrop. Sandy loam s them best; and they are increased by ets from the bulbs. One species is in- enous, the summer snowflake (*L. æsti-*), a perennial, which grows in moist dows and marshes near rivers.

OAPWORT. (*Saponaria*, from *sapo*, p; the bruised leaves are said to produce ther, like soap, when agitated in the er.) This genus contains some truly utiful plants, well deserving of a place very garden. *S. ocymoides*, from its ling habit and handsome flowers, is well pted for rockwork. A mixture of sandy n and peat suits them best; and they readily increased by division at the s or by seed: young cuttings of the ching species will also root readily if ted under a glass. One species, with e varieties, is indigenous. The com- soapwort (*S. officinalis*), a perennial, ws in meadows, by rivers, and under ges. The root is branching, rather y, with many long creeping scions. bage smooth, or nearly so, a little suc- nt. Stems about eighteen inches high, t, round, leafy. Leaves elliptic-lan- ate, acute. Panicle dense, of many t, large, handsome, flesh-coloured, or pink flowers, with an oppressive sweet- (*Paxton's Bot. Dict.; Smith's Eng.* . vol. ii. p. 284.)

ODA. See KELP; SALTS, *their uses to* *tation*; &c.

OD BURNING. See PARING and NING.

OFT-GRASS. See HOLCUS.

OIL. See EARTHS, ANALYSIS and MIX- OF SOILS.

OILING. The practice of supporting als in the summer season, with green cut daily and given to them in the s, stalls, or yards. A number of dif- t plants and grasses may be had re- to for this purpose, particularly those h have a quick and luxuriant growth; cern, sainfoin, tares, clover, turnips, &c. oiling appears to be highly advantage- in a variety of ways, by the food being umed with much less waste, by the t increase of good manure that is pro- d, and by the stock feeding with less ruption and inconvenience, from their g more effectually shaded from the ex- ive heat of the sun, and better pro- ed from the attacks of flies and other cts. In all these respects it would seem to have a great superiority over that of letting the animals range indiscriminately in the pastures or other grass lands.

Soiling has been found, by the most careful experiments, to answer perfectly both with horses, neat cattle, and swine; and with cows it has been found very beneficial in the trials of Mr. Curwen and several others.

By an extensive and judicious use of soiling, the farmer may derive benefit in being enabled to have a considerably larger extent of land both under the states of tillage and grass, from the considerable increase of manure that is produced.

SOLAR INFLUENCE. See TEMPERATURE and LIGHT.

SOLE, or SLADE, OF A PLOUGH. See PLOUGH.

SOLOMON'S SEAL. (*Convallaria.*) There are three indigenous species of *Convallaria* which pass under the name of Solomon's seal, viz. the narrow-leaved Solomon's seal (*C. verticillata*), which is, however, a very rare plant. The angular Solomon's seal (*C. polygonatum*), which is also a rare species, growing in rocky mountainous woods, having a fleshy, creeping root, abounding with mucilage, which may be separated, by grating and washing, in the form of starch. Bread is reported to have been made of these roots in the north of Europe. The stem is twelve or eighteen inches high, angular. Leaves alternate, broadly elliptical, acute, ribbed, plaited, clasping the stem. Stalks axillary, drooping, bearing one, rarely two, pendulous, conical, green and white flowers, smelling powerfully like hawthorn, or even heliotrope. Berry dark blue. A variety with double very sweet flowers is sometimes seen in gardens. The common Solomon's seal (*C. multiflora*) grows in woods and thickets, on a round smooth stem about two feet high. The leaves are of a lighter green than the preceding. Flowers from two to five on a stalk, very faintly scented, more cylindrical and elongated than in *C. polygonatum*. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. ii. p. 156.)

SOOT, is very extensively employed in the east of England, as a powerful manure, and produces, when used at the rate of twelve to twenty bushels per acre, most luxuriant crops of wheat and other grain. This valuable fertiliser is composed of a mixture of charcoal, an oil, salts of ammonia, some muriatic acid, lime, magnesia, silica, and other foreign substances; but the charcoal is by far the largest ingredient, and has a powerful influence on vegetation; and, according to Liebig, it can "completely replace vegetable mould or humus. Plants thrive in powdered charcoal, and may be sown. This is usually done in the spring of the year, in March, April, or May. Wheat so treated speedily assumes a very deep green, and on some soils grows with greatly increased luxuriance. Soot was employed by the Rev. E. Cartwright as a manure for potatoes, both by itself and in combination with various other fertilising substances. The experiments were made on a portion of the same soil as that described in the article ASHES. The following were the results obtained:—

	Per Acre.
1. The soil, without any manure, yielded bushels of potatoes -	157
2. Soot, thirty bushels -	192
3. Soot, thirty bushels, salt eight bushels	240

Various agriculturists have noticed the good results from mixing salt and soot. Mr. George Sinclair, in his prize essay *On Salt as a Manure*, mentions it as "remarkable" in the case of carrots. Mr. Belfield of Elford has done the same with regard to wheat.

In Mr. Sinclair's experiments upon carrots,

	Per Acre. Tons.	cwt.	lb.
The soils without any manure produced carrots - -	23	9	107
Soil with 6½ bushels of salt dug in	44	14	17
Soil with 6½ bushels of salt, and 6½ soot ditto - -	40	4	97

In both the liquid and solid state, it has been employed by Mr. John Robertson of Kilkenny, with great success. "On meadows," he says, "I have used soot with great advantage in substance; and though sown by the hand, one dressing gave me always heavy crops of hay for two succes-

species of sorrel,
ready been descri
SORREL, SHEEP'S S
sorrel (*Rumex acet*
met with almost e
and pastures, flowe
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what woody. Th
powerfully and agr
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Flowers diœcious, w
lated petals. The
depends on binoxa
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acetosella) is much
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common sorrel (*R*
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acid is merely the o
bined with potassa a
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of the year, in sal
wood-sorrel require
and moderately fert
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any mouldy garden
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sorrel is most he
soil, that is tolerab
compartment. The
by seed, and all o
roots, both which r
from the middle of
period in May, an

ɔle herb is without any aromatic or
lavour. Stems at first prostrate,
g more or less upright as the flowers
branched, leafy, straight and wand-
ooth, often reddish, near two feet
Leaves irregularly and doubly pin-
in many linear; blunt segments.
drooping, small, ovate, yellow with
sh calyx, forming numerous slender
isters at the ends of the stems and
s. (*Smith's Eng. Flora*, vol. iii.
See MUGWORT and WORMWOOD.

-BREAD. See CYCLAMEN.

ING. See SEED.

ING MACHINE. See DRILL.

-THISTLE. (*Sonchus*, from *som*-
ollow; the stems are hollow.) A
arge and very natural genus of an-
perennial plants, rarely shrubby,
y tall. They have hollow stems, and
less pinnatifid or lyrate leaves,
or prickly at their edges. The sur-
he herbage is usually smooth, that of
prescence hairy or glandular, often
They contain a bitter white juice,
plants of easy culture in any common
he herbaceous species are increased
ion; the seeds of the annual and
kinds only require to be sown in the
ound. There are three indigenous
al species: the blue sow-thistle (*S.*
), the tall marsh sow-thistle (*S. pa*-
one of our largest herbaceous plants,
from six to eight feet high; and the
w-thistle (*S. arvensis*). The most
native species is annual in habit,
common sow-thistle (*S. oleraceus*),
found almost every where, in culti-
and waste ground; flowering from
September. Hares and rabbits are
nd of the herbage, which, like the
milky and bitter. The leaves are
nes dressed and eaten among other
y herbs, and the roots have occasion-
en converted into bread. (*Paxton's*
ct.; Smith's Eng. Flor. vol. iii. p. 340.)

DE HUSBANDRY. There are
ituations in which, from the small
the enclosures, or the want of suffi-
ower for the easy working of the
n or the subsoil plough, the cultiva-
y prefer the employment of manual
with the spade; and it is fortunately
by experience that the difference in
ense of deep digging, or spade hus-
is not materially different from that
ubsoil plough. A great mass of in-
on on this head was collected by the
Yelloly; not, however, so much with
w of showing the increased fertility
oil by deep stirring, as with the in-
of demonstrating the immense field
s thus opened for the profitable labour of a teeming and increasing population; and it was with this object that, when addressing the statistical section of the British Association at Liverpool, in 1837, he observed:—

"The trials which have been hitherto made of spade husbandry, in various parts of the kingdom, have been insufficient, in point of extent, to afford any adequate criterion of the general applicability of that practice. Such trials, indeed, have been usually regarded either as matters of speculation and experiment, or as charitable efforts adopted by the benevolent to give employment to the poor, without reference to pecuniary expediency. I have, therefore, thought it might be acceptable to the Association to be informed of the results of a much more ample employment of that mode of cultivation than has hitherto, as far as I know, been made in this country.

"The farm where the system is pursued which forms the subject of this communication is situated at Wattelfield, in the parish of Wymondham. It is the property and residence, and in the occupation, of John Mitchell, Esq. The farm consists of 317 acres, of which 207 acres are arable, and 110 in pasture and plantations. It is a mixed soil, but is rather disposed to be heavy. The country is flat, and the land requires draining, which is effected by bushes and straw.

"As soon as it was known that Mr. Mitchell meant to adopt the spade culture extensively and permanently, and not merely as an experiment, or a temporary means of increasing employment, the early prejudices against it subsided; and as the labourers found that the remuneration was fully equal to that of piece work, and much more than the usual daily wages, and that every man, whether married or single, was paid according to the work done, it soon became very popular, and he was speedily able to command the services of the most steady and expert men in his neighbourhood. Though the process was begun with the spade, a strong three-pronged fork, of fourteen inches deep, and seven inches and a half wide, which was found to be more manageable, and less expensive than the spade, was soon allowed to be substituted for it, on the application of the workmen. It cost 4*s.* 6*d.*, instead of 6*s.* 6*d.*; weighed eight pounds; and, when worked down, could be relaid at a trifling expense.

"The digging is effected by taking in about four inches of earth at a time, pressing perpendicularly, and getting to a proper depth at two thrusts. The earth is not, however, turned out of the trench to a greater depth than ten inches, though the fork may get down as far as thirteen or is, however, more laborious than the usual operations of agriculture, though it is much less so under the use of the fork than the spade. They work the land in ridges of about nine feet in width; and the furrows dividing them are sometimes made by the plough, previously to the digging, and sometimes by the management of the labourers, during the work, assisted by the eye only.

"The men receive for the ordinary digging after a white crop, from 2*d.* to 2½*d.* per rod of thirty square yards; the price varying according to the tenacity of the soil, and whether manure is to be dug in. Where the land is to have a fallow crop, that is, turnips, mangel wurzel, or cabbages (for no part of the farm, or the land in the immediate neighbourhood, has ever a naked fallow), there is first a ploughing, which is done at a season when the horses can be best spared, and afterwards a digging at from 1¾*d.* to 2*d.* per rod. In preparing for a fallow crop, there is also an expense incurred in harrowing, and in raising a ridge with the plough, which last is worth about 7*s.* per acre.

"The men are paid the usual wages of the neighbourhood at harvest; but as the whole number ordinarily employed are not required at that period, those for whom there is no occasion disperse themselves among the neighbouring farmers, with the understanding that they may resume their employment when harvest is over, which they are always happy in doing. Though digging is the principal occupation of the men, yet they are employed in all the other common operations of husbandry, at the common rates of payment; and all the work on the farm is paid for, as much as possible, by the

7th, Wheat -

"It is to be obs
has always ploughe
succeeding crop, no
horses, when not wa
are employed in assi
paring the land for
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even in its complet
exclude the plough,
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or six horses, instea
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they would not be c
of the hay and cor
a good deal of the
stacked in the fields
(*Dr. Yelloly on Spad
Brit. Farm. Mag. N
Mr. Blakie objected
clays, to the custom
over the top spit or
throwing the barren
but he recommends
one side, and to sho
upon it. The subso
trench should then
raised, the top spit of
upon it, the crumbs

EL. (*Canis* fam. *extrarius*, Linn.)
e species of dog, which is sup-
lerive its name from its Spanish
th us, however, it has branched
rous varieties and subvarieties.
ng spaniel, which stands at the
: list, presents in itself many off-
of which are named from their
the breed of King Charles, the
&c.: others are called after their
ı, as the Maltese; and the form
overns their nomination, as the
&c. We have water spaniels,
small; and their congeners, the
poodle. The Newfoundland dog
, the setter also, and the Alpine
. popular distinction made be-
ı by many writers is into spring-
s, and water spaniels. (*Blaine's*
f Rural Sports.)

OW. Of this common and well-
l there are several species.

lomestic, or house sparrow (*Pas-*
cus, Selby and Yarrell), abounds
, particularly in the vicinity of
d towns. The nest of the sparrow
under the eaves of tiles, in holes
s in walls, in the orifices of old
es, or in any cavity which will
cient space for the mass of hay
rs collected for their dwelling.
batch of eggs usually consists of
and two other sets are frequently
in the season. The eggs are
ted and streaked with ash colour
brown; the length of the egg
the breadth seven lines. Their
fed for a time with soft fruits,
etables, and insects, particularly
s; and so great is the number of
are consumed by the parent birds
successive broods of young, that
estion whether the benefit thus
is not a fair equivalent for the
seeds required at other seasons of
A writer in the *Quart. Journ. of*
ii. p. 432., sets forth the injury
ulted from his indiscriminate
of the sparrows which bred about
ead.

tree sparrow (*Passer montanus*).
active lively bird; in appearance,
ny of its other peculiarities, very
the house sparrow, and for which
ked by Mr. Yarrell) it has often
aken. It is not so numerous a
d much more local in distribu-
mall colonies of them are to be
various counties. In size it is
an our common sparrow, and is
described as frequenting trees
om houses, and building in the
cayed pollards. The whole length of a male bird is five inches and five eighths.

3. The hedge sparrow (*Accentor modularis*) is very generally diffused over the British islands, and in this country is resident throughout the year, frequenting hedgerows, gardens, and pleasure-grounds from spring to autumn, where it feeds indiscriminately on insects in their various stages, worms, and seeds, but not on fruit, drawing nearer to the habitations of men as winter approaches, to gain such scanty subsistence as chance or kindness may afford. Its nest, which is one of the first formed, is built of green moss, roots, and wool, and lined with hair. The nest being easily found in an almost leafless hedge, the cuckoo is apt to deposit her egg there; and it has been observed that more cuckoos are fostered by the hedge warbler than by any other bird. The young cuckoo generally shoulders the young sparrows out of the nest after they are hatched. The eggs are four or five in number, of a delicate and spotless bluish green colour; nine lines and a half in length by six lines and a half in breadth. The general colour of the plumage is brown. The whole length of the bird rather more than five inches and a half. (*Yarrell's Brit. Birds*, vol. i.) See ACCENTOR and HEDGE BIRDS.

SPARROWHAWK. See HAWK.

SPATTLING POPPY. A name sometimes applied to chickweed.

SPAVIN. In farriery, a disease in horses, consisting of a swelling in or near some of the joints, by which a lameness is produced, and of which there are three kinds; the *blood-spavin*, the *bog-spavin*, and the *bone-spavin*.

SPAWDER. A provincial term signifying an injury arising from the legs of animals being forced too far asunder on ice or slippery roads.

SPAYING. The operation of castrating or extracting the ovaries of the females of different kinds of animals, as sows, heifers, mares, &c., in order to prevent any future conception, and promote their fattening.

SPEARMINT. (*Mentha viridis.*) This species of mint is employed in sauces and salads, as well as dried for soups in winter. There are two varieties, the broad and narrow-leaved, equally good. See MINT.

SPEECHLEY, WILLIAM, was born at a village near Peterborough. About 1796 he was engaged by Sir John Sinclair to write some papers on Domestic Economy, which, however, never were published in the *Transactions of the Board of Agriculture*, for which they were designed. He tried a course of agricultural experiments at Woodborough Hall, and wrote essays;

Kitchen, and Cottage Gardens and Orchards, &c. London. 1820. 8vo.

SPEEDWELL. (*Veronica.*) An extensive genus of herbaceous or somewhat shrubby plants, with annual or perennial roots. The genus is divided into three sections: the first has perennial roots and terminal clusters; the second perennial roots with lateral clusters; the third annual roots with solitary axillary flowers. There are eighteen indigenous species, of which the principal is the common or small speedwell (*V. officinalis*). It belongs to the second section, and grows about dry sandy banks, barren heaths, woods, and mountainous pastures. It is a perennial, flowering from May till August. The stems are prostrate, creeping, variable, from six to eighteen inches long, round. Leaves elliptical, obtuse, serrated, roundish. Clusters lateral, of light blue flowers with dark streaks.

The hardy herbaceous species of speedwell, namely, *spicata*, *Chamædrys*, and *hirsuta*, are admirably adapted for ornamenting the flower-borders, on account of their pleasing habit and beautiful flowers. They are all of the easiest culture, and are readily multiplied by division at the root. The greenhouse shrubby kinds are easily increased by cuttings. The annual species are scarcely worth cultivating, except in botanical collections, and their seeds merely require to be sown in the open ground. (*Smith's Eng. Flor.* vol. i. p. 16.; *Paxton's Bot. Dict.*) See Bird's Eye.

SPERAGE. See Asparagus.

SPHAGNUM. A name used by Pliny for some kinds of moss. The species belonging to this genus are found in bogs at all seasons. The leaves are nerveless, and

those on the stem
and dilated at th
veined with dull
gular, wrinkled, i
branous capsule.
Smith's Eng. Flor
SPIGNEL. S
SPIKE-RUSH.
a marsh, and *chair*
to the watery plac
rish.) These are
plants, which pos
merit to recomme
except in botanica
describes three i
cies; the creeping
the many-stalked s
and the least spi
(*Smith's Eng. Flo*
SPIKENARD,
nyza, from *konis*, d
posed to have the
flies; whence also
flea (fly) bane.
however, the real f
species, dipped in
south of Europe t
winged insects, s
climates.) This is
or shrubby genus,
tish species (*C.*
This is a perennial
or limestone countr
or a marly soil. T
much branched;
downy, bitter, so
portion of mucila
angular, leafy, two
minating in a cor

count of its prickly seed.) There
rarieties, the round-leaved or
ded, and the triangular-leaved
seeded. The first being the most
and, consequently, less able to
w degree of temperature, is em-
the spring and summer crops,
ter for autumn and winter. For
eaved variety, a rich moist and
m, in an open situation, is pre-
ut for the triangular-leaved a
ately fertile and dry one, which
se be an open compartment, but
border is most conducive of a
supply throughout the winter.
should always be well pulverised
of digging, as a fine tilth is one
test inducements to its vigour.
gated by seed. The first sowing
d-leaved variety may take place
e of January, in a warm situa-
repeated in larger but still small
the commencement and end of
and thence to be continued, as
rapidly advance to seed, every
until the middle of April, when,
ction increases, it must be per-
e a week until the close of May,
be reduced to once a fortnight,
ctised until the end of July.
st, the sowing of the triangular-
ety commences, the main crop of
ld be sown during the first ten
t month. The sowing may be
fter intervals of three weeks,
rly part of September.

ngs may be performed broadcast
ly raked, and which is the mode
ractised for the principal crops,
winter standing always, or in
ch deep and a foot apart; in
the seed being scattered thin.

ia, or New Zealand spinach (*Te-
pansa*), is much admired as a
for summer spinach, being of
te flavour, and not so liable to
d. It is propagated by seed,
wn, in the seed-vessel, as ga-
receding autumn, at the latter
h, in a pot, and placed in a melon
seedlings must be pricked while
into pots; and kept under a
ut bottom heat until the third
ay, or until the danger of frost
rans. Hort. Soc. Lond. vol. iv.
.; *Johnson's Kitch. Gard.*)

E, WILD. See GOOSEFOOT.

Y. The provincial name for a
ces, or a small grove or shrub-

E TREE. (*Euonymus euro-*
is shrub or small tree grows wild in our hedges and thickets. The very hard and fine-grained wood is preferred for spindles and for skewers. It is fetid in every part when bruised, and esteemed poisonous. The branches are smooth and even angular when young; afterwards round, with a green, smooth, not warty bark. Leaves ovate, pointed, finely serrated, about two inches long, furnished with awl-shaped stipules. Flowers fetid, small, greenish-white, mostly four-cleft. The capsules usually of a fine rose-colour: seeds orange-coloured. (*Smith's Eng. Flor.* vol. i. p. 329.)

SPINES. In botany, branches that, being imperfectly formed, lose their power of extension, become unusally hard, and acquire a sharp point. They are very different from aculei, or prickles, which are a kind of hardened hair. In leaves they are processes formed either by an elongation of the woody tissue of the veins or by a contraction of the parenchyma: in the former case they project beyond the surface or margin of the leaf, as in the holly; in the latter case they are the veins themselves indurated, as in the palmated spines of *Berberris vulgaris*.

SPLEENWORT. (*Asplenium*, from *a*, privative, and *splen*, spleen; its supposed medicinal qualities.) A genus of ferns, having tufted or creeping, blackish, strong, fibrous roots. The fronds are erect, mostly stalked, either simple, variously pinnate, or branched; notched or serrated, generally of a fine texture, and smooth. Capsules brown or tawny: cover pale, permanently straight, always having a rib or vein between the edge at which it separates from the frond and the outer margin of its lobe or leaflet. There are nine indigenous species, none of which call for any detailed observations. (*Smith's Eng. Flor.* vol. iv. p. 304.) See FERN.

SPLINT. In farriery, a hard excrescence growing on the shank bones of horses. It appears first in the form of a callous tumour, and afterwards ossifies. If the splint interfere with the action of some tendon or ligament, the hair should be removed, a little strong mercurial ointment be rubbed in for two days, and then an active blister applied. (*Youatt on the Horse*, p. 244.)

SPOKEN-CHAIN. Provincially a chain to fix upon the spoke of the wheel of a waggon, to draw it out by, when the team happens to get set fast in a slough.

SPOONBILL, WHITE. (*Platalea leucorodia.*) A singular bird, which occasionally visits the British shores, which is characterised by an extraordinary shaped beak; whence its common name. Its food is very similar to that of the herons, bit-

SPRAT. (*Clupea sprattus*, Linn.) A well-known diminutive fish. See Fish, as a Manure.

SPRING WHEAT. See Wheat.

SPURGE. (*Euphorbia*; Linnæus named this genus after Euphorbus, a physician to Juba, king of Mauritania.) This is an exceedingly variable, and a very extensive genus of plants, comprising a number that are entirely unworthy of cultivation. The hardy perennial species thrive in any common garden soil, and increase by divisions of the roots or by seeds. The hardy annuals and biennials merely require sowing in the open ground. The tender kinds must be sown in the hothouse or in a hot-bed frame, and when potted off must be set with other tender annuals and biennials. The root of *E. Ipecacuanha* is said to be equal to that of the true Ipecacuanha. *E. antiquorum*, *E. canariensis*, and some other fleshy species, produce the drug "Euphorbium," which is the inspissated milky juice of such plants. There are thirteen indigenous species, but the only one necessary to be noticed is the lesser spurge (*E. Lathyris*). It is a biennial, flowering in June and July. The stem rises from a strong fibrous root, to the height of three to four feet, purplish, smooth, round, hollow. The leaves opposite, spreading, in fours, sessile, oblong, acute, entire, and glaucous. The flowers are in a terminal solitary umbel, consisting of four repeatedly forked branches, furnished with cordate entire bractes: the flowers are variegated with yellow and dark purple. Capsules are large and smooth, and, when half ripe, are pickled as capers. The seeds, when pressed between moderately heated iron plates, yield a fixed acrid oil, which

powerfully excitan
bark of the stem,
beaten out flat, for
keeping blisters op
vol. ii. p. 229.)

SPURGE OLI

SPURREY. (S
scatter, because it
genus of herbaceo
plants, with slender
flowers. There are
the most common
seeded corn spurre
nual plant, which gr
and flowers from
stems are spreading
feet long, modera
leafy, angular, and
upper part. Leaves
fleshy, downy, obtu
The flowers are w
flower-stalks. The
is a common weed
Scotland called yar
purse. It is devou
cattle, and appear
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riety of this weed (
cultivated in Fland
superior to other
continues green till
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flour obtained from
that of wheat or r
bread, for which pu
Norway and Gothla
rey greedily, and i

on the poorest soil; or, at all events, rofessor Martyn observes, we have many er plants for such soils. (*Smith's Eng.* . vol. ii. p. 336.; *Holddich's Weeds,* . ; *Willich's Dom. Encyclo.*)

QUILL. (*Scilla*, from *skylla*, to injure, bulbs being poisonous.) An extensive s of interesting bulbous plants. A soil is most suitable for them; and are readily increased by offsets from bulbs. The leaves are radical, linear. flowers in clusters, blue, purplish, hite. There are four indigenous spe- the vernal squill (*S. verna*), the two- ed squill (*S. bifolia*), the autumnal squill *utumnalis*), and the harebell squill, or hyacinth (*S. nutans*). The bulb of wild hyacinth contains much mucilage, h can be readily separated from an d principle, which is conjoined with it. s much employed by calico-printers. *xton's Bot. Dict.; Smith's Eng. Flor.* ii. p. 145.)

QUINANCY WORT. See Woodruff.

QUIRREL. (*Sciurus vulgaris.*) A -known lively little quadruped, abound- in the woods of Britain. The squirrel s on acorns, nuts, the young shoots of s, and the cones of firs. The female structs a nest of moss and dried leaves he branches of trees, where she brings h in April or May from three to seven ng.

QUITCH-GRASS. See Couch and rt.

T. JOHN'S WORT. See John's rt.

TACK. Corn in the sheaf, piled up in cular or rectangular figure, brought point or ridge at top, and afterwards ched to protect it from the influence of weather, and more especially from rains. term is also sometimes applied to hay up in the same manner, which, how- in most places is called a *rick*. The dation of a corn stack is commonly on a platform of wood or iron, raised rops to protect it from the moisture of soil, and also from rats and mice; in respect stacks of corn differ from of hay, which are built always on the nd. It is of great advantage to soak props in corrosive sublimate, which nly preserves the wood, but also de- s vermin. Stacks are of various forms imensions, according to circumstances; for grain those of a long, narrow, e shape are probably the most ad- geous, where the quantity of corn is derable; as they are found to stand firmly, have a better appearance, are conveniently and readily built, and rve the grain better than those of any other form. And they have the great advantage of requiring less thatch as well as labour in putting it upon them than the round stack. But where the corn is only in a small proportion, the round or oblong shape may be more proper and suitable, as being more readily drawn up in the roof; but the circular, with a conical top and cylindrical body diverging a little at the eaves, is esteemed the best form by some. For hay the form of the rick or stack is a matter of still less consequence; the long square or oblong shapes are perhaps the most safe and convenient, especially when not too broad, as they admit the air most fully, and are besides the most convenient to cut from in trussing hay for sale at the market.

STAG. A term applied provincially to a young horse. Also to the male of the deer kind. See Deer.

STAGGERS. See Apoplexy.

STALL-FEEDING. The process of fattening cattle in the stall. The best practice in this mode of fattening is probably that of wholly confining them to the stalls, as by this means they are kept quiet, and free from interruption, and of course feed more quickly and with greater regularity, which seem to be points of great importance in this system of management. There are, however, many other methods adopted in different situations and circumstances.

In regard to the sorts of food that may be employed in the way of winter fattening animals, they are very numerous, but the principal succulent kinds are carrots, parsnips, potatoes, Swedish turnips, cabbages, common turnips, grains, &c.; and of the more dry sorts, oil-cake, oats, barley-meal, rye-flour, bean and pea-meal, and others of the same nature, with different kinds of straw cut into chaff by means of machinery, or hay cut in the same manner. It is usual with some to employ the different meals in a state of mixture in nearly equal proportions, except bean meal, which from its heating quality is mostly made use of in smaller quantities. But on the principle of fresh kinds of food having a more powerful effect on the systems of animals when first applied, it may be more beneficial to have them given in alternation, or at distant intervals, as their effects may in this way be more fully experienced.

In respect to the cut straw and hay that is made use of in this way, the first should be prepared from that which is fresh thrashed out. The hay, instead of being of the inferior kind, should be the best that the farm affords, and such as is not in the least injured in the smell or taste by keeping. The more inferior kinds of hay have, how-acres, on which I feed two cows by spade husbandry. Half an acre of pasture, half an acre and eight rods in wheat, and one quarter of an acre in oats, the other part was green food for the cows, such as rye, tares, cabbage, clover, mangel wurzel, turnips, Italian rye grass; but if you are surprised at my keeping them on this quantity of land, I must tell you that one crop in a year will not do it; but my plan is to take a successive crop, that is, rye is the first thing that I cut green in the spring, then I dig the land up and manure it with the liquid manure as far as it will go, then finish with rotten dung, and plant mangel wurzel and turnips, and the part that I manure with *liquid* is always the *best;* the next thing I cut is winter barley and tares, which I get off soon enough to sow more turnips, and plant some cabbage for winter; by this time I cut the Italian rye grass and clover, which grows again in a short time, with a little of the liquid manure, as soon as it is cut. Last summer I cut the Italian rye grass and clover three times, and this year I have nearly cut it twice already; and there really were two good crops of the Italian rye grass, and I think there will be two more this summer with a little manuring. My early cabbage I always let stand to grow again all the summer, and they bring a great deal of food; then I plant in November, and put the liquid manure to them when I plant as far as it will go, but to the rest I use dung or ashes, which are not so good as the liquid, which anybody may tell in the spring by looking at the bed of cabbage. So now, sir, I hope you understand what I keep the cows on in winter as well as summer. I had no hay last winter,

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through which
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through other
boxes lined with
mately stove drie
it cracks into th
bling miniature
form. Starch ma
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root that of the
sago of the *Sagus*
palm tree; and t
Jatropha Manihot
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lage is cold. Sta
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oles of houses, towers or ruins;
s in hollow trees, and often in
high rocks overhanging the sea;
lly in pigeon-houses. The nest
f straw, roots, and dry grass; the
four or five in number, of a uniform
pale blue, one inch two lines long
nes in breadth. Their food con-
worms, insects in their various
d snails; in default of these, they
erries and grain. The starling is
almost every part of the United
. The whole length of an adult
eight inches and a half. The
verges on black, and is varied
ple and green. The legs are dark
brown. (*Yarrell's Brit. Birds*,
44.)

OF BETHLEHEM. See BETH-
TAR OF.

-THISTLE. A name applied to
cies of *Centaurea*, viz. Jersey star-
. *isnardi*), the common star-thistle
trapa), and the yellow star-thistle,
rnaby's thistle (*C. solstitialis*). The
perennial weed, the others are
(*Smith's Eng. Flor.* vol. iii.
See BLUE-BOTTLE, KNAPWEED,
–

WORT. (*Aster*, a star; whence
common name, the flowers re-
little stars from the rays of their
rence.) Many species of this ex-
genus are stately and handsome
One species is indigenous, the sea
(*A. Tripolium*), a perennial, which
lentifully in salt marshes on the
ea-coast, flowering in August and
er. The herbage is smooth, rather
. Stem round, generally erect,
hree feet high. Leaves lanceolate,
shy. Flowers, large and handsome,
ellow or orange disk, and numer-
ding elliptic-oblong rays, generally
ht blue, occasionally white. (*Smith's*
r. vol. iii. p. 436.) See ASTER.

WORT, THE WATER. (*Cal-*
named by Pliny from *kalos*, beauti-
hrix, hair.) Annual aquatic plants,
row in ditches, ponds, and lakes.
re two native species: the vernal
arwort (*C. verna*), and the autum-
r starwort (*C. autumnalis*). (*Smith's*
r. vol. i. p. 9.)

LING. See ANIMALS, WILD,
G OF, SHEEP STEALING, &c.

M. Water converted into an elastic
the application of heat. It would
n to our subject to go into any de-
he various mechanical uses and im-
nts to which steam has been applied
much success. Latterly, however,
f inquiry has led to an investigation into the application of steam to purposes of husbandry, such as engines for ploughing, draining, &c.; and, though there are obstacles in the way of their successful operation, there is little doubt that eventually the spirit of research and improvement will overcome these difficulties, and create a singular revolution in the practical operations of agriculture, whereby a vast amount of animal power will be saved, and an increased impetus be given to production. A series of very able papers on this subject appeared a few years ago in the *Quart. Journ. of Agr.* vol. v. p. 84. 479., vol. vi. p. 411., vol. vii. p. 225.

STEAMING FOOD. The advantages to be derived from boiling or preparing the food of live stock are now very generally understood and appreciated; although it is still a question whether it always compensates for the extra labour and time consumed. We have already gone into this subject under the head FOOD, and merely revert to it now to call attention to some articles describing apparatuses for steaming food, which will be found in the *Quart. Journ. of Agr.* vol. iv. p. 378., vol. vi. p. 33. Steaming is also popularly treated of and explained in the first volume of *Brit. Husb.* p. 129.

STEARINE. (Gr.) That part of oils and fats which is solid at common temperatures. Both in fats and in fixed oils it is associated with a fluid principle, which cannot be rendered solid at the lowest known temperatures. Stearine is only found in animal fats; or, at least, is rarely present in those of a vegetable origin.

STEELYARD. A well-known balance, by which the weights of bodies are determined by means of a single standard weight.

STEEPING. See BRINING OF GRAIN and SMUT.

STEPPES. (Russ.) The name given to the vast extent of plains peculiar to Asia; synonymous with the prairies of North America, and the llanos of South America. The steppes of Russia are not unlike the heaths of Germany; being in part susceptible of cultivation, and affording pasturage for numerous herds belonging to nomadic tribes. See RUSSIA.

STITCHWORT. (*Stellaria*, from *stella*, a *star*; the flowers are star-like.) A genus of herbaceous plants which are mere weeds. There are eight indigenous species, one or two of which are annual, the others are perennial. See CHICKWEED.

STICKLEBACK. (*Gasterosteus aculeatus.*) A well-known fish, abounding in newly cut ditches, canals, and other collections of water. It seldom exceeds two or to the act of impregnation.

STILES. A well-known contrivance for the admission of foot passengers, without permitting the stock of the inclosures to escape. Stiles are made in very different forms and manners in different districts, according to the materials, situations, and purposes for which they are intended.

STILT. (*Himantopus melanopterus.*) A bird remarkable for its long and slender legs. The black-winged stilt has occasionally been killed in some of the English counties; but it is merely an accidental visiter to our shores. The whole length of this bird is about thirteen inches. The head, neck, breast, and under parts of the body are white; the back and wings nearly black, tinged with green; the legs and toes pink. (*Yarrell's Brit. Birds*, vol. ii. p. 559.)

STINT. A name given to some diminutive species of sandpiper. Mr. Yarrell, in his *Brit. Birds*, describes two species, the little stint (*Tringa minuta*), which is about six inches long, and Temminck's stint (*T. Temminckii*), which is even smaller in size, being only five inches and three quarters long. The food of these birds consists of small insects and worms. See Sandpiper.

STIPE. The stalk of a fern leaf, or of the head of a fungus.

STIPULES. In botany, small scales or appendages situated on each side at the base of the petioles or leaf-stalks, most commonly of a less firm texture than the latter, and having a subulate termination.

STOCK. (*Matthiola.*) This is a genus of old and well-known inhabitants of the garden. The principal species are, double stock gilliflowers, Brompton, and queen stocks, annual and ten weeks' stock. The

those that lie u
the upper disk.
STONECHAT
species of warble
sident with us.
grass, hair, and f
the base of some
five or six in nu
blue, the larger en
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lines and a half
breadth. The he
are black; sides
white; breast, ri
length of the bi
quarter. (*Yarrel*
245.)

STONECROP.
herbs, with altern
flat, cylindrical,
mostly perennial.
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There are ten ind
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and dry sandy gr
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STONE CUR

STONE-PA
These are chiefly
native species, the
(*A. libanotis*), wh
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high, angular, an
Leaves doubly pi
minal, hemispheri
reddish flowers, bl
Eng. Flor. vol. ii.

STOOKING

d, all dicotyledonous trees are endowed ature with the property of sending up ts from the stumps or stools; but this t the case with most of the gymnosperms oniferous trees. A wood of pines or therefore, when once cut down, can r be renewed, except by seeds. It is rious fact that the shoot, however large stool may be, can be traced to the pith, therefore appears to have been origin- a shoot of the first year's growth of the t. That its growth has been impeded ident; but when the tree is cut down, the whole sap thrown into a small space, latent, yet vital, gum is stimulated, and ig thence produced.

TORK. (*Ciconia.*) The white stork *alba*) is that species which visits, though ly, England. The whole length of bird is three feet six or eight inches. ew recent instances of the visit of the k stork (*C. nigra*) to this country are record. In length this species is about e feet four inches. (*Yarrell's Brit. ds*, vol. ii. p. 489—493.)

STORK'S-BILL. (*Erodium*, from *ero-* , a heron; the carpels resemble the head beak of that bird.) This is an exten- genus of plants of considerable beauty: y thrive well in any common soil with usual treatment. There are three in- nous species, the musky stork's-bill (*E. chatum*), an annual; the sea stork's-bill *maritimum*), a perennial; and the hem- stork's-bill (*E. cicutarium*), an annual, ch is the most common species, and s everywhere in waste ground. The is tap-shaped, whitish. Herbage some- t hairy and viscid, disagreeably scented. ns procumbent, hairy, mostly branched, . Leaves pinnate; leaflets pinnatifid, Flowers rose-coloured, in stalked um- Capsules single-seeded, bristly, with xed hairs. (*Smith's Eng. Flor.* vol. iii. 9.)

OT. A provincial term applied to a or young bullock.

OVEN. A sapling shoot from the of a fallen tree.

OVER. A general name for the dif- t kinds of fodder arising from thrashed , whether it be straw, chaff, or the straws, such as ears and rough chaffy er, separated by the rake or riddle the corn in chaff after the straw has removed from the floor.

OWK. The handle of a pail: also a k of twelve sheaves of grain.

RAINS. In farriery, accidental in- arising from over distension of the les or tendons, in consequence of which animals suffer great pain, and are ge- lly lamed.

STRANGLES. In farriery, a disease which is principally incident to young horses; usually appearing between the fourth and fifth year, and oftener in the spring than at any other season. It is preceded by cough, and is a disease to which all horses are subject, but it never returns. A blister will be found the best application to hasten the formation and suppuration of the tumour under the jaw, which, from its situation, has probably given the name to this disease. (*Youatt on the Horse*, p. 149.)

STAPWORT. (*Corrigiola*, a diminutive of *corrigia*, a leathern thong, from the habit of the plant.) These are pretty annuals, only requiring to be sown in the open ground, and to be treated as other hardy annuals. One species is indigenous, the sand strapwort (*C. littoralis*), which grows about the southern coasts of England. It has a small tapering root. Stems several inches long, spreading on the ground in every direction, flaccid, not much branched. Leaves, scattered, simple, linear-lanceolate, obtuse, glaucous, rather fleshy. Clusters terminal and lateral, subdivided or interrupted, of numerous pearly, often sessile flowers. (*Smith's Eng. Flor.* vol. ii. p. 112.)

STRATH, in Scotland, is generally understood to signify a valley of considerable size, whose appellation is determined by some river running through it, or some particular characteristic.

STRATUM. When different rocks lie in succession upon each other, each individual forms a *stratum*. See GEOLOGY.

STRAW. The stalks or culms on which corn and other grasses grow, and from which the grain has been separated by thrashing. When chopped or cut small, it affords a wholesome provender for horses and oxen, especially if it be mixed with green food. (See CHAFF and CHAFF ENGINES.) It is likewise usefully employed in thatching cottages, houses, and barns. But as such buildings are liable to be uncovered by violent storms, farmers should, if possible, annually reserve a sufficient quantity of wheat straw in order to be provided against accidents; thus the necessity of purchasing straw at a high price, or of thrashing their wheat at an improper season, may be effectually obviated. The value and qualities of the straws of the different cereal grasses varies considerably according to the soil and season. It is thought that when grown on gravelly or rich clay soils it is more valuable as fodder than when it is reared on black deep loam or cold moory land; and it is now generally admitted that it possesses more succulence when the corn is rather green than when it is in a riper state. It is supposed by straw is so scarce in all except the northern counties, and some parts of Wales, and is in such demand for thatching, brick-making, &c., that it is but seldom applied to other uses. When not allowed to be carried off the premises, the chief value of white straw for farm purposes lies in its conversion into manure; for although it may carry store cattle through the winter, it will neither fatten them nor enable any animal to work; and its intrinsic worth for the uses of litter and of occasional feeding has been estimated by experienced farmers at 20*s*. to 30*s*. the ton. (*Sinclair's Scot. Husb.*; *Brown's Treat. on Rural Affairs*, vol. i. chap. v.; *Brit. Husb.* vol. i. p. 132.) See HAULM.

STRAWBERRY. (*Fragaria*, from *fragrans*, fragrant; the perfumed fruit of the strawberry is well known.) The strawberry is our earliest fruit, and, as the harbinger of the *fructus horæi*, its appearance is as welcome as its flavour agreeable. The cultivation and propagation of this plant is so familiar to every one, as are the wholesomeness and deliciousness of the fruit, that neither need be particularised here any further than that seeds sown early in spring will generally fruit the same year, very late in autumn. Our indigenous species are two, the wood strawberry (*F. vesca*), and the hautbois strawberry (*F. elatior*). The covering of strawberry plants with sea-weed in the winter has been found to increase the size of the fruit to a prodigious degree. This is much practised in the island of Jersey. A very interesting article on the mode by which the metropolis is supplied with strawberries will be found in No. 124. of the *Saturday Magazine*.

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STRENGTH,
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s applied to steam-engines. The of action which a horse can exert es as the duration of the labour is d. Tredgold gives the following owing the average maximum verith which a horse unloaded can ccording to the number of hours :—

Greatest Velocity per Hour in Miles.	Time of March in Hours.	Greatest Velocity per Hour in Miles.
14·7	6	6·0
10·4	7	5·5
8·5	8	5·2
7·3	9	4·9
6·6	10	4·6

seful effect a horse is capable of g depends much upon the manner his strength is applied. See Carts, meter, Thrashing Machine.

th of Materials. — There are four ways in which the strength of a ly may be exerted: first, in resistgitudinal tension, or force tending t asunder; secondly, in resisting a ding to break the body by a transain; thirdly, in resisting compresa force tending to crush the body; thly, in resisting a force tending to it asunder by *torsion*. Mr. Hodgives the following results of his nts on the resistance of a crushing short pillars of some of the most descriptions of wood, the force plied in the direction of the fibres.

cription of Wood.	Strength per square Inch in lbs.	
- - -	6831 to	6960
- -	8683	9363
- - -	7518	7518
- - -	7733	9363
h birch - -	3297	6402
- - -	5674	5863
al - - -	5748	6686
deal - -	6781	7293
- - -	7451	9973
- - -		10331
ruce) - -	6499	6819
any - -	8198	8198
Quebec) - -	4231	5982
English - -	6484	10058
pitch) - -	6790	6790
ed) - -	5395	7518
- - -	3107	5124
(dry) - -	8241	10493
- - -		12101
t - - -	6063	7297
r - - -	2898	6128

's *Dict. of Science*; *Barlow's Treat.* *rength of Timber*.)

BLE. The root ends of the culms left in the field, standing as they er the corn has been reaped by the r scythe. In some parts of the only a small portion of the straw is ith the ears of corn, and the stubble in that case is a foot or eighteen inches in length; but in others, the corn is cut as close to the surface as possible, in which case the stubble is quite short. In general, long stubble is a symptom of bad farming, because a quantity of straw is in this case left waste in the field, which might have been carried home and rotted into manure.

STUBWOOD. The young wood that is cut from stubs or stools, or such wood as grows in hedgerows and does not properly come under the name of timber, pollards, or thorns. The age or size of cutting must ever be guided by the demand in a given district; whether it be for cordwood, hoppoles, hoops, stakes, faggots, &c.

STURK. A provincial name for a young bullock or heifer.

STYLE. In botany, is that elongation of the ovarium which supports the stigma. It is an extension of the midrib of the carpellary leaf, or is formed by the rolling up of the attenuated extremity of the latter.

SUBSOIL-PLOUGH. See Plough and Subsoil Ploughing.

SUBSOIL-PLOUGHING. In farming the operation of breaking the substratum by means of a plough constructed especially for that purpose. Considerable discussion has taken place, with regard to the advantages of subsoil-ploughing; a difference of opinion which appears to have been principally caused by an inattention to the chemical effects produced by the subsoil, or Deanstonizing system of tillage, so named from being first employed, or at least first brought into general notice, by Mr. Smith of Deanston, in Stirlingshire, when he was examined, in 1836, before the Agricultural Committee of the House of Commons. By this system, by means of a subsoil-plough, of which there are several kinds, the subsoil, or under crust of earth, is merely broken and pulverized, say to the depth of from fourteen to twenty inches, without being brought to the surface, or mixed with the upper soil; after a lapse of four or five years, a portion of the previously disturbed substratum is found, by experience, in a state to be advantageously (by deep ploughing) brought to the surface; it being in this time, by the action of the atmosphere, and perhaps by a partial mixture with the surface-mould, rendered sufficiently friable and fertile. It is of necessity a consequence of this subsoil-ploughing that the permanent drains of all lands thus cultivated must be constructed rather deeper in the soil than is usual with farmers: the top of those of Deanston are placed at a depth of twenty-two inches from the surface, so as to be completely out of the way of the subsoil; to have strength and massive weight sufficient to penetrate the hardest stratum; to resist the shocks from fast stones, and to throw out all stones under 200 lb. in weight. All this has been accomplished and practically proved at Deanston, over an extent of at least 200 acres of various soils; and also in various parts of England, Scotland, and Ireland, during several seasons. The plough requires four good horses, an active ploughman, and a lad to drive the horses and manage them at the turnings. Six horses, yoked three and three abreast, may be necessary in some very stiff or stony soils. A common plough, drawn by two horses, goes before the subsoil-plough, throwing out a large open furrow of the active soil; the subsoil-plough following, slits up thoroughly and breaks the subsoil, and the next furrow of active soil is thrown over the last opened furrow of the subsoil; the stones brought to the surface by the subsoil-plough being thrown aside on the ploughed part of the land by a lad, thus the work proceeds until the whole field is gone over. The lad should carry a bag of wooden pins, that he may mark the site of the large fast stones which the plough cannot throw out, and which must afterwards be dug out with the pick, and perhaps blasted.

"The charge of subsoil-ploughing a Scotch acre may be estimated at 24*s.* or 30*s.* per statute acre, being one fifth of what a similar depth with the spade would cost, and, upon the whole, as effectually done. When land which has been opened up by the subsoil-plough shall have undergone the first rotation of cropping, several inches

4s. each, to cove
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tact with a substratum of
er absorbent properties than
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this place, to examine, first,
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e broken-up subsoil; secondly,
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r the sake of the argument,
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ical composition of the sub-
ace-soil is nearly the same,
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silica, alumina, and carbo-
nd that the surface-soil pos-
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remains. And yet, although
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ils of Sussex, Dorsetshire,
mpshire, very advantageously
atum of chalk existing under
nd spread it in considerable
the surface. Those of Essex
n many places do the same
r stratum of clay or marl on
rface-soils immediately rest; and they find this a very profitable practice, because the earths which constitute all fertile soils being also the necessary constituents of the commonly cultivated grasses, are gradually and incessantly carried off from thence by continual cropping, and consequently in time an advantageous opportunity is afforded for their being replenished with the earths, perhaps contained in the subsoil, in which they may have become deficient.

The chemical effect of pulverizing and breaking up a subsoil is certainly advantageous to the plant in two ways, besides others with which we are very likely at present unacquainted; first, it renders the soil penetrable to a much greater depth by the roots, or minute fibres of the plant, and consequently renders more available any decomposing matters, or earthy ingredients, which that substratum may contain; and, secondly, it renders the soil much more freely permeable by the atmosphere, rendering, in consequence, a greatly increased supply, not only of oxygen gas to the roots of the plants, but also yielding more moisture, not only from the soil, but from the atmospheric air; which moisture, let it be remembered by the cultivator, is in all weathers as incessantly absorbing by the soil as it is universally contained in the atmosphere, abounding most in the latter, in the very periods when it is most needed by the plants — that is, in the warmest and driest weather.

It is, perhaps, needless to prove, that the roots of commonly cultivated plants will penetrate, under favourable circumstances, much greater depths into the soil, in search of moisture, than they can, from the resistance of the case-hardened subsoil, commonly attain. Thus the roots of the wheat-plant in loose deep soils, have been found to descend to a depth of two or three feet, or even more; and it is evident, that if plants are principally sustained in dry weather by the atmospheric aqueous vapour absorbed by the soil, that that supply of water must be necessarily increased, by enabling the atmospheric vapour and gases, as well as the roots of plants, to attain to a greater depth; for the interior of a well pulverized soil, be it remembered, continues steadily to absorb this essential food of vegetables, even when the surface of the earth is drying in the sun.

And by facilitating the admission of air to the soil, another advantage is obtained, that of increasing its temperature. The earths are naturally bad conductors of heat, especially downwards; thus it is well-known, that, at the siege of Gibraltar, the red-hot balls employed by the garrison were readily a lighter colour. A free access of air to all soils also adds to their fertility, by promoting the decomposition of the excretory matters of plants, which otherwise would remain for a longer period, to the annoyance of plants of the same species.

In a recent communication to the secretary of the *English Agricultural Society*, Sir E. Stracey has given some of the results of his experience with the Rackheath subsoil-plough, and they are of a description which cannot be too generally known:— "On my coming," he remarks, "to reside on my estate at Rackheath, about six years since, I found 500 acres of heath land, composing two farms (which had been enclosed under an act of parliament about forty years), without tenants; the gorse, heather, and fern shooting up in all parts. In short, the land was in such a condition, that the crops returned not the seed sown. The land was a loose loamy soil, and had been broken up by the plough to a depth not exceeding *four inches*, beneath which was a substratum (provincially called an iron pan), so hard, that with difficulty could a pickaxe be made to enter in many places; and my bailiff, who had looked after the land for thirty-five years, told me that the lands were not worth cultivation — that all the neighbouring farmers said the same thing— and that there was but one thing to be done, viz., to plant with fir and forest trees; but to this I paid but little attention, as I had the year preceding allotted some parcels of ground, taken out of the adjoining lands, to some cottagers; to each cottage, about one third of an acre. The crops on all these allotments looked fine, healthy, and good,

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cre : the wheat, the "golden drop." My
dish turnips on this land this year are
good; my pudding and sugar-loaf tur-
failing in many parts, sharing the fate
hose of my neighbours, having been
tly injured by the torrents of rain
ch fell after they had shown themselves
ve the ground. Turnips must have a
p and well-pulverised soil, in order to
ble them to swell, and the tap-roots to
etrate in search of food. The tap-root
Swedish turnip has been known to pe-
rate thirty-nine inches into the ground.

Sub-Turf Plough.—"Being on the sub-
t of the subsoil-plough," says Sir Ed-
and Stracey, "I may as well tell you I
ve contrived another plough, from the
e of which the greatest benefit has been
ived by my park land. I call this my
ub-turf plough.' It is used to loosen the
f about ten inches and a half deep below
surface, without turning over the flag;
ening the soil underneath, consequently,
itting the air and the rain, and permit-
the roots of the herbage to spread in
ch of food. There are no marks left
which it can be known that the land
been so ploughed, except from the
ght lines of the coulter, at the distance
out fourteen inches one from another.
bout three months from time of plough-
these lines are totally obliterated, and
quantity of aftermarth, and the thick-
of the bottom, have been the subject
dmiration of all my neighbours. An-
advantage from this sub-turf plough-
is, that, before that took place, water
lying stagnant in many parts (after
y rains), especially in the lower
nds, to a great depth: now no water
be seen lying on any part, the whole
g absorbed by the earth." (*Journ. of*
Agr. Soc. vol. i. p. 253.)

nd for heavier soils, the evidence in
r of subsoil-ploughing is equally valu-
In the year 1838, an experiment
made by Sir James Graham, which is
rtant in several respects. It was on a
of about eight acres, of the poorest
wettest land. "The surface soil is
t five inches deep of black earth, of a
r quality. The subsoil is a weeping
tive clay, with sand and rusty gravel
mixed. This clay extends to the bot-
of the drains, which are of tile, laid
y inches deep in every furrow. This
was rented by the out-going tenant at
d. per acre. It was in pasture of the
est description, overrun with rushes
other aquatic plants. After draining
ne half of this field, I used Mr. Smith's
oil-plough. On the other half I trench-
ghed to the depth of ten inches, by two ploughs following in succession. In the first part, not mixing with the surface any of the subsoil; in the last part, commingling the surface and the subsoil in nearly equal proportions. The whole field was heavily, but equally manured, and planted with potatoes; and though the potato crop, even on good land in this neighbourhood (Cumberland), was below an average, yet the crop in this field exceeded an average, and yielded about twelve tons per acre. The field is equally drained in every part. The crop was so equal throughout the field, that I am unable to pronounce positively which part was the best, but I am inclined to give the preference to that portion where Mr. Smith's subsoil-plough was used." (*Journ. of Eng. Agr. Soc.* vol. ii. pp. 346—421.; *Trans. High. Soc.* vol. ii. p. 206.; *Brit. Farm. Mag.* vol. iv. p. 434.)

SUBSTRATUM. A stratum lying under another stratum. The term *subsoil* is generally applied to the matters which intervene between the surface soils and the rocks on which they rest; thus, clay is the common substratum, or subsoil, of gravel.

SUCCORY. See Chiccory.

SUCCULENT. A botanical term, signifying fleshy, or filled with juice.

SUCKER. A young twig or shoot from the root of a plant. See Propagation.

SUDORIFIC. Having the power of producing perspiration. It is a medicine which, entering the circulation, acts on the subcutaneous vessels, and augments the action of the glands of the skin which secrete the sweat.

SUET. The fat situated about the loins and kidneys, which is harder and less fusible than that from other parts of the same animal. That of the ox and sheep is chiefly used; and, when melted out of its containing membranes, it forms tallow, and is largely used in the manufacture of candles and the ordinary soaps. Beef and mutton suet, when fused, concrete at a temperature of about 100°. Like other kinds of fat, it is a compound of carbon, hydrogen, and oxygen. See Adeps, Fat, Lard, &c.

SUFFRUTICOSE. (Lat. *suffrutex*, an undershrub.) Any plant which is not exactly either a shrub or an herbaceous plant, that is, which has not hard woody twigs and complete buds like the one, nor perishable succulent leaves and shoots, like the other, is so termed. Lavender is an instance of a suffruticose plant.

SUGAR. (Fr. *sucre;* Germ. *zucker.*) The great commercial demand for sugar is almost exclusively supplied from the sugar-cane (*Arundo saccharifera*), which contains it in greater quantity and purity than any other plant, and consequently affords the

The crystals are next separated from the molasses, or uncrystallisable sugar, by dripping. This forms muscovado sugar, which is afterwards purified in Europe. The purest raw sugar comes from Demerara. Pure sugar is a compound of 44·44 of carbon, 6·18 of hydrogen, and 49·78 of oxygen, in 100 parts. Sugar is nutritive, demulcent, and powerfully antiseptic. Grape sugar undergoes fermentation more readily than cane sugar. A large quantity of sugar, identical to cane sugar, is contained in the sap of the American maple (*Acer saccharinum*), that of the cocoa nut (*Cocos nucifera*), and in the juice of the beet-root (*Beta vulgaris*), from each of which it may be economically obtained: it has also been extracted from grapes or raisins, and, as is well known, is contained abundantly in many ripe fruits and esculent vegetables. It is, however, in these seldom so pure or in such quantity as to admit of ready separation. The total average quantity entered annually for home consumption is, in round numbers, nearly 4,000,000 cwts. See MOLASSES, SACCHARINE SUBSTANCES, &c.

SULPHUR-WORT. (*Peucedanum*, from *peuke*, a pike, and *danos*, parched; so named because of its strong resinous smell.) A genus of perennial, fetid, resinous, smooth herbs, with round, striated, branching, leafy, solid stems. Leaves repeatedly compound, with extremely narrow, acute, entire leaflets. Umbels large, concave, or flat, of numerous general and partial smooth rays. Bractes several, rather small. Flowers yellow. Fruit, first reddish, then of a tawny brown: there is one indigenous species, but it is not common; the sea sulphur-

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return. Poultry ar

pril as the mean period of its arrival;
it remains more than six months in
country, frequently on its return re-
ing the precise locality it had inhabited
easons before. Swallows are occasion-
seen earlier than the date here men-
ed, even in a backward spring, the
ation being influenced by the tempera-
of the country they proceed from.
y feed entirely on winged insects, which
sought for in the air during the greater
of the day; the power of flight enjoyed
hese birds enabling them to remain on
wing for hours in succession in pursuit
heir prey, without any apparent lassi-
e. The nest of the swallow is formed of
stened earth or clay, mixed with straw
bents, and lined with feathers. The
s, four to six in number, are white,
kled with ash-colour and dark red;
are nine lines and a half long by six
s and a half broad. The general colour
he plumage is slate blue and dull black;
chin and throat are chestnut. Whole
th of the bird eight inches and a half,
hich the very elongated outside tail-
ers measure nearly five inches. (*Yar-*
Brit. Birds, vol. ii. p. 213.)

WAMP. Ground habitually so moist and
as not to admit of being trod by cattle,
at the same time producing particular
s of trees, bushes, and plants. A swamp
rs from a bog and a marsh in producing
s and shrubs, while the latter produce
herbage, plants, and mosses. In autumn
spring, the exhalations from swamps
productive of agues, consequently it is
rtant to fill them up or drain them.

WAN. (*Cygnus.*) Of the noble web-
ed birds so called there are three Bri-
species: the Hooper, or Bewick's; the
, and the tame swan. The wild swan
Hooper ought, perhaps, to be regarded
e only true native species. The tame
(*C. olor*) is superior in bulk to either
e wild species, and is at once distin-
hed by a large black callous knob on
base of the bill. Our remarks in this
e will be exclusively directed to the
esticated swan. These graceful birds
rarely dressed for the table; they are
idered too ornamental to destroy. They
not destructive to fish, and they keep
water free from weeds. Mr. Main, who
studied their habits, in his work on
nestic Poultry, says the tame swan is
ivorous and granivorous; that is, they
upon weeds and grain. They love also
ad, vegetables, &c., which they eat
dily from the hand.

he swan lays from five to eight eggs in
summer, and breeds only once in the
r. They love an islet to breed their young upon, for the sake of its quiet; and a little straw deposited there is all they require for making their nest. The swan sits a month, but if the weather is bad, they are known to remain longer before they hatch. The cygnets, or young swans, remain a year with their parents; but when the breeding season approaches the old cob, or male bird, drives them away. This is the period to sell; and if the birds have paired, they fetch a higher price in the market. Swans are not in full plumage till the third year. These birds often take flight at the fall of the year, therefore the old birds should have the first joint of one wing removed, which would prevent their roving. Two pair of swans will seldom agree together upon the same piece of water. The cob, or male swan, is larger than the female, and bolder. They require feeding in very severe winters, and the ice should be broken for them to swim about. At other times they feed on weeds growing in the water, or herbage on the banks of it. Swans and cygnets are caught most easily with a swan hook, which is a long pole of ten or twelve feet, with a blunt hook ten inches in length, bent at right angles to the pole; the angle should be turned like a ring, and open in the inner side, to let in the neck of the bird. The swan has a peculiar kind of snort, but no voice. They hiss when angry. See ANIMALS, STEALING OF.

SWARD. Green turf; that is, the surface of land under pasture grasses. A fine sward may be called the characteristic feature of British landscape, not being found in the same degree of perfection in any other country, not even in Ireland.

SWEAL. To singe or burn off the hair, as in hogs.

SWEET-BRIAR. See EGLANTINE.

SWEET FLAG. See ACORUS and AROMATIC REED.

SWEET-GRASS. (*Glyceria*, from *glykeros*, sweet, alluding to the herbage; whence also the common name.) A genus of grasses of which some of the species are aquatics. Dr. Smith enumerates six indigenous species: viz. the reedy sweet-grass (*G. aquatica*), the floating sweet-grass (*G. fluitans*), the reflexed sweet-grass (*G. distans*), the creeping sea sweet-grass (*G. maritima*), the procumbent sea sweet-grass (*G. procumbens*), and the hard sweet-grass (*G. rigida*). The only species which have been thought worthy of trial by Mr. Sinclair and other experimental cultivators of grasses are: —

1. The floating sweet-grass (*G. fluitans*). The panicle is oblong, branched, divaricating. Spikelets close pressed. Florets numerous, obtuse, seven-ribbed, with short

trout, are said to be very partial to the seed.

2. The reedy sweet-grass (*G. aquatica*). In this species the panicle is erect, repeatedly branched, spreading. Florets numerous, obtuse, with seven ribs. Nectary cloven, acute. This grass is common on the banks of rivers, and frequent on the margins of standing pools. On the banks and little islands of the Thames, where it is generally mown twice in the year for hay, it affords abundant crops of valuable winter fodder. Mr. Curtis informs us that in flat countries, which do not admit of being sufficiently drained, it is almost the only grass for hay and pasturage. In the fens of Cambridge, Lincoln, &c., immense tracts which used to be overflowed and produce useless aquatic plants, and still retain much moisture, though drained by mills, are covered with this grass, which not only affords rich pasturage in summer, but forms the chief part of their winter fodder. Its powerful creeping roots make it a dangerous and troublesome weed in ditches, where, with other aquatic plants, it soon chokes them up. In the fens of the Isle of Ely this grass grows to the height of six feet, and proves excellent fodder for milch cows, though horses are not fond of it. The nutritive matter of this grass contains a greater proportion of sugar than exists in any of the superior pasture grasses. The best manner of propagating it is by planting the roots either in autumn or spring. It flowers about the second and third weeks

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ar, which was undoubtedly f all the European varieties, Chinese breed, was formerly British Islands, and very forests until the time of the gland.

is now spread over the tem- mer parts of the old conti- djacent islands. His colour and climate, but is generally with black spots and streaks. vered with coarse hairs or ected with soft wool, and nd longer bristles upon the e, which he erects when in a very bold and powerful ecomes more fierce and in- e. From the form of his fly herbivorous in his habits, roots, which his acute sense uch enables him to discover rface. He also feeds upon ces, such as worms and larvæ, s up from the ground, the small reptiles, the young of ccasionally carrion; he even us snakes with impunity. produces a litter but once a nuch smaller numbers than ated. She usually carries her months, or sixteen weeks.

te the hog has been known to thirty years, but when domes- sually slaughtered for bacon o years old, and boars killed om reach to the age of five. hog is tamed, it undergoes mongst other changes in its The ears become less move- g required to collect distant formidable tusks of the male being necessary for self-de- muscles of the neck become from not being so much exercised as in the natural state. The head becomes more inclined, the back and loins are lengthened, the body rendered more capacious, the limbs shorter and less muscular; and anatomy proves that the stomach and intestinal canals have also become proportionately extended along with the form of the body. The habits and instincts of the animal changes: it becomes diurnal in its habits, not choosing the night for its search of food; is more insatiate in its appetite, and the tendency to obesity increases.

The male, forsaking its solitary habits, becomes gregarious, and the female produces her young more frequently and in larger numbers. With its diminished strength and power of active motion, the animal also loses its desire for liberty. These changes of form, appetites, and habits being communicated to its progeny, a new race of animals is produced, better suited to their altered condition. The wild hog after it has been domesticated does not appear to revert to its former state and habits; at least the swine of South America carried thither by the Spaniards, which have escaped to the woods, retain their gregarious habits, and have not become wild boars.

In its wild state the hog has six incisor teeth in the upper, and six in the lower jaw; but when domesticated the number is reduced to three in each jaw, and this number is not constant. The vertebræ of the back vary from fourteen to fifteen in number; the lumbar and the sacral from four to six; the caudal from two to three or four, the tail being often rudimental in the domesticated races.

Mr. T. E. Eyton (*Trans. of Zool. Soc.* Feb. 1837), amongst other osteological differences in the races of hogs, points out the following as applicable to the number of vertebræ: —

	English male.	African male.	Chinese male.	Wild Boar.	Domestic Hog.
Cervical	7	7	7	7	7
Dorsal	15	13	15	14	14
Lumbar	6	6	4	5	5
Sacral	6	5	4	4	4
Caudal	21	13	19	20	23
	55	44	49	50	53

The hog family includes several species, but these have usually been divided into three genera.

1. The true hog, which is the most diffused and important class, comprehending the wild boar (*Sus aper*) of Europe, Asia, and Africa; the babiroussa (*Sus babirussa*) of the islands of the Eastern Archipelago, which is of lighter form than the common wild hog; the Papuan hog (*Sus papuensis*) of New Guinea, and the wood swine, or

tail, and are further characterised by a glandular opening in the back, whence the generic term *dicotyles*, signifying a double navel.

The hog does not appear to have been indigenous to America, but was taken over by the early voyagers from the old world, and it has now spread and multiplied throughout the continent.

The first settlers of Canada, the British North American settlements, and the United States, carried with them the swine of the parent country, and a few of the breeds still retain traces of the old English character. From its nature and habits the hog was the most profitable and useful of all the animals bred by the early settler in the distant clearings. It was his surest resource during his first years of toil and hardship. It arrived earlier at maturity, required less care, sought out, for the most part, its own food, was the least subject to accidents and diseases in a new situation, and therefore best repaid any portion of attention bestowed on the breeding and rearing it.

The widely extended foreign commerce, and the long prevalence of the slave trade, afforded the Americans opportunities of procuring the best varieties from China, Africa and other countries. The large consumption of pork in the United States, far exceeding the consumption of any other country, has also contributed mainly to the improvement of the breeds, by causing the Americans to pay considerable attention to the rearing of swine, which have thus become one of the most important articles of

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, *or Siamese Breed.*—The
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brought to America and England from Canton and other Indian ports, for the most part as sea stock by the vessels employed in the tea trade, &c. Owing to the much larger consumption of pork by the Chinese than of any other animal food, they pay great attention to the rearing and fattening of their swine. It is said they even use the milk of the sow for domestic purposes. The pure Chinese breed is too delicate and sensible of cold to be of much value in climates liable to frequent changes of temperature. It is chiefly, therefore, by intermixture that its value is recognised; and it is for this reason that its introduction has proved so beneficial in England, by correcting the coarseness of form, quieting the restless disposition, and adding a greater tendency to mature quickly and fatten kindly. The flesh of the Eastern hogs is more suited for pork than for bacon. Mr. Culley subdivides the Chinese breed into seven varieties; but there appear to be only two distinct species,—the white and the black; the former better shaped than the latter, but less hardy and prolific. Both are, however, small-limbed; ears and head thin and transparent, small and fine; neck thick; the body close, compact, and well formed; legs very short; flesh delicate, round in the carcase, thin-skinned, and the head so embedded in the neck, that, when quite fat, the end only of the snout can be seen. They are rather difficult to rear; the sows are bad nurses; and, from their small size, they seldom reach to a greater weight than from ten to twelve stone when one year old, and sixteen to eighteen stone when two years old.*

The black race, from their valuable properties of fattening on a small proportion of food, being very thrifty, and prolific breeders, notwithstanding their inferior size, have been advantageously crossed with other breeds.

There is a mixed tawny breed, or patched with black and white, which is valuable for breeding sows and roasters.

Hampshire breed.—This is a very large breed, which is longer in the neck and body, but not so compact in form as the Berkshire. They are mostly of a white colour, or spotted, and are well disposed to fatten, coming up to a great weight when properly managed in respect to food. The goodness of the Hampshire hog is proverbial; it is principally fattened for large hams and bacon.

The Shropshire breed is large and coarse; but these hogs are found profitable where the keep is in sufficient abundance for their support; hence they are held in estimation in England by distillers, and are commonly by a cross with the Berkshire, which has reduced the length both of their legs and carcase, and rendered the head lighter.

The Rudgwick breed.—This is the most enormous breed in Great Britain, and is reared about the neighbourhood of a village on the borders of Sussex and Surrey, whence it takes its name. They feed to an extraordinary size without any peculiar care, and weigh, at two years old, on an average, full 70 stone, which is nearly double what most other kinds will weigh at the same age. The Rudgwick sows are accounted good mothers, very prolific and hardy, and are particularly noted as being an extremely large sort, having been known to weigh from 80 to 116 stone, 8 lbs. to the stone. Indeed, some have reached to the extraordinary weight of 182 stone. As large breeds pay the farmer the best in many cases, such a breed as the Rudgwick deserves to be attended to in the system of hog management.

The Suffolk and Norfolk breeds have been long in repute as hardy and prolific species, and when crossed with either the Dishley or the Berkshire hog, produce animals which are held in very general esteem.

The Norfolk breed. — This is described as being a small, short set-eared, thin-skinned porking sort, various in colour, white, bluish, striated; generally an inferior kind. But on the Lincoln side of the county there is a large spotted variety of very good form and quality.

The Suffolk Breed is a small, delicate, white race, which has for many years been held in good estimation. They are shorter

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and deep in the belly, full in
iarters, but light in the bone
They feed remarkably quick,
ind are of an excellent quality
'he sows are good breeders, and
from eight to twelve; but they
racter of being bad nurses.

tshire breed.— Originally this
bodied, low hog, hollow about
's, and high on the rump; with
ge pointed ears; round bone;
colour. But of late years this
een advantageously crossed with
Berkshire sorts, and a smaller
'ariety produced.

cester, the Yorkshire, the North-
the Hereford breeds, call for
The Hereford appears to be
t of the Shropshire, and is a
race; but the others are very
ls, possessing few good points.

ing the various breeds of swine,
ey of the principal continental
l distinct races may not be out
shall therefore give a slightly
lgment of a diffuse article which
ice appeared in the *Quart. Jour.*
iii. p. 49.

n the time of Buffon, the greater
e hogs of Vivarez and the north
ere white; while in Dauphiny,
and Provence, they were all
: pigs still prevail both in Spain
The variety known in France
ame of *porc de nobles* appears
d from the improved English
originated in a cross between
iinese sow and an emancipated
oar. The French breeds of
n general bad, but excellent
ent from Bretagne from hogs
orns and fatted off with maize.
l breeds of France at the pre-
—

e of the Pays d'Auge, in which
nall and sharp, ears narrow and
ly long, legs broad and strong,
white, and bones small. It at-
weight of 800 lbs.

e of Poitou.—The distinguish-
rs of which are, head long and
he point projecting, ears large
us, body long, bones large, but
ong, bristles coarse. Its weight
eds 500 lbs.

ce of Périgord.— Neck thick
ody broad and compact, hair
race, crossed with others, has
pied swine, so common in the
nce.

ce of Champagne.— These do
vell, they are of large dimensions, with long flat sides, broad pendent ears, and coarse white hair.

5. *The race of Boulogne* are also of considerable size, and disposed to fatten quickly; ears very broad, general colour white. This breed has sprung from a cross between the larger English breed and one of the common races of France.

The French pigs, although they have excited many facetious observations from travellers, and not unfrequently been compared to greyhounds, may be fattened, we are assured, at a small expense; and the method of doing this is now beginning to be understood. The Chinese and English breeds are also getting into use for crossing. The fact that 4,000,000 pigs are killed yearly in France, shows of how great importance they are to the small agriculturist. (*For. Quart. Rev.*)

Other European Breeds. — In some parts of Hungary the breed of swine is excellent. In Germany swine are common, but the breed is every where indifferent. Of the other continental races only a very few require particular notice.

The Jutland Swine, which are of a large size, and form an important branch of Danish commerce, have the ears large and pendent, body elongated, back somewhat curved, legs long.

The Swedish Swine.— The most peculiar and characteristic breed of Sweden are supposed to contain a cross of the wild boar, and have the head broad, turned upwards; ears unusually erect, body lengthened, legs long.

The Polish and Russian Pigs are generally small, and of a reddish or yellowish colour.

Race of the Cape of Good Hope.— This breed is somewhat less in size, but else approaches closely to the Siamese pig, and is nearly identical with the breed of the South Sea Islands. It probably originated in India. The hair is black or deep chestnut, hard, and thinly scattered; the ears are straight, the tail pendent and terminated by a tuft of bristles. This race is now very generally distributed; it has been propagated extensively in Australasia, and now occurs not only in Southern Africa, but in several parts of South America.

The smooth or short-legged Swine, a breed derived from the Chinese, are bred in Spain, Portugal, Savoy, and the north and south of Italy. This pig is of small size, very productive, and a ready fattener; it is usually of a copper colour, but sometimes occurs of a bright fiery red. The head is unusually short, the jaws thick, the forehead stunted; the skin falls in folds above the eyes; the ears are short, pointed, high, and covered all over with slender frizzled bristles, of a grey colour, more or less deep, approaching to rufous brown.

The Pig of Guinea (not the Guinea pig) is a remarkable variety, which is little known. The back is bare; head small; ears long, slender, and much pointed; tail long, naked, reaching to the ground; hair short, red, shining, finer and softer than that of any other known race.

In Asia only Europeans and the low Hindoos eat pork. Wild hogs are abundant, and do so much injury to the rice fields that it is a material part of the ryot's business to watch them, which he does night and day, on a raised platform of bamboos.

Of the Mediterranean breeds there are several, which are approved and held in much estimation; among these are the Maltese, the Neapolitan, &c., and hogs are occasionally brought from the sea-ports of Turkey and Spain.

The Maltese breed was at one time in great favour in England; it was of small size, of a black colour, nearly destitute of bristles, with an aptitude to fatten readily. A breed from the country near Naples has been recently introduced, which is extensively employed as a cross with the existing native breeds. This Neapolitan breed is very similar to the Maltese breed already alluded to. Their flesh is good and delicate, but the animals are not hardy, and quite unfit for general use. The duchy of Parma is said to produce the best hogs of Italy, which possess all the good qualities of those about Naples. They are also more hard

that he may sing
peace when they
them to sleep at
their fatting. (*Tr*
many wild swine i

Characteristics
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In the selection
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long, but full in t
and rather short
bone; thick, plum
case; full in the qu
hide; and of a g
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Depth of carcase,
of the loin and bre
moderate shortness
of the gammons
fore absolute esse
ties to produce a
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er. If colour deserve any
perhaps the light, sandy, and
are to be preferred, as these
rd by far the most delicate
ad.

.—The sow generally goes
ur lunar months, but the pe-
ion in different species varies
According to the experi-
Teissier on the gestation of
ears that the extreme period,
sows were 109 to 143 days,
ead to the inference that they
ge 127 days from the time of
ar until they farrow; but ex-
es that they most commonly
little more than sixteen
gh they occasionally go with
weeks. Both the sexes mani-
for coition at seven or eight
d although frequently brought
still earlier age, it is more
restrain them until they have
e age of twelve months, as
stronger litter will be pro-
boar should not commence
at least a year old, and he
ered in his prime at two years
uld not be strained by being
rve too many sows; from
rteen being sufficient. The
rely be put to the boar before
old. See Gestation.

s when collectively spoken of
ither termed swine, hogs, or
en distinctively named, the
male is called a "barrow," the
t castrated is called a "boar,"
e a "sow," or "shoot;" their
n very young being styled
," and when advanced some-
size, "porkers."

ch difference of opinion as to
r breeding sows. Some con-
ws at three years old throw
ch larger and stronger than
age; while others are of opi-
are never such good breeders
of from a year and a half to
a half old; after which they
unevenly.

the sex of the progeny, it is
recent French work on the
neration (*Giron, sur la Ré-*
Animaux Domestiques), that
those which receive the male
generally more males than
is not a matter of much con-
vine; but in horses and cattle
of some moment: and if this
e out by experience, the hint
y prove useful to breeders.

produce two litters in a year (occasionally five in two years), and from eight to twelve pigs at each farrow. The number of pigs to be kept will be easily indicated by the number of teats which the mother has; and on no account should more be attempted to be retained than nature has thus provided for.

"The choice of a boar," says a modern writer, "depends so much upon fancy, or local prejudice, in favour of a particular breed, and is so little governed by either soil or climate, that no other general rule can be laid down upon the subject, than to avoid an animal which is not small-headed, deep and broad in the chest, the chine rather arched, the ribs and barrel well rounded, and the haunch falling full down nearly to the hock. He should also be more compact in his form and rather smaller than the sow; for, if she be coarse, her progeny will be improved in form and flesh by the cross, and the more roomy she is, the better chance will she afford of producing a large and healthy litter." (*Brit. Husb.* vol. ii. p. 511.) The boar cannot be too well kept; but the sow should not be highly fed before taking the boar.

The plan or custom of *breeding in and in* from close relations is a most injudicious course, and seems to bring on degeneracy in the offspring. In selecting both sows and boars, a due regard must be paid to the object for which the progeny are designed. Small bone is desirable in stock reserved for breeding, as this description produces the least offal.

Uses.—A pig for its size is one of the most useful animals in the whole creation, inasmuch as he is food from top to toe, and there is no part of him which cannot be turned to account. His fat is made into lard, which is used in medicine, as well as by housekeepers, confectioners, and others. That about the loins is the firmest and the most dense. For ordinary use it must be separated from the membranes, which is effected by melting it over a slow fire and straining through cloths. It should be stirred as it cools, to prevent the separation of the solid part or stearine from the eluine or oily part. The flesh is either eaten fresh when young, or of the adult animal, bacon hog, salted in brine or with dry salt, and then either kept moist as *pickled pork*, or merely dried; *white bacon*, or cured, dried, and smoked *bacon*; that of the hind legs, *ham*, equally nutritive, but less easily digested; the collar and head of the old boars are made into *brawn*; the skin or rind is eaten with the flesh if not smoked, and is also tanned for saddle seats, shoes, covers for pocket-books, &c.; the bladders are prepared as ox bladders. The bristles clean our teeth and brush our clothes: those of superior quality from Russia, fetch 14l. to 20l. the cwt.: the second quality, from 5l. to 10l. The abdominal fat is used: as also the blood for food, and it yields a bezoar, principally from a morbid concretion in the stomach of the wild hog. Even the intestines are used for chitlings, and converted into an inferior kind of lard, by being cut open and washed clean, and (after the water is well pressed out of them) melted in the same way as lard: this substance is very useful for making common candles, greasing wheels, and other general purposes. To sum up all, the hog multiplies his species in a degree proportioned to his usefulness.

The flesh of the hog when fresh is easy of digestion and nutritive: but it is not a food capable of being eaten for a length of time with impunity. It is apt to cause derangements of the mucous membrane, and diseases of the skin.

Bacon. — In Great Britain the curing of bacon, as an article of commerce, prevails most in the counties of York, Hants, Cumberland, Northampton, Dumfries, Galloway, and the northern and other ports of Ireland.

For bacon flitches, the larger breeds, such as will weigh when killed from eighteen to twenty-two *imperial* stone, are always preferred, from being the most profitable to the farm and readily taking the market. In selecting pigs for this purpose, the sow should be of a large deep carcase: head long, with deep ears, straight chine, and of equal symmetry from the shoulders to the tail; of fine skin, which shows an aptitude to fatten, and the boar should be of a thicker and closer make than the sow.

Small hogs for bacon will be ready for the knife in twelve weeks, and the larger from sixteen to twenty weeks. The girth of fat bacon hogs is about as follows: — When ten score, 4 feet 1 inch; twelve score, 4 feet 4 inches; fourteen score, 4 feet 7 inches; sixteen score, 4 feet 11 inches; eighteen score, 5 feet 2 inches; twenty score, 5 feet 7 inches. (*Hillyard's Pract. Farm.* p. 51.)

"In Hampshire, and some adjoining counties, after the hog is killed, they first swale him, or singe off the hairs, by kindling a fire round him, which is far preferable to scraping off the bristles with warm water, as the latter mode softens the rind, and injures the firmness of the flesh. He is then cut into flitches, which are well rubbed with common salt and saltpetre mixed, and are laid in a trough, where they continue for three weeks or a month, according to size, and are often turned. They are then taken out, suspended in a chimney, over a wood or turf fire, or in regular curing-houses, till they are quite dried. In Ke
dried before a slack fire, which
similar method and time to th
in salting. They are hung up
on racks for use. Somersetsh
shire bacon, which is the best
is cured as follows: — The side
are laid in large wooden trough
with bay salt, and left unmoved
four hours, to drain off the bloo
Then they are taken out, and
dry, and some bay salt, previo
in an iron fryingpan, is rubbed in
till enough of it is absorbed.
tinued for four successive days, d
the flitches are turned every s
With large hogs, the flitches mu
in brine for three weeks, and must
every other day, after which the
as usual. In these methods th
skin is left on; but in some coun
is a different practice, which has
commended abroad as preferable.
it affords an opportunity of conve
skin into leather, while the meat
salt and is cured as well as in th
mode. The hides of swine have
made into shoes in China. Where
sumption of bacon is very rapid.
mentioned practice may be adopte
is certain that bacon will in a sh
become rusty, and consequent lo
curred, if it be not cured with
and kept in a dry room." (*The*
Grazier.) See BACON.

Pork. — In England, mess or t
or that for the London market, is
cured near the principal sea-ports
the coast, from whence it can
shipped to the metropolis. If the
breeding hogs is for pork and ham
is evident that pork from a hog o
five to thirty-five stone (eight p
the stone) is by far more profita
those from thirty-five to fifty s
which case a cross between the Ch
Essex will be found to answer
as the progeny come to early
(*Baxter's Agr. Lib.*)

The middle-sized hogs, such as th
umberland, the Berkshire, the Su
Oxford breeds, are those genera
ferred for this purpose, and their
weight will be from eight to ten
imperial stone.

For delicate pork for family
smaller kindly-feeding pigs are ch
Berkshire and the Suffolk breeds
too large, will be the best for this
The Chinese will answer well at six
months old, when it will weigh four
imperial stones. By higher feeding
be made, when a little older, to

weight; but the meat will then oarse. Weanlings are generally very short period. A pig of five nths old will fatten, if in good in eight or ten weeks.

of the hog is neither mixed with ıor collected at its extremities, the animal all over, and forms a nct, and continued layer beneath ments, and in this respect may resemble the whale and other animals. It is termed lard, and chemical composition and pro- om the fat of the ruminating It more readily imbibes salt than kind of fat; and the same pro- g possessed by the flesh, there is food better suited than pork for n by salting. See LARD.

.—The number of swine sold in market in 1830 was 254,672, he average weight of ninety-six ch (a very moderate computa- s the number of pounds of pork annually at 24,448,512. (*Youatt*) The swine sold in Glasgow 1822 were 6539. The exports om Ireland in 1825 were 65,919; 76,191. Estimated value in the r, 893,839*l.* Increase between periods, 310,272.

Jnited States of America a very ber of hogs are reared; and lat- attention has been paid to the ent of the breed by judicious The piggeries are there on an ex- le; and it is no uncommon thing the States for a farmer to have to 4000 pigs. In a letter written igan city, dated 11th September, writer, a farmer, states that he 3500 pigs up to fatten! In the ent of the States, there are about head of swine bred annually, and bout 27,000 are kept or reared te of New York. In 1840 the this state was said to be 1,916,953.

n the British colonies, &c.

	1832.*	1836.†	1841.
la - -	220,000	250,000	
la - -	350,000	400,000	
ick - -	65,000	80,000	
and Cape Bre- - - -	98,214	100,000	
rd's Island -	30,000	22,000	35,521
d and Labra- - -	16,00	20,000	
s‡ - -			26,301,293
n - -		3,845	
- -			
- -		405	
l Hope -		160,000	
- -		20,000	
- -		3,000	
's Land -		20,000	
- -		1,000	
alia - -		500	
- -		4,000	

r's *North America*, 2d ed. vol. ii. p. 589.
Brit. Colonies. ‡ *Statis. Returns.*

Diseases.—This subject has been so much neglected by practical men, that but little is known in the way of cure. In the absence, therefore, of scientific prescriptions, it will be most advisable to study prevention rather than hazard a trial of the numerous recipes recommended as cures. The diseases of swine are generally the result of want of care and cleanliness, or arise from injudicious and irregular feeding; from their being kept in loathsome and uncomfortable situations, inhaling the most noxious vapours, and at one time overfed, and another stinted in their supply of food. Is it to be wondered at that they become subject to internal and cutaneous diseases? Fortunately they will generally eat when even sick; and salts (1 to 2 oz.), sulphur (2 to 3 drachms), antimony, and such like aperients, may be mixed with their food for measles, and other disorders arising from an impure state of the blood. If they will not eat, there can of course be no cure applied.

In swine-pox, sulphur and madder may be administered in small quantities, with treacle, in the wash; fresh brewer's grains, or pollard, may also be given. Madder and sulphur will also be found the best alterants in foulness of the skin or habit. Salt, mixed with ground ivy, leeks, or other similar vegetables, is one of the best applications for the sores of swine. But for cutaneous diseases in general, an ointment formed of equal parts of mutton suet and tar, with the addition of a little sulphur, will be found beneficial. Strong beer and pease porridge are recommended as tonics.

In cases of surfeit, indigestion, or injury from eating slightly poisonous matter, swine will refuse their food, constantly lie down, and have the stomach distended. In this case, two heads of garlic, mixed with 6 oz. of fresh butter, will afford relief, given every six hours. Soap-suds are said to have the effect of emptying the stomach.

The most formidable of the diseases to which swine are liable, is inflammation of the lungs, and other internal parts. This disease has been known to destroy a fourth of the hogs in a distillery in the course of a few weeks. The chief indications of the disease will be the distressing cough, the heaving of the flanks, and the refusal of all food. Bleeding must be promptly resorted to, and moderate purges cautiously administered. The safest aperients are castor oil or Epsom salts, after which the following sedative powder may be given: foxglove (*digitalis*) 2 grs., antim. powd. 2 grs., nitre half a drachm.

In cases of murrain, a species of leprosy, which prevails chiefly in hot seasons, the condition, it will prevent most of the diseases to which the animals are subject, and they will also thrive and fatten at half the expense when shut up for that purpose. From the confinement of the hog, and the nature of his food, a description of dyspepsia takes place, a superabundant acid is formed in the stomach, and, the skin sympathizing, cutaneous eruptions display themselves; one of the best prophylactics in such a condition of the animal are cinders or charcoal. It operates as a most salutary tonic, and improves the general powers of digestion. Hogs are so fond of cinders, that when a handful of them is thrown into a sty, the animals fight for them.

Weaning. — If the young pigs have been well fed, they may be weaned after six weeks, and in all cases in two months. In their after treatment, whan separated from their mother, they should be regularly fed three times a day, and their food should at first consist of warm liquid food, such as whey, milk, or the refuse of the dairy and kitchen, &c., raised to the temperature of the mother's milk by the addition of a little warm water. They will soon learn to partake of more solid substances.

The rearing and fattening of the hog presents little difficulty, for this animal is reared equally well on a small or a large scale; by the cottager, from the wash and refuse of his house and garden, or by the extensive breeder, who has more abundance and variety of food at command.

As the situation, climate, crops, and other local circumstances must to a great extent regulate the breeding and feeding of swine, it is quite impossible to lay down rules of general application, or to describe a prac-

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to the well-litte
then be found be

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natural food, suc
couch grass, &c.,
mast, hazel nuts,
fruits, are eagerl
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Europe, in the
where these abo
suffered to range
own food. Hog
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olives, &c., after
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not refuse them.

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tional expense

dairy, the grains and wash or liquid se of breweries, distilleries, and sugar ufactories, where they can be obtained, sweepings of barns and granaries, will e found exceedingly fattening. Animal tances, particularly fish, should, how-, be seldom or never given as food, since will necessarily impart a strong and greeable flavour to the meat. A little should be generally added to all their uals, which will create thirst, and induce animals to consume a greater quantity food. Fermented wash is found to fatten ine much quicker than fresh food.

Ringing.—The practice of ringing swine, ich was usually performed at the time of eaning, is growing into disuse, and the ging is not advisable, inasmuch as it not ly proves painful to the animal, but trou-some to the owner; for it frequently ppens that the ring breaks, or is worn ; the cartilage gives way, and the ring to be as often replaced by a fresh opera-n. A more preferable and lasting pro- is now adopted, which consists, in either ting the two strong tendons of the ut (the cartilaginous and ligamentous longations) about an inch and a half the nose, by a slight incision with a p knife, or else to shave or pare off the tle on the top of the nose, which may done without prejudice to the animal n about two or three months old. The e heals over in a short time, and the als are thus prevented from grubbing earing up the ground. (*Prize Essay on ne*, by P. L. Simmonds; Wilson "On Hog," *Quart. Journ. of Agr.* vol. iii. ; *Low's Illustrations of the Breeds of Animals.*)

WINE'S CRESS. See Wart-Cress.

WINE'S SUCCORY. See Nipple-rt.

WINGLE-TREE. See Plough.

WING-PLOUGH. See Plough.

WITZER, STEPHEN, was a general ener and seedsman of the reigns of e and George I. He was a native of pshire. Mr. Loudon says he died in , at which time he must have been ty years of age. He wrote

nographia Rustica; or the Nobleman, Gentleman, ardener's Recreation, containing Directions for eral Distribution of a Country Seat into rural tensive Gardens, Parks, Paddocks, &c., and a ge- System of Agriculture. Illustrated with great va- of Copperplates, done by the best hands from the er's Drawings. London, 1718. 3 vols. 8vo. 2. The al Kitchen Gardener; or a new and entire Sys- of Directions for his Employment in the Melonry, a Garden, and Potagery, in the several Seasons of ar. 1727. 8vo. 3. Compendious Method of rais-alian Brocoli, Spanish Cardoon, Celeriac, Finochi, ther foreign Kitchen Vegetables. As also an Ac- of the La Lucerne, St. Foyne, Clover, and other Seeds. With the Method of burning Clay for the vement of Land, lately communicated to the Au- by a person of worth and honour of North Britain. London, 1728. The fifth edition is dated 1731. 4. An Introduction to a general System of Hydrostatics and Hydraulics. London, 1729. 2 vols. 4to. 5. A Dissertation on the true Cytisus of the Ancients. London, 1731. 8vo. 6. Universal System of Water and Water-Works, Philosophical and Practical, with plates. London, 1730. 2 vols. 4to. The third edition, made very complete, especially that part which relates to the burning of clay. 7. Country Gentleman's Companion; or Ancient Husbandry restored, and Modern Husbandry improved. 1732. 8vo. (*G. W. Johnson's Hist. of Gard.*).

SYCAMORE. See Maple.

SYTHE. See SCYTHE.

T.

TAG. A term applied to young sheep of the first year. See Sheep.

TALLOW. (Germ. *talg*.) The fat obtained by melting the suet of the ox and sheep, and straining it so as to free it from membrane. When pure, it is white, tasteless, and nearly insipid; but the tallow of commerce has usually a yellow tinge, and is divided, according to the degree of its purity and consistence, into candle and soap tallow. Tallow consists of stearine, eluine, margarin, and traces of hircin. According to Chevreul, its ultimate components are 78·996 of carbon + 11·708 of hydrogen + 0·304 of oxygen in 100 parts. It is used in medicine as an emollient and a demulcent. Tallow is an article of great importance. It is manufactured into candles and soap, and is extensively employed in the dressing of leather and in various processes of the arts. Besides our supplies of native tallow, we annually import a very large quantity, principally from Russia. The exports of tallow from Petersburgh amount, at an average, to between 3,500,000 to 4,000,000 poods, of which the largest portion by far is brought to England. (*M'Culloch's Com. Dict.*)

TAMARISK. (*Tamarix.*) This is a genus of very elegant shrubs. The hardy indigenous species, or French tamarisk (*S. Gallica*), is well suited for ornamenting shrubberies: it will grow in any soil or situation, and is freely increased by cuttings planted in the open ground, in spring or autumn. Sheep feed greedily on this species for the sake of its salt taste. The stem is slender, with abundance of long, drooping, smooth, red, shining branches. Leaves minute, lanceolate, deciduous, spurred, acute. Lateral cylindrical clusters of numerous, nearly sessile, reddish or white bracteated flowers, without scent. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. ii. p. 111.)

TANK. In gardening, a cistern or reservoir made of stone, timber, or some other material. Tanks are used for collecting and preserving water during a rials one third of their length beyond those below, by filling up the back with earth as it proceeded, to balance the weight of this projecting masonry.

At the Eastbourne workhouse for fourteen parishes, a tank has been made twenty-three feet deep by eleven wide, of the roughest materials, being only flint stones, and though they require more mortar than if they had been regularly shaped, only ninety bushels of lime were allowed, including two coats of plaster, and the workmanship is executed like field walls at 10*s.* per 100 square feet; the only essential being that no clay be used (which worms in time bore through), and that the lime, or Parker's cement, be good.

A current of air is said to promote the purity of water in tanks, which is easily effected by the earthenware or other pipe which conveys the water from the roof being of six or eight inches in diameter, and an opening left for the surplus water to run away; and where the prevailing winds do not blow soot and leaves on the house, the water remains good, even for drinking, without clearing out the rubbish more than once a year; but, in some cases, filtering by ascension may be found useful, and effected by the water being delivered by the pipe at the bottom of a cask or other vessel, from which it cannot escape till it has risen through the holes in a board covered with pebbles, sand, or powdered charcoal. See Reservoirs, Ponds, &c.

TANNER'S BARK. The bark of oak, chestnut, willow, larch, and other trees which abounds in tannic acid, and is used by tanners for preparing leather. After being exhausted of the tanning principle by

tannic acid, the
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TANNING.
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is constantly repeated, the pit being
ished from time to time with fresh
ns of tan, till the operation is com-
. The effects produced by this simple
re — 1. The shortening of the time
ning to one fourth of that generally
ed. 2. The production of a consider-
ncrease of weight. 3. The leather
l by this method resists water longer
hat tanned by the old process. 4.
ew method is cheaper than the old.
is applicable to the existing tan-
at a comparatively trifling expense,
capability of working in rounds or
and of expending tan or liquor. 6.
it is available for all sorts of lea-

NSY. (*Tanacetum.*) The species of
are not possessed of much beauty.
ardy kinds succeed in any common
nd are readily increased by rooted
f the fibrous creeping root. The
house species should be grown in a
ich soil. They increase freely by
s. Withering asserts, that if meat
bed with the leaves of tansy, the flesh-
l not touch it. The only indigenous
is the common tansy (*T. vulgare*).
tems are about two feet high, solid,
ched, smooth. Leaves doubly pin-
, dark green, deeply serrated, naked.
s numerous, of a golden yellow, ter-
densely corymbose. Every part of
b is bitter, with a strong but not un-
t scent. The qualities are esteemed
nic and cordial nature, expelling in-
l worms, and strengthening the diges-
wers. The plant, however, does not
with every stomach. There are two
es of this species, the variegated, and
rled or double tansy, which is kept
e in gardens, as being more whole-
or milder than the wild sort; but
pudding is out of fashion. (*Paxton's
Dict.; Smith's Eng. Flor.* vol. iii.
.; *G. W. Johnson's Kitchen Gard.*)

NSY, WILD. See Silver-Weed.

P-ROOT. A root which penetrates
nd perpendicularly into the ground,
t dividing, and has few lateral fibres.
pe it resembles a spindle; hence it is
cally termed a fusiform root. But
ain trunk of any root which pene-
vertically deep into the ground is
the tap.

R. A dark brown viscid liquid, ob-
by charring the wood of the fir-tree;
ists of resin, empyreumatic oil and
acid. When inspissated by boiling, it
erted into pitch. The manufacture,
which is carried on in the pine forests of northern Europe, is simple. A conical hole, usually in the side of a bank, being made, roots and fillets of pine are let into the cavity, and the whole is covered with turf, which is beat firmly down above the wood. The wood being kindled, a slow combustion takes place. A cast iron pan at the bottom of the cavity receives the fluid, and has a spout which projects through the bank and carries the tar into barrels. As quickly as the barrels are filled, they are closed with bungs, when the material is ready for exportation. This manner of preparing tar has been derived from the earliest ages. Tar is a very compound substance; it contains modified resin, and oil of turpentine, acetic acid, charcoal, and water. Tar is used in medicine as well as in the arts. It is an excellent topical stimulant when made into an ointment with lard in dry skin diseases. These two substances, tar and pitch, are of extensive use in the arts. (*Low's Pract. Agr.* p. 375.) See Gas Tar.

Tar may be found useful as an application for cuts in sheep by clipping, and also to the parts affected by the fly. It is also of great use in some cases for applying as a paint to boarding, &c.; but in this use a little tallow or other coarse fat should be melted with it, as by this means it goes farther, and resists the weather more effectually.

TARE EVERLASTING. See Lathyrus and Vetchling.

TARES. (*Ervum*, from *ervo*, tilled land, some of the species are a pest on cultivated ground.) The word tare is frequently applied to what is properly the common vetch (*Vicia sativa*). There are two indigenous species of tare, which are troublesome annual weeds.

1. Smooth tare (*E. tetraspermum*), which grows in corn-fields, hedges, and thickets, particularly such as are rather moist. The root is small and tapering. The herbage is besprinkled with fine soft hairs, especially the flower-stalks and calyx. Stem weak, quadrangular, branched from the bottom, leafy, climbing to the height of two or three feet. Flowers mostly in pairs, small drooping, pale grey; the standard streaked, and the keel tipped with a deep blue. Legumes pendulous, oblong, bluntish, smooth. Seeds most generally four.

2. Hairy tare (*E. hirsutum*), which is in habit much like the foregoing; the flowers are in clusters of five or seven, very small pale blue, or almost white, with two dark spots on the keel. Legumes short, dark brown, besprinkled with hairs, to which the specific name alludes. Seeds two in each legume, large and prominent. (*Smith's*

and belly white; lower part of neck in front partly covered with circular spots of black. The whole length of the bird is fourteen inches and a half. (*Yarrell's Brit. Birds*, vol. iii. p. 185.)

TEAM. A number of horses or oxen drawing at once in the same plough, cart, or other carriage.

It has been long a disputed point among farmers whether horses or oxen form the most economical and advantageous team for the purpose of the cultivator in performing his work. The question remains still undecided, though many intelligent farmers now incline to the side of horse teams, except in particular circumstances and situations.

TEASEL, or TEAZLE. (*Dipsacus*, supposed to be derived from *dipsao*, to thirst; in consequence of the leaves holding water.) It is a curious genus of plants: some of the species are pretty flowering plants, especially the small teasel. They grow well in any common soil, and are readily increased by seeds. There are three native species, all biennial.

1. The manured, or fuller's teasel (*D. fullorum*), which, although growing about hedges, can scarcely be considered wild. This species is extensively cultivated in the west of England, the dried heads of which furnish the teasel used by fullers in dressing cloth. The root is fleshy, branched, and tapering. Stem five or six feet high, erect, strongly furrowed, prickly, leafy, branched at the top. The leaves sessile, combined, serrated, with prickly ribs. Flowers whitish,

head.
3. Small tease
pilosus). This sp
places on a cha
blows in August
is three or four
branches, angula
cending hooked b
ovate, pointed, s
stalked, with late
in small globula
deflexed, about
This is a useless
to the farmer. (
p. 192.) See Fu
TEATHING.
of eating turnip
crops, in the ear
stock, as sheep
written tathing.
TEESDALIA
Robert Teesdale,
tish botanist, for
of Carlisle, autho
growing about C
dale died at Tu
25th, 1804.) The
well adapted f
seeds have only t
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There is one indi
stalked, or irregu
lis). The root
leaves numerous,
partly undivided
Stems several, er
tral one quite st

but a knowledge of the effects of
r caloric of the chemists) upon living
ces (modified as those effects are by
y ever-varying circumstances), ren-
any of the processes of agriculture
asily understood, and may serve to
t new or altered farming operations.
hemical philosopher, indeed, is well
what mighty results are produced in
be of ours by the presence of heat,
w disastrous would be the conse-
of its withdrawal, to all animated
; for life, both animal and vegetable,
in its absence, be extinct: the ocean,
l other waters, a mass of ice. Even
reek philosophers had, in some way
er, arrived at a knowledge of its im-
ce, for they ranked fire as one of the
lements of which they deemed the
se to be entirely composed. The in-
nt modern cultivator is also well
of many of the effects of heat upon
, and how varying the action of the
degree of temperature is on different
nd even on the same soil when dif-
ly placed; that some crops will only
articular kinds of soil, and languish
ers whose temperature is different,
e of all the efforts, however skilfully
ed, of the farmer. Those, for in-
, where the bean is so profitably cul-
l, he tells you are "too cold" for
; and those, on the contrary, where
rnip flourishes so well, are much "too
or the luxuriant growth of the bean

Other lands, he is aware, are ex-
too much to particular winds; others
uated on elevations too considerable;
are too low down in the valley for
ofitable cultivation of crops, which, in
situations, flourish so well. These
ations are thus described by an ex-
t modern farmer: — "The crops,"
r. John Morton, in his valuable work
ils, p. 216., "are never so good or so
on cold tenacious clay soils, on the
ne formation, or on the moorlands in
hire, at the elevation of 500 feet, as
re on the chalk wolds in the same
y at 800 feet high. This difference
to dry calcareous soils a very great
tage. In England, land at an eleva-
f 1000 feet above the level of the sea
es unprofitable to the arable farmer,
crops do not ripen, except in very
ular seasons; and therefore it ought
o be used as pasture at such an alti-

action of heat upon the earths I
(*antè*, p. 412., EARTHS) endeavoured
lain; but there are other effects of
pon vegetation, modified by circum-
s, as by inclination, by elevation above the level of the sea, and other disturbing causes, which will be the subject of this article; and to this end I shall, to a great extent, employ the very language of the late M. Decandolle in his Essay upon the effects of elevation above the level of the sea, upon the geography of plants (*Brande's Journ. of Science*, vol. iv. p. 176.), and of M. Mirbel (*Ibid.* vol. ii. p. 35.) upon vegetable nature in general.

It is hardly, perhaps, necessary to remind the intelligent modern agriculturist, that as all plants absorb their food in the fluid state, heat alone enables them to do so; for without the presence of caloric, water and all other fluids would be solid: in its absence, rain and dew, and the insensible vapour of the atmosphere, all so essential to vegetation, could not exist; the sap of plants would become solid, and their destruction inevitable. "The influence of the change of seasons and of the position of the sun," says Davy (*Agr. Chem.* p. 38.), "on the phenomena of vegetation, demonstrates the effects of heat on the functions of plants. The matter absorbed from the soil must be in a fluid state to pass into their roots, and when the surface is frozen they can derive no nourishment from it. The activity of chemical changes likewise is increased by a certain change of temperature, and even the rapidity of the ascent of fluids by capillary attraction. The last fact is easily shown by placing in each of two wine glasses a similar hollow stalk of grass, so bent as to discharge slowly any fluid in the glasses by capillary attraction; if hot water be in one glass, and cold water in the other, the hot water will be discharged much more rapidly than the cold water. The fermentation and decomposition of animal and vegetable substances require a certain degree of heat, which is consequently necessary for the preparation of the food of plants; and as evaporation is more rapid in proportion as the temperature is higher, the superfluous parts of the sap are most readily carried off at the time its ascent is quickest."

If we examine the vegetable productions of the earth under different circumstances, and in various climates, we shall find an instructive mass of facts with regard to the habits and food of vegetation, all, however, more or less connected with the temperature which the plant is calculated to endure, or which best suits its habits. Thus a high temperature seems to produce on plants an effect somewhat analogous to that of heat upon animals: they become less sensible of its action; are, in other words, influenced by it with increasing difficulty. This observation was some years since made by Mr. T. A. Knight, with his usual accumates, for the temperature of these is, in many instances, low during the night. In Jamaica, and other mountainous islands of the West Indies, the air upon the mountains becomes soon after sunset chilled and condensed, and, in consequence of its superior gravity, descends, and displaces the warm air of the vallies. Yet the sugar canes are so far from being injured by this sudden decrease of temperature, that the sugars of Jamaica take a higher price in the market than those of the less elevated islands, of which the temperature of the day and night is subject to much less variation." And after commenting upon the effects of heat upon the chemical composition of the sap of plants, he adds,—"Some experiments which I have made upon germination have perfectly satisfied me that these afford plants of greater or less vigour in proportion as external circumstances are favourable in producing beneath the soil the necessary changes in the nutritive matter they contain; and I suspect that a large portion of the blossoms of the cherry and other fruit trees in the forcing-house, often prove abortive because they are forced by too high and uniform a temperature to expand before the sap of the tree is properly prepared to nourish them." He then proceeds to detail the successful results of various experiments upon the peach-tree, by keeping up a much higher temperature during the day than during the night; and remarks, towards the conclusion of his paper,—"Another ill effect of high temperature during the night is, that it exhausts

outside. It is
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inherent in veget
Knight saw th

ons in very different climates; if the
was placed on the banks of the Rhine
the other on those of the Nile, each
ld adapt its habits to the climate in
ch it was placed; and if both were sub-
uently brought in early spring into a
ate similar to that of Italy, the plant
ch had adapted its habits to a cold
ate would instantly vegetate, whilst
other would remain perfectly torpid.
cisely the same thing occurs in the hot-
ses of this country, where a plant ac-
tomed to the temperature of the open
will vegetate strongly in December;
ilst another plant of the same species,
sprung from a cutting of the same ori-
al stock, but habituated to the tem-
ature of a stove, remains apparently
less. It appears, therefore, that the
ers of vegetable life in plants habituated
old climates are more easily brought
action than in those of hot climates, or,
ther words, that the plants of cold cli-
es are most excitable; and as every
ity in plants becomes hereditary when
causes which first gave existence to
e qualities continue to operate, it fol-
that their seedling offspring have a
tant tendency to adapt their habits to
climate in which art or accident places
. But the influence of climate on the
s of plants will depend less on the aggre-
quantity of heat in each climate, than on
istribution of it in the different seasons
e year. The aggregate temperature of
and and of those parts of the Russian
re that are under the same parallel of
de, probably does not differ very con-
ably; but in the latter the summers are
mely hot and the winters intensely
and the changes of temperature be-
n the different seasons are sudden and
t. In the spring, great degrees of heat
nly operate on plants which have been
exposed to intense cold, and in which
ability has accumulated during a long
d of almost total inaction, and the pro-
of vegetation is in consequence ex-
ely rapid. In the climate of England
pring on the contrary advances with
and irregular steps, and only very
rate and gradually increasing degrees
at act on plants, in which the powers
e have scarcely in any period of the
ding winter been totally inactive. The
is a native of both countries, and has
ted alike its habits to both: the Siberian
ty introduced into the climate of Eng-
retains its habits, expands its leaves and
oms on the first approach of spring, and
tates strongly in the same temperature
hich the native crab scarcely shows
of life, and its fruit acquires a degree
of maturity even in the early part of an unfavourable season, which our native crab is rarely or never seen to attain. Similar causes are productive of similar effects on the habits of cultivated annual plants; but these appear most readily to acquire habits of maturity in warm climates, for it is in the power of the cultivator to commit his seeds to the earth at any season, and the progress of the plant towards maturity will be most rapid where the climate and soil are the most warm. Thus, the barley grown on sandy soils in the warmest parts of England is always found by the Scotch farmer, when introduced into his country, to ripen on his cold hills earlier than his crops of the same kind do when he uses the seeds of plants which have passed through several successive generations in his colder climate; and in my own experience I have found that the crops of wheat on some very high and cold ground which I cultivate, ripen much earlier when I obtain my seed-corn from a very warm district and gravelly soil, which lies a few mile distant, than when I employ the seeds of the vicinity." (*Knight's Papers*, p. 174.)

Some plants possess the power of resisting very high temperatures in a remarkable degree. The *Vitex Agnus-Castus*, according to Mrs. Marcet, has been known to strike root in water heated to 170°. And when one of the hothouses of the botanical garden at Paris was burnt, all the plants which it contained perished, except the flax of New Zealand, which resisted a degree of heat that even consumed its leaves. (*Con. on Veg. Phy.* p. 119.)

The consideration of the results produced on vegetation and animal life by different temperatures or climates, did not escape the attention of Arthur Young. He very correctly told his contemporary farmers (*Ann. of Agr.* vol. xxxix. p. 481.) that there is no condition of life but circumstances may occur in the culture of the earth that will make a greater knowledge of these necessary, than usually falls to the share of the generality of husbandmen. Half the operations of agriculture are bestowed on plants exotic to the country in which they are cultivated; every day's experience gives fresh instances of the vegetables of one climate being naturalised in another. The truly English spirit which actuated Arthur Young would ever and anon peep out, notwithstanding his morbidly keen political feelings. "An inquiry," he observed, "into the best climate in the world, is an amusing, and in some circumstances might prove an useful one. The climate of Chili is, I believe, the finest in the globe; what they call their winter does not last three months, interesting facts, why it is that the improved drainage of a district increases its warmth; and why judiciously placed plantations of trees, as in belts and in hedgerows, retard the rapid evaporation produced by the wind, and consequently the frequent sudden production of cold so common to exposed countries. And again, the improvement of the soil by deeper ploughing, or more finely pulverising the soil, by admitting more freely the access of the atmospheric air, increases very sensibly its mean temperature; dressing clay soils with sandy ashes or other porous materials produces the same effect. And hence, in the more northerly portion of our island, by such general improvements a very sensible increase to the temperature of certain districts has been experienced. "There are many local causes," adds Mr. Morton, "which alter and modify the temperature; amongst these we may mention the humidity of the soil and atmosphere, large tracts of pasture land, and the neighbourhood of forests, wastes, bogs, lakes, and mountains, all of which have the effect of decreasing the temperature of the place; whereas a dry siliceous sandy soil and subsoil, a dry atmosphere, a well-drained and cultivated district, have all a tendency to increase the temperature of any locality." (*On Soils*, p. 214.)

The study of the results of varying temperatures should not be confined to those produced on the vegetable world only. The live stock of the farm might be in many situations rendered more profitable

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and Thunberg, wh
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Mountainous co
these local species.
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Pyrenees, the Alp
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liar floras, and th
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se. The *Phalangium bicolor*
r itself in the country round
)sses over to Spain, clears the
terminates its career in Brit-
sia polifolia belongs to Por-
, and Ireland. The heaths
exclusively to Europe and
extend themselves from the
ring on the pole to the Cape
, over a surface which is very
portion to its length. The *Ra-*
zica, as yet found only in the
ows, without deviating from
: valleys in those mountains
om north to south; and so
not a single plant of it has
in those which skirt the chain
irection.

bserved, that with the excep-
ıens, which bid defiance to al-
es alike, a vastly greater pro-
cies is calculated to endure a
ee of warmth, than is adapted
cold. The progressive course
tion demonstrates itself more
lirect our view from the polar
quinoctial regions. Botanists
at Spitzbergen, which lies
degree of northern latitude,
y about 30 species; in Lap-
es in the 70th degree, about
ıd, in the 65th degree, about
len, which reaches from the
s of Lapland to the 55th de-
ı Brandenburgh, between the
ı degree, 2000; in Piedmont,
43d and 46th degree, 2000;
n Jamaica, which is between
19th degree; in Madagascar,
een the 13th and 24th degrees
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within the tropics fills the
veller with amazement by the
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ne woody to the herbaceous
ch more considerable towards
than in Europe; and the dif-
refore in favour of the equi-
is, for trees give the character
to vegetation. Those of the
is class within the tropics are
nspicuous for the height and
e of their stems, the richness
f their foliage, as well as by
nd well-contrasted colours of
. By the irregularity of their
et off to advantage the palm
have, in general, the simple
of our columns, of which they were the models. It is towards the equator that the gigantic climbers, which grow to the height of several hundred yards, are found, as well as those magnificent herbs of the Scitaminea and Musa, as tall as the trees of our orchards, with flowers and foliage not less pre-eminent in their dimensions. For instance, the *Corypha umbraculifera*, an East Indian palm, with leaves in the form of an umbrella, and more than six yards across; and the *Aristolochia*, which grows on the river of La Madalena, the flowers of which, according to Humboldt, serve the children for hats. The far greater part of the aromatic plants belong also to the equinoctial regions.

The inferiority of the vegetation of our regions will appear in a still stronger light, if we compare the species of the same genera, or tribes, which grow both in Europe and under the Line. In South America, plants of the fern tribe, with a foliage and fructification not very unlike our common brake and polypody, grow like palms, and have a stalk in the form of a column. The cold and temperate climates of our quarter of the globe abound in dwarf herbaceous turfy gramineæ; hot countries have also many plants of this tribe, but they are on a much larger scale. This difference begins to be perceived even when we reach Italy, where the millet attains the height of four or five yards. The bamboos, panic-grasses, and the sugar-cane of Asia, Africa, and America, reach the height of eight or nine yards. The heaths of the northern parts of Europe are low bushes, with feeble stems and small bloom; those of the coasts of the Mediterranean have also a small bloom, but their stems are taller and more robust; those of the Cape fascinate by the form, splendour of colour, and size of the corolla.

All the plants of the mallow tribe with us are herbaceous; those of hot climates are either shrubs or trees. A tribe of so little account in Europe holds a place amongst the vegetables of most note in the equinoctial regions. There it counts amongst its species the baobab and the ceiba, the giants of the vegetable creation, besides the "hand tree" of Mexico, so called from the form and disposition of the stamens of the flower, which represent very tolerably a hand, or paw, with five fingers.

There are beauties in wild and unreclaimed lands, which disappear at the approach of civilisation. In Europe the soil abounds only in plants which are of use to man. Domestic vegetables, by the aid and protection of the cultivator, have so trenched upon the domain of the wilderness, that space is scarcely left for the existence of those for which man has no call. The decomposed, and help unceasingly to augment the surface of the soil covered with high mosses and thick lichens, that, preserving a prolific moisture, assist in lowering the temperature of the district.

None, however, approach in magnificence the forests which shade the equinoctial regions of Africa and America: we are never satiated in admiring, there, the endless multitude of vegetables brought into near contact with each other, and mingled together; so different amongst themselves, and often so extraordinary in structure and progress; those enormous trees still exhibiting no symptoms of decay, though their age goes back to a period at but little distance from the last revolution on our globe; those towering palms, contrasting by their simple forms with all that surrounds them, those extensive climbers, those rattans, which, knitting together their long and flexible branches by numberless knots and turns, encircle as one group the whole vegetation of these extensive regions. To clear a path through these, neither fire nor the axe is sufficient: the one extinguishes for want of circulation in the air; the other is broken or blunted by the hardness of the wood it meets. The soil cannot afford place to the numberless germs which it developes. Each tree disputes with others which press from all sides for the soil it needs for its existence; the strong stifle the weak, while rising generations obliterate even the slightest trace of destruction and death: vegetation never flags; and the earth, so far from becoming exhausted, acquires new fertility

is changed. Wi
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nge, beyond the forty-third degree of thern latitude; that the olive will thrive ttle further; that the vine is barren out the latitude of fifty degrees, or at least er brings its grape to perfection. He is tious of exposing to a southern aspect species whose sap is readily set in mo- by the first gleam of warmth; he knows t late frosts destroy them, witness the eyards round Paris: the plantations there ch escape the injuries of frost, are not se which look towards the south, but se that face towards the north. The of the latter is set in motion late, and n the heat reaches them, the season is ady settled, and no risk is incurred n the inroad of cold.

ocal circumstances, such as the ele- ion of the place, its aspect, the nature well as inclination of its soil, the ximity of mountains, of forests, of the &c. &c., are all causes of variation temperature, and must each be at- led to in accounting for the vege- on of any particular district. For in- ce, the winter is less severe on the thern coasts of France, than in the in- or on the same level; an effect of the nity of the ocean. The sea preserves a more even temperature than the at- phere, and is constantly at work to ntain some degree of equilibrium in warmth of the air. In the summer it ies off the caloric from it; in the er it gives back a part of that which it ains. It is thus that the mass of water in the vast basin of the ocean tempers, ts shores, the heat of summer and the of winter. For this reason, in Devon- and on the coast of Calvados, the le, fuschia, magnolia, pomegranate, an rose, and a swarm of other exotic ts, grow in the open air, but in the ior of England and France require er. The same cause permits the cul- ion of many species in the open ground London, that near Paris will not e out of the green-house.

Proportion as the natural temperature ountry decreases, — as we advance to- s the Pole for instance,—we are sensible e change in the appearance of the ve- ion. The species which require a mild temperate climate are supplanted by rs which delight in cold. The forests ith pines, firs, and birches, the natural ration of a northern land. The birch, ll trees, is the one which bears the se- ty of the climate the longest; but the er it approaches the Pole the smaller rows; its trunk dwindles and becomes ated, and the branches knotty; till at it ceases to grow at all towards the seventieth degree of latitude, the point where man gives up the cultivation of corn. Further on, shrubs, bushes, and herbaceous plants only are to be met with. Wild thyme, Daphnes, creeping willows, and brambles cover the face of the rocks. It is in these cold regions that the berries of the *Rubus arcticus* acquire their delicious flavour and perfume. Shrubs disappear in their turn, and are succeeded by low herbs, furnished with leaves at the root, from the midst of which rises a short stalk surmounted by small flowers. Such are the saxifrages, the primroses, the *Androsaces*, *Aretias*, &c. These pretty plants take up their quarters in the clefts of rocks; while the grasses, with their numerous slender leaves, spread themselves over the soil, which they cover as with a rich verdant carpet. The lichen which feeds the reindeer occasionally mixes in turf; sometimes of itself covers vast tracts of country; its white tufts standing in clumps of various forms, looking like hillocks of snow, which the sun has not yet dissolved. If we go further, a naked land, sterile soil, rocks, and eternal snows are all we find. The last vestiges of vegetation are some pulverulent *Byssi*, and some crustaceous lichens, which cover the rocks in motley patches.

The principal causes which induce this progression of changes are three: — 1. The excess of duration in the winter, a consequence of the obliquity and disappearance of the solar rays. 2. The dryness of the air, a consequence of the decrease of heat. 3. The prolonged action of the light, which illumines the horizon through the whole period of vegetation.

It is well known that too great a degree of cold, by congealing the sap, occasions the rupture of the vascular system in plants, and thereby destroys them; but the deleterious action of cold is not confined to purely mechanical results; it has been proved that heat is a stimulus that cannot be dispensed with in vegetation. Many species secrete juices in warmer regions which are unknown in their economy in colder climates. The ash yields manna in Calabria, but loses that faculty as it approaches towards the north. The grape in the south of Europe abounds in saccharine matter; in the north it contains an excess of acid. So long as the organic functions, which depend upon the degree or duration of heat, can be carried on, the ash and the vine continue to flourish; they grow even when those functions are performed incompletely, but their growth is stinted; they finally disappear at that point where the portion of warmth in the atmosphere, though still equal to prevent the freezing of the sap, is no longer able to stimulate their organs or their frame into action. All other vegetables, whose dimension and duration subject them to the full severity of the frost, share the same destiny, at a greater or less distance from the torrid zone, and in proportion as their constitutions require a greater or less degree of heat; so that nothing is found near the pole but such dwarf shrubs as are sheltered under the snow in winter, or annuals and herbaceous species, endowed with so quick a principle of life, as to rise, flower, and fruit within the space of three months; or some agamous and cryptogamous species, which adapt themselves to all degrees of temperature, and are consequently the last organic forms under which vegetable life is to be descried. Heat and moisture united, the farmer well knows, are highly favourable to the growth of plants. No countries are more abundant in herbaceous vegetables, or better wooded, than Senegal, Guinea, and Cayenne, where both these props to vegetation are in the plenitude of their force. Experiments made with the hygrometer prove that the moisture of the atmosphere increases as we approach the equator. In hot climates, when the sun sinks beneath the horizon, the watery exhalations condensed are returned to the earth in the form of dew, which moistens the surface of the foliage, and feeds those vegetables in which the absorbing power of the parts above ground suffice for their support: of this number are the succulent plants, the *Aloes*, the *Cacti*, &c.; in these the fibrous root only serves to hold them in their places, and the moisture of the atmosphere is inhaled and retained by the spongy parts above. Thus, in the vast plains that receive the waters from the eastern declivity of the Andes, when the scorching heat of summer has consumed the grasses and other herbaceous kinds which the rainy season has brought forth, we still find some lingering *Cacti*, which under their dry thorny coats conceal a cellular system, by which an abundant sap has been imbibed and preserved. But in countries where the atmosphere holds but little moisture in evaporation, either because the soil is wholly destitute of water, or by reason of the coldness of the temperature, we find no plants at all, or such only as are of a dry hard texture. The sands of Africa, unwatered by rivers, are found to be utterly barren. Spitzberg, Nova Zembla, &c., where the influence of the sun is felt only for two months of the year, at most, and where consequently the air is habitually dry, furnish a very scanty portion of herbaceous plants only, or some dwarf shrubs with a narrow heathery foliage.

Vegetation, in ascending above the level of the sea, undergoes modifications analogous to those which attend its progress from the line to either pole: with this distinction,—that in the last case the phenomena succeed by almost imperceptible gradations, while they crowd upon and follow each other in rapid succession on the ascent of mountains. The height of 4000 or [illegible] yards in the hottest parts of the globe produces changes as distinct as the [illegible] leagues or more which lie between the equator and the polar regions. The three causes of the influence of which I have just spoken, all re-appear within this space, viz. a diminution of heat, dryness of the air, and protracted duration of light. The higher we ascend, the shallower the upper stratum of air becomes; thence the excessive cold at great heights. The weight of the atmosphere which, at the level of the sea, supports a column of mercury equal to twenty-eight inches, diminishes as we ascend; so that at considerable elevations it will only support a column of a considerably less weight or power, which gradually diminishes as we ascend. A consequence of this fact is, that the vaporisation of fluids takes place on high mountains at a very low degree of heat. Notwithstanding this, however, the decrease of heat is so great that the ambient air is very slightly impregnated with moisture. It is true that heights have not the long days of the polar regions, but they receive the rays of the sun earlier than the plains, and are quitted later by them; so that their nights are shorter than in levels.

This progressive varying course of vegetation on mountains had not escaped the attention of Tournefort. At the foot of Mount Ararat he had observed the plants which grow in Armenia; a little higher, those of Italy and France; above, those of Sweden; and upon the summits, those of Lapland. Observations of the same kind have been subsequently made on Mount Caucasus, the Alps, Pyrenees, and other mountains of the old continent; and in Britain, whose hills, however, can rarely be dignified with the name of mountains. Linnæus, in his own way, had summed up these observations in an axiom. "The different kinds of plants," says he, "show by their stations the perpendicular height of the earth." Yet it was not till lately that any exact survey had been taken of this interesting department of botanical geography.

The common heath (*Erica vulgaris*), says M. De Candolle, which covers the [illegible] plains that lie along the coast of Western France, grows in the Pyrenees to the very summit of Mount Cenis, and to the very summit of Mount Calm, at nearly [illegible] yards

vation. The cross-leaved heath (*Erica*
ix) is another instance; it grows from
evel of the sea to 2400 yards of eleva-

The sea-gilliflower (*Statice armeria*)
nd in Holland, in spots which lie be-
he level of the sea, and on the Alps at
evation of 2500 yards. *Statice Plan-*
ea grows on the beach of Olonne, and
00 yards of elevation on Mount Viso.
colt's-foot and the bird's-foot trefoil
grow at the level of the sea all over
ce, and are met with again above Mount
t, at the height of about 2400 yards. The
y grass, which is generally found at the
s of the sea, flourishes also at the edge of
tream at Neouvielle in the Pyrenees, at
eight of about 2000 yards. Mother of
e (*Thymus serpyllum*), which grows in
y lowland spot in France, mounts also
e tops of a great many of the Alpine
ts. Even thyme (*T. vulgaris*) ascends
Pic d'Ereslids to above 2000 yards.
love, which is met with in all the low-
s of the west and midland part of France,
s on the Lozere at 1500 yards, and
ly at the same elevation on Mount
a.

at-grass (*Nardus stricta*) grows at the
of the sea, and also forms the highest
ted swards that are found in the Ce-
es, the Alps, and the Pyrenees; it
s indifferently in marshy places, and in
which are liable to dry up; so that it
und both on the tops of mountains
e the snow disappears in the summer,
on the sides of those from whence it is
r entirely absent. The sweet-scented
al grass (*Anthoxanthum Odoratum*), and
Timothy grass (*Phleum pratense*), which
every where in England and France
e level of the sea, ascend to the eleva-
of 2000 yards. The common juniper
mmunis) attains an elevation of 3000
; the marsh lousewort does the same;
scorpion-grass 3500 yards; and the
(*Bellis perennis*), the ox-eye daisy
ysanthemum Leucanthemum), and the
er campion (*Silene inflata*), ascend to
yards; and the kidney vetch (*Anthyllis*
ris) to 3000 yards. When plants, in
not suited by their nature to support
cess of either heat or cold, are found
ow in different latitudes, it is always at
heights as that the effect of elevation
ensates that of the latitude. Thus
of the plants of the Alps and Py-
s grow in the plains of the north of
ce, especially in the Ardennes and
bouring provinces. Of these I have
dy cited some instances. Again, we
that many plants which belong to
and, or other countries of the north of
pe, when they are met with in France,
grow there at considerable elevations. *Saxifraga Greenlandica* grows in the Pyrenees, very near to the summit of the Maladette, which is 3278 yards high, and comes down to below 2400 yards. *Linnæa borealis* is not found in the Alps below an elevation of 1800 or 2000 yards. *Menziesia Dabæcia*, which covers the lowlands in Ireland, is found in Western Pyrenees as high up as 1000 yards. The chestnut grows in the lowlands of the north of France, upon the hills of the south of France, and at a great elevation on the Apennines, and at a still greater on Mount Etna.

Plants which are the objects of husbandry are controlled by laws corresponding completely with the preceding. Such as grow in all latitudes, grow likewise at all elevations. Those that are found only in determinate latitudes, are found only in corresponding elevations. Thus we learn from Humboldt, that the potato, which succeeds so well in the north of our old continent, is cultivated in Chili as high as 3600 yards. We know that the cabbage thrives both down at the edge of the sea, as well as on the Alps, at every elevation at which man can take up his abode. Corn is also cultivated at very extraordinary elevations. Rye is grown in France, in the departments of the higher and lower Alps, at 2200 yards, particularly above Allos in Provence. Wheat does not grow so far to the north as rye, neither will it do so well as that grain at great elevations. Yet it is grown at 1800 yards. At such elevations sowing is generally done before harvest time, that the plants may get strength before the snow falls; which has been known to lie upon the rye the year through. When this has happened, the rye remained in *statuo quo* while the snow lay, and resumed its growth at the end of eighteen months, when that had melted away. Barley will grow well only in temperate climates: it is true it may be raised under the tropics, but not at a lower elevation than from 3000 to 4000 feet, and then it is a profitless crop.

Cultivated plants which do not bear cold are under a like influence as to elevation; they can only be grown at such heights as correspond in temperature with that of the distance from the equator to which they belong. In general it is considered that a degree of latitude affects the mean temperature nearly in the proportion of 180 or 200 yards of elevation.

This rule, it is true, is liable to numberless modifications from local circumstances; yet I have had the curiosity to apply it, adds M. Decandolle, to the different plants of husbandry, and have obtained some re-

Now if, setting out from that point, which is a little beyond forty-five degrees of latitude, you take four degrees to the north upon the same meridian, you come to between Rheims and Epernai; that is to say, very close upon the northernmost limit at which the vine forms a branch of husbandry. With regard to the olive tree, the local peculiarities of the countries where it grows are such as to make investigations of this kind very intricate: it is generally cultivated in parts protected on the north by some vast range of mountains, where the mean temperature is consequently higher than it would otherwise be. When it is not sheltered by any range of mountains, the northernmost point in Europe at which we find the olive is Ancona, in 43° 37′ of latitude. In respect to the other point of view, its positions have been measured in several parts of Roussillon, Languedoc, Provence, and Italy; and these have been always nearly at an elevation of 400 yards above the level of the sea; which ought to indicate that the olive might grow two degrees more to the north of Ancona. Now, if we take two degrees towards the north from that point on the same meridian, we come to about Lake de Harde and the neighbourhood of Como, which are just the northernmost points at which the olive is cultivated. The fig-tree, which goes farther to the north than the olive, and not so far as the vine, preserves a corresponding gradation in regard to the elevations at which it will grow; but we can hardly determine any precise limit for a tree over which aspect has more power than

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lants which belong to fresh water and lt water. Of these a great portion grow out preference in every degree of lati- the medium in which they exist pre- ng a more equable temperature than tmosphere. Duck-weed (*Lemna minor*) he greater reed-mace, or cat's-tail (*Ty- atifolia*), grow in the marshes both of Europe, and America; the latter be- ommon to Jamaica, China, and Bengal. ably there is no region on the globe e the gray bog-moss (*Sphagnum palus-* is not to be found. This indifference imate is still more remarkable in the lants, such as the *Fuci loreus* and *Ce-* a. The gulf-weed (*Fucus natans*), de- ng itself from the rocks on which it , and forming shoals of an immense nt on the surface of the water, ob- ts the ship's way as well towards the as under the line, on a level with the and to a height of 1000 yards we find palms, the liliaceous plants, the plan- trees, the balsam of Tolu, with crowds ther species which grow only in a very emperature. This is the zone of the s, a tribe conspicuous for the elegance grandeur of part of its species, and ing one of the chief ornaments of the hing plains that lie between the tropics. e of them, however, thrive in more tem- te regions. The Ceroxylon andicola, a palm rising sixty yards in height, grows e Andes at Solima and Quindin in 4° f northern latitude, setting off at 1860 above the sea, and continuing to the t of 2870; an elevation where the at- here is at a moderate degree of warmth. her species has been discovered at the ts of Magellan, towards the fifty-third e of southern latitude. Two sorts, the alm and date-tree, are even seen to on our side of Europe, upon the coasts Mediterranean, and not far from the f the Pyrenees; thus advancing their to beneath the forty-third degree of rn latitude. But these are exceptions, alms in general confining themselves hottest parts of the globe, and none met with towards the polar regions.

effect of water in preserving the le temperature of the grass in water ows is excellent; this was first clearly ained by Sir H. Davy. See **Irriga-**

regards the effects of vegetation upon emperature of the district; that of ts is felt far around: their usual effect ool the atmosphere to a greater extent than the degree of latitude. When ce and Germany were covered with d, Europe was much colder than at ent; the winters were longer; the vine could not be cultivated on this side of Grenoble; the Seine froze every year. The forests of Cayenne, which have been cleared of their wood by Europeans, experience in summer, in its full force, the overwhelming heat of the sun of the torrid zone; while, in the same season, the interior of the country is cooled to such a degree by forests, that a fire or shelter is found necessary in order to pass the night.

The causes why forests thus lower the temperature are plain: — they detain and condense the clouds as these pass; they pour into the atmosphere volumes of water dissolved in vapour; winds do not penetrate into their recesses; the sun never warms the earth they shade; and the soil, being porous, as formed in part of the decayed leaves, branches, and stems of trees, and coated over besides by a thick bed of brushwood and moss, is constantly in a state of moisture; the hollows in them serve as reservoirs for cold and stagnant waters; their declivities give rise to numberless brooks and rivulets; and, as we see, the best-wooded countries are ever those which are watered by the largest rivers.

In proportion as man, who finds himself cramped in countries of long-standing civilisation, extends the boundaries of his domain by stripping the soil of its ancient forests, so the wind and sun disperse the superabundant moisture; the springs exhaust themselves; the lakes dry up; inundations cease altogether, or confine themselves to a smaller extent; the volume of water carried along by rivers diminishes, and the atmosphere becomes warmer and drier. These are results that cannot be denied; and, without mentioning the numerous evidences which history offers, it will be sufficient to adduce the United States of America as a proof. It is a fact admitted by all, that the clearing of the woods, begun two centuries ago in the European countries, and continued unceasingly to this day, has occasioned a very evident diminution in the quantity of water, and a perceptible elevation in the temperature of the atmosphere. But where, from improvidence or brutul selfishness, man has destroyed the woods of a country without reserve, the soil, bereft of the moisture requisite to the maintenance of vegetation, has been reduced to the most fearful sterility. The Cape Verd Islands, once watered by numerous springs and covered with lofty forests and luxuriant herbage, now present to our view only waterless gullies, rocks bared of their mould, with here and there a patch of parched herbs, some stunted bushes, and a few plants of the succulent kind, such as *Cacalias*, *Spurges*, &c.

rain water, which penetrates its clefts, silently undermines it; the frost cracks and crumbles it away; it falls in ruins, accumulating at the foot of the mountain mounds of rubbish. This is an evil which has no remedy. The forests, once banished from highland tops, are never replaced; while the washings and rubble carried down yearly by the rain, soon transform into a desert the populous and flourishing valley below.

The vegetable mould produced by herbaceous plants upon unsheltered lands is destroyed by the action of light, heat, and oxygen; while that which is formed in the shade of forests increases from day to day by the remains of vegetables, as well as of the animals of all kinds which seek refuge in them. This is the reason why newly-cleared land is endowed with such prodigious fertility. In these, either rye or oats are commonly cultivated for the first year; its too abundant riches causing the more valuable wheat to grow rank, and produce little grain. But sooner or later the soil is exhausted, and recourse must be had to manure, to restore the nutritious particles carried off by successive crops. If this is neglected, the harvests begin to dwindle: briars and brambles, and a thousand wild plants, take the place of those produced by cultivation. The flocks, too, diminish rapidly; for the increase of live stock, and consequently of the human race, depends above all things upon the prosperity of agriculture.

That long-continued prosperity, there is

June	93	33	6
July	98	33	6
August	94	32	6
Sept.	82	27	5
October	79	21	4
Nov.	66	16	4
Dec.	63	4	3

See Altitude.

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(*Tenens*, from the Latin
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e courts with no favour; they
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ut a tenancy at will strictly
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does not give him a term to
is indemnified. (*Richardson*
4 Taunton, 128., per Lord
If two parties agree that the
and the other shall hold so
arties please, that is a hold-
d there is nothing to hinder
aking such an agreement."
who is suffered to remain in
r his lease is expired, pend-
on for a new lease, is a tenant
v. *Stennett*, 2 Espinasse, 617.)
of the tenant at will has, in
d to be the possession of the
v. *Fearnside*, 1 Wilson, 176.)
lives rent free by the consent
is a mere tenant at will. (*Rex*
& R. C. C. 498.; *Rex* v. *Fil-*
. 458.) So is also a person who has been let into possession of land under a contract of sale which has not been completed; he is a mere tenant at will to the vendor. (*Ball* v. *Cullimore*, 2 C. M. & R. 120.)

A tenant from year to year is one who holds lands by an uncertain and undeterminate tenure, more especially if an annual rent is reserved. (*Germain* v. *Orchard*, 3 Salkeld, 228.) Payment of rent is *primâ facie* evidence of a tenancy from year to year. (*Doe* v. *Dodd*, 2 N. & M. 838.) In *Doe* v. *Watts*, 7 T. R. 85., Lord Kenyon C. J. observed, "It would be extremely unjust that a tenant who occupies land should, after he has sown it, be turned out of possession by an ejectment, without any notice: and it was in order to avoid so unjust a measure, that, so long ago as the time of the year books, it was held that a general occupation was an occupation from year to year, and that the tenant could not be turned out of possession without reasonable notice to quit, *vide* 13 Hen. VIII. 15. b." And although the Statute of Frauds enacts that all leases by parol for more than three years shall have the effect of estates at will only, yet, per Lord Kenyon C. J., "what was then considered a tenancy at will has since been properly construed to enure as a tenancy from year to year." (*Clayton* v. *Blakey*, 8 T. R. 3.)

When a tenant, therefore, takes possession, he is bound to keep the premises for a year, for till then he cannot give the proper notice, which notice being a six months' notice, expiring at the period he took possession; and the same remark applies to the landlord, and to the executors of a yearly tenant. (*Shore* v. *Porter*, 3 T. R. 13.) Per Lord Kenyon, "whatever chattel the intestate had must vest in his administrator as his legal representative." The entrance of a tenant in the middle of a quarter, paying up to the regular quarter day, and afterwards paying every six months during his term, makes no difference; he is a tenant from the quarter day. (*Doe* v. *Johnson*, 6 Esp. 10.) The tenant who holds over after his lease is expired is a tenant at will at the rent he paid under the lease, till the landlord receives the first quarter's rent, and then he becomes a yearly tenant at the same rent. (*Bishop* v. *Howard*, 3 D. & R. 293.) A tenant under an agreement for a lease is a yearly tenant. (*Doe* v. *Smith*, 1 M. & R. 137.) An occupation pending a negotiation for a lease, will entitle the landlord to sue upon a *quantum valebat*, although no distress for rent can be made. (*Hamerton* v. *Stead*, 5 D. & R. 206.) But no tenancy is created where the occupier got into the house without the

275.)

A tenant from year to year may assign over his interest in the estate for any portion of time less than a year, or he may sublet a portion of it in the absence of any agreement to the contrary with his landlord, and this he may do without having his landlord's consent to the transfer; the law gives him authority to do so himself. (*Rex* v. *Aldborough*, 1 East, 598.) But though a yearly tenant can thus assign over his interest, a tenant at will certainly cannot. See Customs of Counties, Landlord and Tenant, &c.

TENCH. (*Cyprinus tenca.*) A British fish, which inhabits by choice stagnant waters, on a loamy, clayey soil, forming a soft muddy bottom. Its back is of a dusky colour; the head, sides, and belly of a greenish cast, beautifully variegated with a golden hue. The tench commonly weighs about four pounds, though it sometimes amounts to ten, and on the Continent they have attained to the size of twenty pounds. Tench is a simple fish, and easily taken; the method of angling for it differs in no material respect from that of carp, which see. (*Blaine's Encyclo.* p. 1061.; *Walton's Angler.*)

TENDRILS. The curling, twining organs of prehension, by which some plants lay hold of others.

TERRIER. There are two prominent varieties of this dog — the rough and the smooth. Terriers are very useful to agriculturists, for exterminating rats, pole cats, and similar depredators; and are also ser-

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Water saturated with salt - ·0500 = $\frac{1}{20}$
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Muriatic acid, sp. gr. 1·137 - ·0608 = $\frac{1}{17}$
Oil of turpentine - - ·0700 = $\frac{1}{14}$
Ether - - - ·0700 = $\frac{1}{14}$
Fixed oils - - - ·0800 = $\frac{1}{12}5$
Alcohol - - - ·0110 = $\frac{1}{9}$
Nitric acid, sp. gr. 1·40 - ·0110 = $\frac{1}{9}$

ble exhibiting the degrees of the Centigrade and Fahrenheit's Thermometers corresponding to those of Reaumur's Thermometer.

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6	95·	203·	25	31·25	88·25
5	93·75	200·75	24	30·	86·
4	92·5	198·5	23	28·75	83·75
3	91·25	196·25	22	27·5	81·5
2	90·	194·	21	26·25	79·25
1	88·75	191·75	20	25·	77·
	87·5	189·5	19	23·75	74·75
	86·25	187·25	18	22·5	72·5
	85·	185·	17	21·25	70·25
	83·75	182·75	16	20·	68·
	82·5	180·5	15	18·75	65·75
	81·25	178·25	14	17·5	63·5
	80·	176·	13	16·25	61·25
	78·75	173·75	12	15·	59·
	77·5	171·5	11	13·75	56·75
	76·25	169·25	10	12·5	54·5
	75·	167·	9	11·25	52·25
	73·75	164·75	8	10·	50·
	72·5	162·5	7	8·75	47·75
	71·25	160·25	6	7·5	45·5
	70·	158·	5	6·25	43·25
	68·75	155·75	4	5·	41·
	67·5	153·5	3	8·75	38·75
	66·25	151·25	2	2·5	36·5
	65·	149·	1	1·25	34·25
	63·75	146·75	0	·0	32·
	62·5	144·5	1	1·25	29·75
	61·25	142·25	2	2·5	27·5
	60·	140·	3	3·75	25·25
	58·75	137·75	4	5·	23·
	57·5	135·5	5	6·25	20·75
	56·25	133·25	6	7·5	18·5
	55·	131·	7	8·75	16·25
	53·75	128·75	8	10·	14·
	52·5	126·5	9	11·25	11·75
	51·25	124·25	10	12·5	9·5
	50·	122·	11	13·75	7·25
	48·75	119·75	12	15·	5·
	47·5	117·5	13	16·25	2·75
	46·25	115·25	14	17·5	0·5
	45·	113·	15	18·75	1·75
	43·75	110·75	16	20·	4·
	42·5	108·5	17	21·25	6·25
	41·25	106·25	18	22·5	8·5
2	40·	104·	19	23·75	10·75
1	38·75	101·75	20	25·	13·
0	37·5	99·5			

e Meteorology, and Weather.

THICKET. Trees or shrubs crowded together in such a manner as to form a mass not easily penetrated by men or cattle.

THISTLE. A well-known prickly weed, common in corn-fields and pastures. Wherever thistles grow naturally it is a sure sign that the land is strong, and of a tolerably good quality; but they are at the same time a great annoyance to every plant intended to be cultivated.

By an excellent regulation in France, a farmer may sue his neighbour who neglects to thistle his land at the proper seasons, or may employ people to do it at the other's expense: and it were to be wished that a similar law was in force here, to prevent the wide-spreading mischief occasioned by the seeding of this pernicious weed; among which may be reckoned, besides its choking the young corn, that if wheat in particular be not well thistled, the reapers take up the grip so tenderly, lest they should prick themselves, that, by their loose handling of them, they sometimes leave upon the ground corn enough to sow the whole field. There are no plants over which the economical farmer ought to keep a more watchful eye than the thistle tribe, as they are not only useless but occupy much ground, and, being furnished with winged downy seeds, are capable of being multiplied and carried almost to any distance: besides, they do much mischief by impeding the work both in handling hay and corn crops. It is, of course, a matter of much consequence to be well acquainted with the qualities of each kind, in order to enable us to judge with certainty how far and by what means their destruction may be effected in the most certain and ready manner.

There are many sorts of thistles, but those which chiefly deserve the attention of the farmer are either of the annual, biennial, or perennial kinds.

The annual species of thistle are the musk thistle (*Carduus nutans*), the milk thistle (*C. marianus*), the welted or curled thistle (*C. acanthoides*), the slender-flowered thistle (*C. tenuiflorus*), the common sow-thistle (*Sonchus oleraceus*). The principal biennial thistles are the spear or bull thistle (*C. lanceolatus*), the marsh thistle (*C. palustris*), and the cotton thistle (*Onopordum acantheum*). The perennial species are two, the common sow-thistle (*Sonchus arvensis*), and the common or field thistle (*Cnicus arvensis*). The dwarf or stemless thistle (*C. acaulis*), the star thistle (*Centaurea calcitrapa*), and the common carline thistle (*Carlina vulgaris*), are more frequently found to infest dry sandy pastures and calcareous soils than loamy or damp grass lands. Where they prevail to a great extent, there is no remedy like breaking up the land and taking a course of crops; for palliative remedies are of little avail. Hand-weeding, when the weeds are confined to local spots, and are only just beginning to spread generally over the soil, will be found effectual; but when once the pasture becomes generally infected with the seeds and roots of these plants, no time should be lost in using the plough, harrow, and horse-hoe, and a judicious course of cleansing crops before returning the land again to permanent pasture.

Among the species of pasture weeds that generally prevail in loamy soils, and are also prevalent in clayey and damp soils, are the marsh or red plume thistle (*Cnicus palustris*), the meadow or small purple plume thistle (*Cnicus pratensis*), and the melancholy plume thistle (*Cnicus heterophyllus*). In crops of artificial grasses, such as sainfoin, lucern, &c., where the dwarf plume thistle (*Cnicus acaulis*) prevails, and when it is impracticable, under such circumstances, to draw out this weed without injuring the crops, a good remedy will be found in the use of common salt. Children may be employed to apply the salt by hand to the crown of the weed. If the least part of the root of the thistle be left, it springs up season after season. Besides possessing this principle of vitality in the root, its seeds are so winged with down as to render dissemination, even to a great distance, by means of the wind, almost certain.

It is obvious that the annual and biennial species of thistles may be readily removed by preventing their running to seed and disseminating themselves, which is best effected by carefully eradicating them, or frequently mowing them over close to the surface, and rolling. But in the perennial kinds, from their roots continuing in the earth, increasing and throwing out new shoots or stems every year, there is much difficulty in extirpating them, and they perhaps can be no other way destroyed than by rooting them out of arable land by deep ploughing and frequent harrowings, or by fallowing or laying the land down to pasture; the annual species seldom appear in pasture lands. But for destroying the common thistles the best method is by weeding pincers, or the finger and thumb when in loose land, cutting them over in the bleeding season frequently by weeding knives, and applying salt to the cut stalk. (*Holdich's Weeds; Mart. Doyle's Husb.*)

THISTLE, CARLINE. (*Carlina.*) One species of this genus is indigenous, the common carline thistle (*C. vulgaris*), growing in dry sandy heathy pastures and fields. The root is small and tapering, biennial. Stem erect, firm, round, ten or twelve inches high, somewhat corymbose. Leaves lanceolate, sinuated, and wavy, green, veiny, rigid, copiously bordered with prickles. Flowers terminal, solitary, of a singular aspect, and not inelegantly variegated. (*Smith's Eng. Flor.* vol. iii. p. 397.)

THISTLE, COTTON. (*Onopordum*, from *onos*, an ass, and *perdo*, to destroy: referring to the imaginary effects on the ass.) The common cotton thistle (*O. acanthium*), a biennial, grows very frequently in waste ground, on hedge-banks, and by road-sides, in a gravelly soil. The root is tap-shaped. The whole herb is covered with white cottony pubescence, which is easily rubbed off. The stem is four or five feet high, branched, and, when in a growing state, may be peeled and boiled for the table; but it has little flavour, except some bitterness, which it loses by being steeped in cold water. Leaves ovate-oblong, sinuated, woolly on both sides. Flowers solitary, at the ends of the branches, large, of a bluish rose-colour. The calyx cottony, and very prickly. The large brown seeds are eaten by goldfinches, and the birdcatchers about London provide themselves with heads of this thistle and *Carduus marianus* to entrap these and other birds, on bright autumnal mornings. (*Smith's Eng. Flor.* vol. iii. p. 395.)

THISTLE, PLUME. (*Cnicus.*) This is a separation from the genus *Carduus* made by Sir J. E. Smith. They are prickly herbaceous plants, and differ chiefly in the down being evidently feathery, not merely rough. The biennial species may be readily destroyed by mowing before the flowers form seed. There are nine indigenous species: —

1. The spear plume-thistle (*C. lanceolatus*), a biennial, very common in waste ground, and on banks, by road sides. Stem about four feet high, flowering from June to September.

2. Marsh plume-thistle (*C. palustris*), a biennial, growing plentifully in moist meadows or pastures, and watery spots by road-sides. Stem from three to six feet high.

3. Creeping plume-thistle (*C. arvensis*). A very troublesome perennial weed in cultivated fields and by way-sides, from its fleshy root, which is very tenacious of life, creeping deeply into the earth to a great extent. Stems three or four feet high.

4. Branching bog plume-thistle (*C. Forsteri*). A perennial, flowering in July and August, with a tapering root.

5. Woolly-headed plume-thistle (*C. eriophorus*). A large and conspicuous perennial plant, growing in waste mountainous ground, and by road-sides, on a limestone or chalky soil.

erous plume-thistle (*C. tuberosus*).
ial.
ancholy plume-thistle (*C. hetero-*
A perennial, growing in moist
pastures in the north.
dow plume-thistle (*C. pratensis*).
ial, growing in low wet meadows
res, especially among trees. Root

rf plume-thistle (*C. acaulis*). A
growing on chalky and gravelly
ot woody, running deep into the
Stem entirely wanting. The large
een leaves, spreading close to the
n a circle near a foot in diameter,
other herbage. (*Smith's Eng.*
iii. p. 387.)
LE, THE STAR. See Star-

LE, THE WAY. See Saw-

N. A name given to several in-
shrubs and small trees. See
n, Black-Thorn, Buck-Thorn,
horn, &c.
N-APPLE. (*Datura.*) An or-
genus, but chiefly composed of
sessing very deleterious qualities.
ies is indigenous, the common
le (*D. stramonium*), an annual,
ws in waste grounds and dung-
s a bushy, fetid herb, two or three
of a narcotic quality, and greatly
as a remedy for the asthma, being
ke tobacco. The leaves are ovate,
nuated. The flowers are axillary,
ite, sweet-scented, especially at
ut three inches long. Fruit as
walnut in its outer coat, very
Seeds black. (*Smith's Eng.*
i. p. 313.)
OW-WAX. See Hare's-Ear.
SHING, or THRESHING. The
ting out the corn from grain or
s. The flail was the implement
sed for thrashing corn, and which
the grain from the straw and
y effectually and expeditiously;
is now become expensive, and
uises a great many seeds, it has
mpted to avoid these inconve-
y proper machines provided with
of flails, or other parts answering
purpose, made to move by the
water, wind, or horses. By this
business of thrashing is found to
med cheaper, more expeditiously,
less damage to the health of the
which is frequently thought to be
y the dust, &c., which arises in
on way of thrashing, as well as
treme laboriousness of the work.
machines for effecting the purpose of thrashing have been lately invented. See Flail, and Thrashing-Machine.

THRASHING-MACHINE. To the farmer on an extensive scale the thrashing-machine is absolutely necessary. He cannot wait for the tedious operation of the flail to prepare a delivery of corn for a given day, or pressing purpose; nor can he, without the risk of pilfering and imposition, keep his barn constantly open for thrashers. The flail, however, is still the implement in general use among all who farm on a scale not sufficiently extensive to require any of the complex machinery which modern skill has invented. The advantages of the flail are, its simplicity, the power of giving employment to the labourers in the barn during wet days, and the convenience of having fresh straw for fodder every day. (*Doyle's Pract. Husb.*) See Flail.

For the whole of the following description of the thrashing-machine I am indebted to the valuable essay *On Agricultural Implements*, by Mr. J. Allen Ransome of Ipswich.

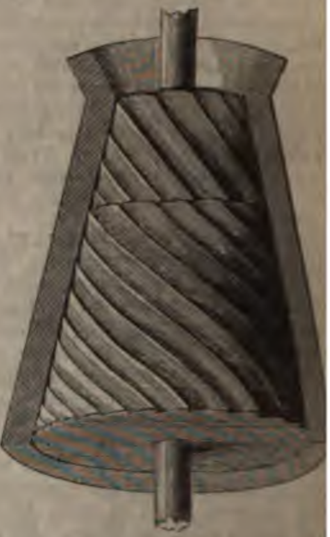
It will not tend to throw any light upon this subject to revert to the practice of ancient times, further than to state, that of all the modes then adopted, "the bruising with the cart wheel," "the sharp thrashing instrument having teeth," "the trampling under the feet of the unmuzzled ox," or "the rollers plain or fluted" mentioned in the later practice of continental agriculture, the flail alone remains in use; and it is with this instrument, preserving very nearly its original form, and by which till very lately the entire growth of corn and seeds in this kingdom was thrashed, that our comparison of the more modern inventions of the present and last century has to be made.

That the flail may be made thoroughly to effect, though at great cost of labour and time, the purpose of clearing the grain without damage either to the corn or the straw, is a point none will be inclined to dispute. But the disadvantages attending its use are not confined to waste of labour and time; for, though it may be granted that the operation, if properly performed, may be perfect, how difficult it is to secure its proper performance, every agriculturist whose journies to his barn have from time to time interrupted his surveys of other not less important agricultural operations, can fully testify. It is evident that the latter part of this operation will require much more labour to produce a given quantity than its earlier stages; and hence the straw is frequently passed away partially thrashed, in order to procure a greater bulk in a given time. Nor are these disadvantages all with which we have to contend: constant inspection may, perhaps, to some extent, remedy them; but no attention will altogether suffice to remove the temptation to pilfer, which is continually presented where large quantities of grain are ever under the eye and in the power of those to whom a small portion is of great importance; and hence arises, even when undetected, and often, indeed, when not committed, a cause of painful temptation on the one hand, and injurious suspicion on the other.

To overcome these evils, prejudicial not only to the true economy of the farm, but to those feelings of confidence which, justly to sustain the social bond, should ever exist in the relation between the labourer and his employer, the attention of our enterprising neighbours in Scotland was first directed to the construction of machinery; and in 1732, Michael Menzies, a gentleman of East Lothian, invented and patented a machine for thrashing grain. We regret that, as nothing but the bare record of this invention is enrolled in the Patent-office, we have not been able to learn more of this, the germ of thrashing-machine invention, than that it was a contrivance by which a series of flails were made to revolve upon a cylinder; but we are pleased to be able in some degree to redeem it from the "condemnation of faint praise" with which we find its memory generally accompanied, by reference to the report of a committee appointed by the Society of Improvers in Scotland, to inspect its operation, and determine upon its merits. This committee, after various trials, reported it to be "their opinion that the machine would be of great use to farmers, both in thrashing the grain clean from the straw and in saving a great deal of labour; for one man would be sufficient to manage a machine which would do the work of six." They further recommended the society "to give all the encouragement they could to so beneficial an invention, which, being simple and plain in the machinery, might be of universal advantage." The society approved of the report, and acted upon the recommendation.

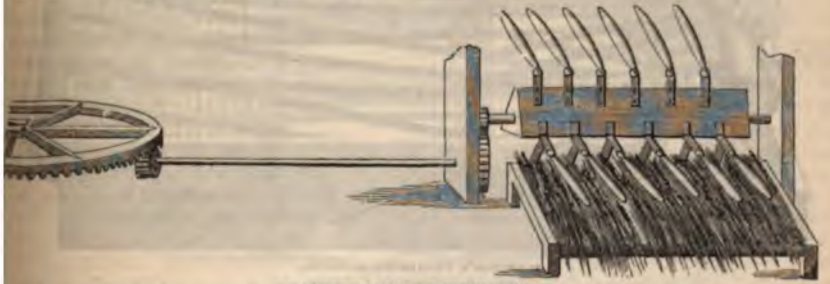
During the next period of twenty years we are not aware of any other attempts to carry out the object of thrashing by machinery; but in 1753-8, Michael Sterling, a farmer in the parish of Dumblane, Perth, applied the principle of the mill in common use for hulling flax to this purpose. This mill had a vertical shaft, with four cross arms inclosed in a cylindrical case, three feet six inches high, and about eight feet in diameter. The shaft was made to turn at considerable velocity, and the sheaves were gradually let down from an opening at the top; the grain and straw, after being subjected to this beating, were then
through an opening in the floor,
rakes and fanners completed the sep
of the grain from the straw and ch
was, however, found that this machin
off the ears of barley and wheat ins
clearing them of the grain, and that
it was only fit for oats.

It is curious to trace the variou
by which the desideratum of thrash
machinery was attempted to be
plished; a few of these we shall ven
bring before our readers, and a slight
of them will suffice satisfactorily t
that in following out the principles
distinguish Meikle's machine (hereafte
mentioned), little of value has been
the public of those which have falle
desuetude. In 1772, two gentleme
siding in Northumberland, Alderto
Smart, invented a machine, by whi
sheaves were carried round betwe
indented drum of six feet diameter,
number of fluted rollers, which, pressi
means of springs against the fluted co
rubbed out the corn from the ears; a
1785, William Winlaw, of Mary-le-
patented an invention which he de
nated a "mill for separating grain
straw."



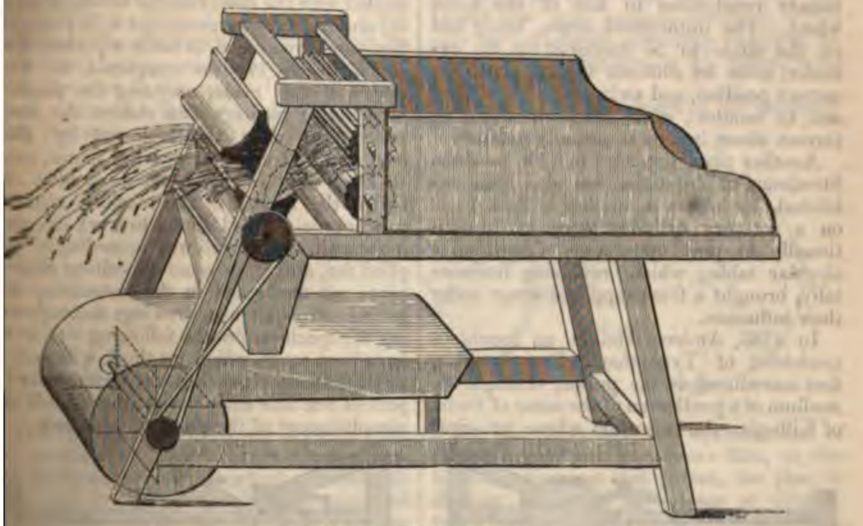
This mill was made on a principle
to the coffee mill, but was found
ceed the simple object proposed in the
cification, by *grinding* the grain as w
separating it from the straw. Other
chines upon the plan of rubbing out the
were also tried, but, on account of the
mage done to the grain, were discarded.

dition to the mill invented by Winlaw, machine was in 1792 patented by Wil- ghby of Bedford, Notts, the principle of ich appears to have been somewhat simi- to that of Menzies; how nearly so, we gret we have not the opportunity of dging. It comprised a series of loose flails made to act upon a grated floor, and turned rapidly round by means of a horse-wheel, better perhaps explained by the accompanying cut than by any other means. The straw was presented by hand to the action of the flails.



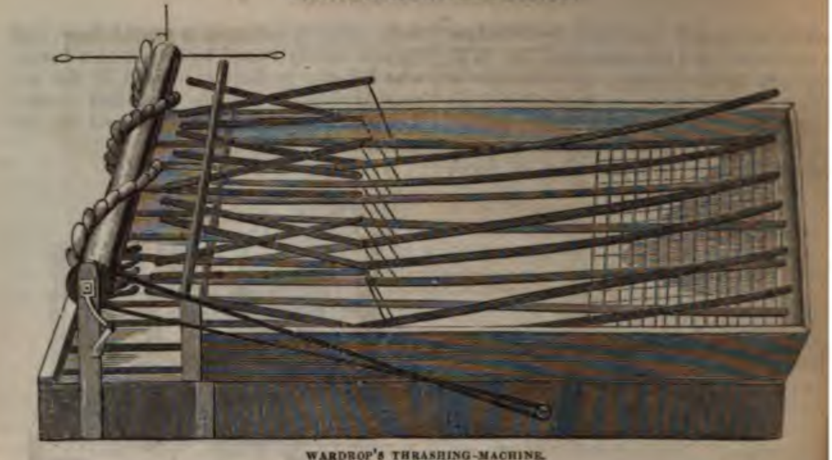
WILLOUGHBY'S THRASHING-MACHINE.

In 1795, an individual of the name of bb, residing at Lewes, obtained a patent an invention of which the principal are was the passing the straw between two rapidly-revolving beaters, under which it was held by two feeding rollers, whence the corn fell into a winnowing-machine, as shown in the figure below.



JUBB'S THRASHING-MACHINE.

he inventive talent of our transatlantic hren was at this time brought to bear this important subject. James War- , of Ampthill, Virginia, invented a ma- e, which was introduced into this country t 1796, to be worked by two men; it made with flails or elastic rods twelve in length, of which twelve are attached eries, each having a spring requiring wer of twenty pounds to raise it three high at the point; a wallower shaft, with catches or teeth, in its revolution successively lifted each flail in alternate movements, so that three of the flails were operated upon by the whole power, viz. twenty pounds, and are seen in the accompanying cut on the point of striking, three at two thirds raised, three one third raised, and three at rest; consequently, the whole weight to be overcome is 120 pounds. The flails beat upon a grating, to which the corn is introduced by hand.

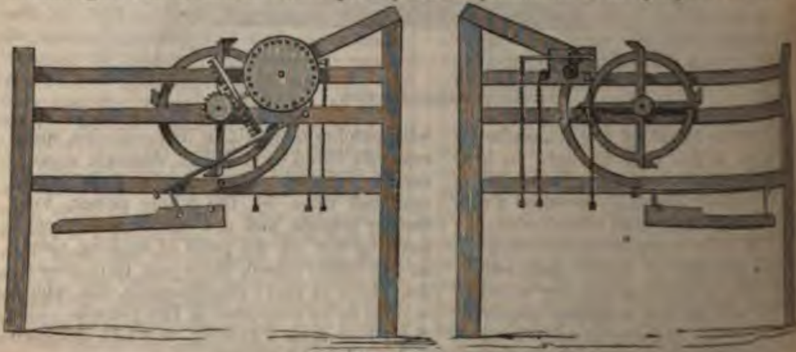


WARDROP'S THRASHING-MACHINE.

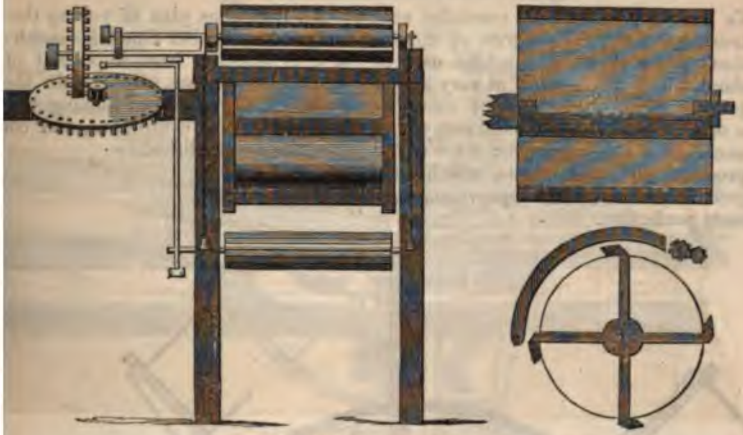
In communications from M. D. Musigny to the Society of Arts, a curious account is given of a machine worked by one horse, which, walking round a circle of forty feet, caused a cylinder, upon which thirty-two flails were placed, to revolve at the rate of twenty revolutions to one of the horse wheel. The unthrashed straw, being laid on the circle to be described by the cylinder, must be difficult to confine to its correct position, and awkward both to place and to remove; while the corn would be thrown about in a most slovenly manner.

Another plan, patented in 1796 by John Steedman, of Trentham, has also been exhibited, by which a number of flails fixed on a rotatory cylinder were made continually to play upon a given spot on a circular table; which, revolving horizontally, brought a fresh supply of straw under their influence.

In 1785, Andrew Meikle, an ingenious mechanist of Tyningham, East Lothian, first introduced to the public, through the medium of a gentleman of the name of Stein, of Kilbogie, the invention whose principle has been the basis upon which the machines in use up to the present time have been mainly constructed. It appears that, his attention having been long turned to the subject, he discovered that the plan of rubbing would never be otherwise than attended with the disadvantage before alluded to; and his son George agreed with the gentleman above named to erect a perfect machine, and in 1786 he completed the first that was ever made, adopting the plan of introducing between two rollers the corn which was then thrashed out by four beaters fixed upon a revolving drum, and striking, as it revolved, the corn held between the rollers. The machine alluded to was erected, and found to work exceedingly well. A patent was accordingly applied for, and, after some opposition from a party not concerned in the invention, obtained. From his own drawings accompanying the specification, the following woodcuts have been made, which we think will not be uninteresting, as proving how comparatively perfect was this early design to the full accomplishment of the purpose intended.



NEIKLE'S THRASHING-MACHINE.

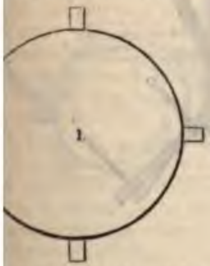


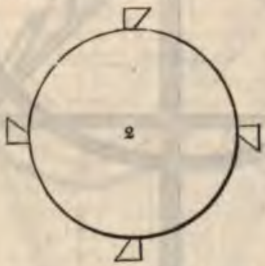
MEIKLE'S THRASHING-MACHINE.

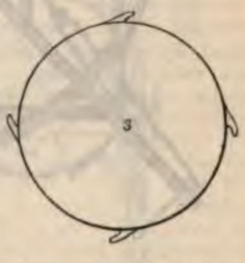
trials between the erection of the machine and the obtaining the pa- ew principle appears to have sug- tself, viz. that of stripping off the m the ear by a comparatively sharp , as termed by him, "scutching out n," instead of beating it by a flat

The difference has been partially ed by supposing a handful of straw corn in the ear to be held in the hile with the flat sides of a two-feet ears should be struck or beaten; this is the operation of the common beater (see *fig*. 1.). If, instead of striking the ears with the flat side, a sharp blow be given with the thin edge of the rule in the direction of the ear where the rule touches, it will strip the corn from the ear with less labour and with greater certainty. This may be called the scutching principle to which Meikle's beaters in his patent were applied (*fig* 2.).

The difference is shown in the following cuts:—





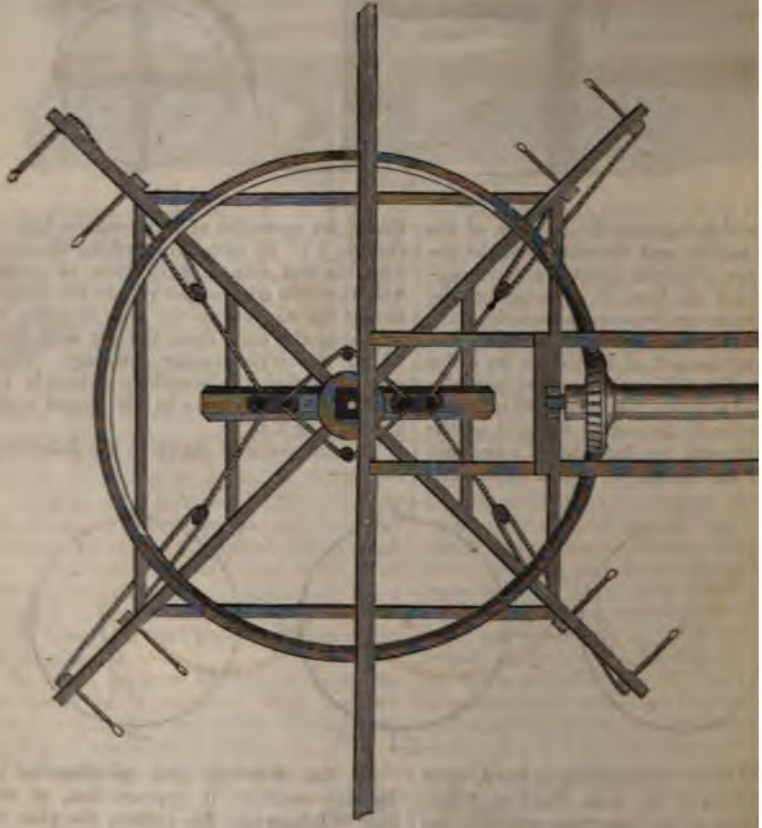


l not be uninteresting to learn, upon hority of Sir John Sinclair, "that ntor of this important machine was d comfortable in his old age, and to provide for his family after his by the voluntary donations of his countrymen." Not less gratifying estimony of Professor Low, in his le treatise on the *Elements of Prac- riculture*, that "to Andrew Meikle, a question, belongs the honour of perfected the thrashing-machine. and improvements have indeed ade on certain parts of the original ; but in all its essential parts, and principle of its construction, it re- it came from the hands of its in- " (p. 118. 3d edit.).

By the drawings and specification of Meikle's machine, it appears that, at the time of taking out this patent, the plan of shaking the straw by means of circular rakes had not been suggested; and in the report drawn up for the consideration of the "Board of Agriculture" for the county of Northumberland, we find that, in 1789, the first machine having a circular rake attached, and with fanners below, to perfect the cleaning of the grain, was erected. Although it is not there stated, we have good reason to believe that this important improvement, occasioning the addition of but one light wheel to the machine, was the invention of J. Bailey, the enterprising occupier of Chillingham, one of the gentlemen appointed to draw up the report alluded to

We have thus far traced carefully, and, we trust, correctly, the progress of the invention of the thrashing-machine used in Scotland, till it has arrived at very nearly its present perfection. Various combinations of mechanical powers, and many contrivances, have doubtless been since added to produce particular effects, which have progressively tended to its improvement and ultimate perfection.

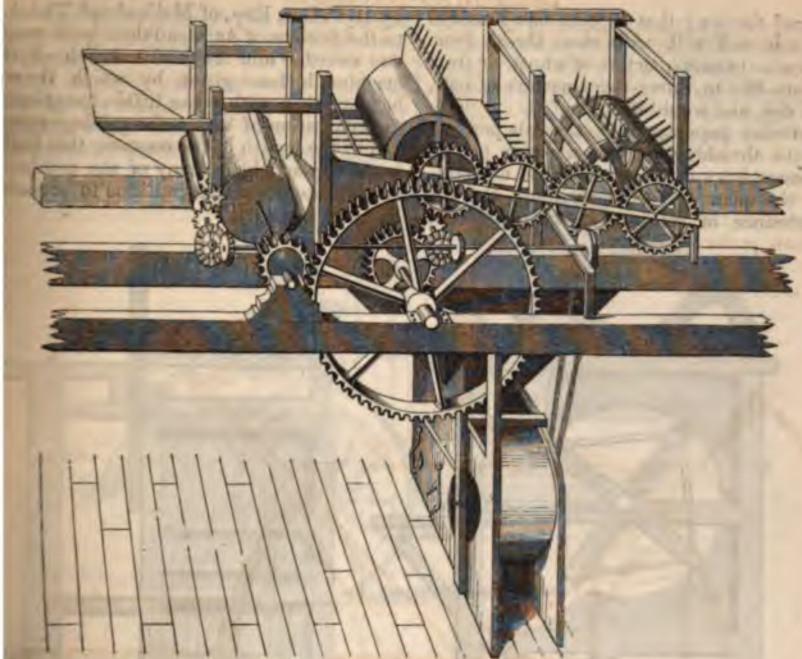
An ingenious plan of yoking th
invented by Walter Samuel, a smith
dry, is not the least important
The following cut will explain t
by which the object of making th
pull with equal, continuous, and
effort, is accomplished:—



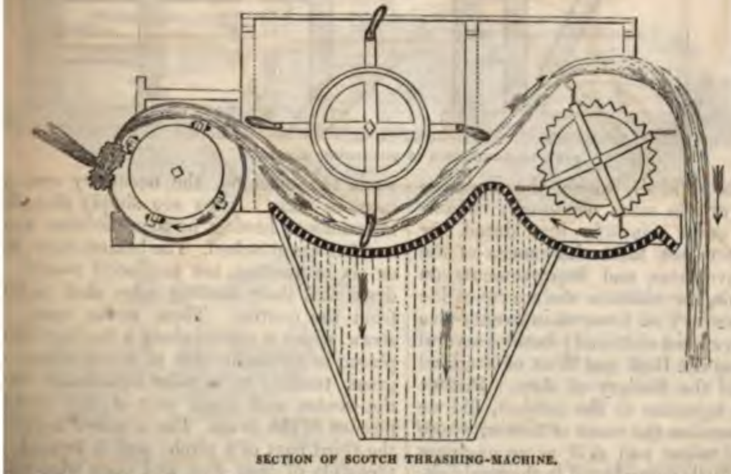
SAMUEL'S PLAN OF YOKING THE HORSES.

The same object has been sought to be obtained by a much more complicated contrivance, of weights acting by chains over a pulley placed in the centre of the machine, which weights were so adjusted as to be equivalent to the supposed power of the horse to whose draught they were attached, while the animal's head is tied to the shaft before him. The writer has occasionally seen these in use on the estate of the Earl of Leicester, and in various parts of the county of Norfolk; but although the horses are thus constantly kept to the collar, they
have appeared, from their strained
and from the circumstance of all the
irons being invariably bent, to
larger amount of disadvantage
commensurate with profit.

After inspecting many of the
of the Scotch machine, we have
the annexed illustrations as
best idea of the construction and
the instrument; for these we are
Professor Low's work, from which
copied:—



MODERN SCOTCH THRASHING-MACHINE.

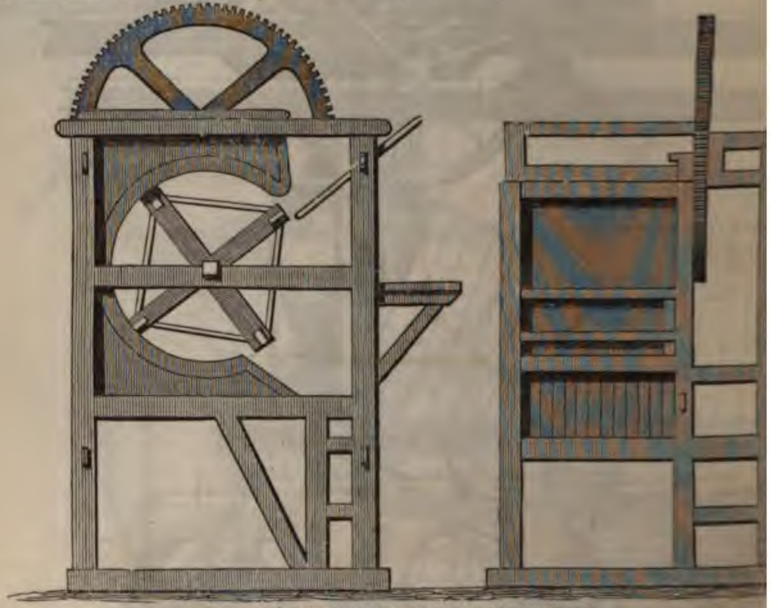


SECTION OF SCOTCH THRASHING-MACHINE.

In 1795, Wigfull, of Lynn, obtained a
tent for an improvement in thrashing-ma-
ines, the principal feature in which was an
empt to combine the character of the im-
lse given by the stroke of the flail, with
at of revolving beaters; his beaters, in-
ad of being fixed (as in the case of
eikle's scutchers) on the drum, were made
se and attached by means of short lengths
chain, so that the centrifugal force pro-
ted them, while in rapid motion, with increased velocity against the corn, which, passing between two rollers, was held till sufficiently thrashed; the corn was then, by means of a shaking skreen, and rolling cloth or endless web, carried to the blast of a fan, where it was separated from the chaff.

This machine is highly spoken of in the *Repertory of Arts.* Alluding to one used by Ede and Nichols, Elm, it is stated "that it was made for four horses, but afterwards altered for six; that it cost one hundred guineas, and will, with ease, thrash from fifteen to twenty quarters of wheat, or from twenty-five to thirty-five quarters of oats, in a day, and would do more."

Another important step towards perfecting the thrashing-machine was now gained in one which appears to us as first embodying the plan of feeding without the incumbrance of rollers. It was submitted by H. P. Lee, Esq., of Maidenhead
to the Society of Arts, and their go
was awarded him for it. A sketc
machine is here given, by which
be seen that, with some little alte
the adaptation of means for gainin
and in the length of the concave, t
model upon which many of the
in the eastern counties continue to



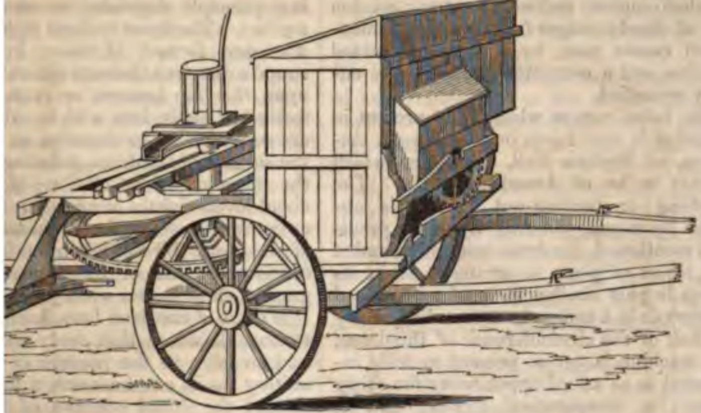
LEE'S IMPROVEMENTS IN THRASHING-MACHINES.

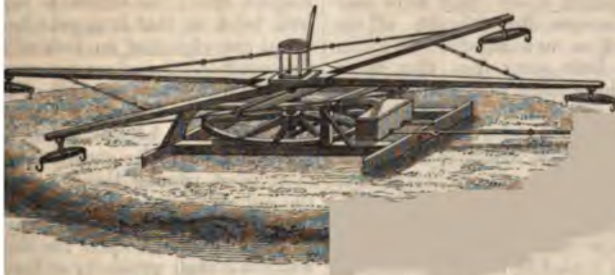
It will be difficult, within the limits to which this article must necessarily be confined, to enter minutely into detail, or adequately to set forth the merits of the various inventions and improvements on this machine, for which in the course of the last half century no fewer than twenty-five patents have been obtained; besides several awards from the Bath and West of England Society and the Society of Arts. But we should do injustice to the subject, did we not here mention the name of Lester, whose mechanical talent and skill as an engineer have not a little contributed to the establishment of a higher style of excellence in agricultural mechanics, than was coincident with the then taste of the age in that much neglected department.

The machines now in general use throughout the eastern counties are, with few exceptions, portable. They are frequently the property of individuals who, itinerating from farm to farm, thrash at a certain price per quarter; the farmer finding horses, and, with the exception of the proprietor, who feeds the machine, the necessary c
ment of men. They are simply thr
instruments, having neither circular
nor fanners attached. The beaters, fou
or six in number, are so placed rou
drum that their beating edge shall r
from the centre. These strike up
straw, which is passed along a feeding-
placed at an inclination of about thi
grees, tending to a point equidistant
the centre and upper part of the ci
ference of the drum. The concave de
the third part of a circle, and is form
ternately of iron ribs and open wire
in segments, so placed that its inner e
may be brought into near contact wi
edges of the revolving beaters, and su
tible of adjustments by screws to incre
diminish the distance. The usual pla
place it with about three quarters of a
space at the feeding part, and gradu
increase the distance to an inch and a
ter or two inches at the lower end,
the straw is delivered upon a fixed h
riddle, through which such part of the

riven through the wired part of
falls, while the straw is removed

shing part, commonly called the
occupies a space of six feet by
half feet, and, together with the
by which motion is communicated (which is made either for two, three, or four horses' power), may at pleasure be elevated upon a pair of wheels and axle, and thus removed by two horses. Illustrations of the machine when packed for travelling, and when fixed, are exhibited below.





joins.

een urged against these machines,
are apt to break the straw, and
nd nib the barley as to render it
malting; but we are inclined to
faults are not so much attribut-
principles of the machines, as to
r in which they are frequently
t of the hands of the workman;
times to the want of skill and judgment in the parties who have the management of them.

Many of these machines are made by persons who possess little claim to any mechanical knowledge, and who, purchasing the unfitted castings, by the help of village artisans, produce an imitation of those which are considered good. As the perfection of these machines must depend upon mathematical accuracy in the adjustment of all their parts, and in the truth and precision of their fittings, it is unreasonable to expect that this can be accomplished where no facilities exist beyond the forge and the work-bench; and hence arises a degree of discredit, which is unfairly thrown upon the principles upon which the machine is constructed.

With these machines, properly constructed, barley may be thoroughly thrashed with as little or less damage than with the flail, and wheat straw need not be so broken operation is one taken out by Joseph Atkinson, of Braham Hall, Yorkshire, which appears to be of American origin. The thrashing or beating-out process is obtained by means differing from any previously mentioned; the drum being surrounded by a series of pegs, so arranged as in its motion to pass similar rows of pegs placed at intervals in a concave, surrounding nearly one half of the circumference of the drum. This machine is not at present so fully introduced as to afford opportunity for fairly testing its comparative merits; and it would be unfair to give, upon slight evidence, an opinion which may have any tendency to increase the difficulty of the introduction of a new article. We can therefore say little more than that while such trials as have fallen under our own inspection have not convinced us of its superiority, we are inclined to the belief that the principle is not so defective as to prevent its being carried out to advantage, under such modifications as may be suggested upon further trials.

We have now to draw the attention of our readers to a machine in operation upon Lord Ducie's example-farm at Whitfield, of which it is probable in a forthcoming report of that interesting establishment, that a full account accompanied by the necessary drawings will be given. Through the kindness of the manager John Morton in accordance with whose suggestions it was constructed, we have been favoured with an opportunity of witnessing its performance, and with the following description, which we give in his own words: —

"This machine is worked by a steam-

are so placed as
the surface of the
the direction of
about seven eight
or concave inclos
of about one thir
consists of four
grating, three inc
It is made of cast
section placed so
sent an edge to
uniting (as is not
chines) the flute
machine with th
English ones; the
iron bolts, so tha
about one eighth
the scutcher. Spi
bolts, which perm
to yield when to
any time occur b
volving drum. T
most of it passin
the concave; but
shall be allowed
straw, it is thrown
which we shall pr
scribe."

The shaker in
principle altogeth
generally attache
chine: these, it w
fact, revolving rak
is not unreasonab
only involve loss
one horse at least,
tion of the grain is
remedy this defe
which may mor

he even numbers, 2, 4, 6, &c., to
air. These frames are supported
shafts, each having two cranks
three inches and a half on each
n. The frames are attached to
s by arms with brasses, in which
revolve. The shafts are con-
ther by a rod, so that they both
e same time. Now, suppose them
d so that the cranks are one ver-
r the other, and suppose the
aining the odd-numbered spars
hed by its arms to the upper
the frame to which the even-
spars are fixed to be in like
ached by its arms to the lower
very evident that by a fourth
lution of the shaft the one pair
hall have ascended and the other
ded, and they will be on a level;
time half a revolution is com-
relative position will be exactly
he lower pair being now the
the time the revolution is com-
elevations and two depressions
es will have taken place.
p-and-down motion is exactly
ated to shake any thing sub-
it. In the revolutions of the
ry thing attached to them also
o that each point of the arms,
spars revolves about a centre
o itself only. At the same time,
ity in the length of the crank,
iform motion of the two shafts,
ct of keeping the frames always
heir position at any one point
lel to their position at any other.
ry evident, from what we have
ny light substance, such as straw,
he frame, will, by the revolution
nks, receive, not only a shaking
and down, but also a progressive
ward. The first pair of frames
the height of the crank, three
nches, and will, at the same time,
ward twice that distance, seven
descending motion will then be
opped by the ascending pair of
spars of which, rising between
the first pair of frames, raise it
ree and a half inches, and carry
rward seven inches. It thus, as
ions proceed, not only receives a
of blows from below, as the
essively rise, but is, at the same
d forward from the drum, from
dropped on the shaker, and thus
for that portion of straw suc-

two bodies with equal velocity
st one another, the collision is
if one were moving with double
the velocity and the other were at rest. It thus becomes evident that the straw on the descending spars meets with as severe a blow from the spars of the ascending frame as if it were struck with twice the velocity when spread out, as we originally supposed, on a fixed horizontal platform. The effect of this succession of blows is thus more considerable than we might at first conceive, and the efficiency of the machine is proportionally increased.

"The length of the moveable harp is also of importance; for as the straw, when the cranks are three inches and a half in length, is carried forward seven inches, the number of blows it receives will depend on the length of the shaker. In the case now described, the spars being six feet long and the cranks three inches and a half, the straw will of course receive ten blows, and its progressive motion sends it off as fast as it comes from the scutcher. Each portion is removed before a second portion drops upon it."

The motion given to the straw by this shaker is the most perfect we can conceive; the blows occasioned as each series of spars strike it from beneath, effectually remove every particle of loose grain, while the shaker rapidly carries forward the straw, and at its termination deposits it in the straw house, while the corn sifted out by its action falls before the blast of a fanner; (the construction of which is peculiar, and will be described under the head WINNOWING MACHINE;) and all the light grain and short straws thrown out by the first winnowing into the light corn spout is then taken up by another elevator, deposited again upon the feeding board, and passed a second time through the drum, in order effectually to separate any that may remain. After passing through another winnower, the thoroughly cleaned corn is taken up by a third elevator and dropped into a hopper, through which it passes into a sack, which is placed on a weighing machine, and it is there weighed and left thoroughly fit for market.

We have introduced at length the description of this machine, or rather series of machines, as being the most complete of any that have fallen within the range of our observation; the most comprehensive in its design, performing every operation, from receiving the sheaf at the barn door to depositing its grain in a clean state weighed up in the sacks, and excellent in the greater part of its detail, which is carried out, both as regards ingenuity and workmanship, in a style very superior to the general character of agricultural machines. We would, however, remark upon one part of its operations, which we are inclined to consider su-in its passage between the drum and concave (which we conceive may and ought to be accomplished), there would then be any advantage in a second fan.

This brings us to the consideration of the comparative advantages of the scutching and the beating principles. We are willing to believe, as in the illustration of the rule used edgewise, a much lighter blow is effective to clear out the corn from every ear which the edge of the rule or scutcher shall pass; but it will be obvious it will only act on these, and consequently it will be necessary to bring the edges of the scutchers so near to the concave as not to allow more than the thickness of one ear between them; hence the necessity of the drum, as described above, revolving within one eighth of an inch of the concave. The tendency of the scutching principle, in its attempt to carry them rapidly through the narrow interval, will be occasionally to break off some of the ears; and these ears, when no longer supported by the straw, may fall behind the scutches, and thus be carried through unthrashed. The centrifugal force would no doubt have a tendency to throw them again to the action of the next bar of the concave; but it must be borne in mind, this part will be pre-occupied with the straw which is in the act of passing, and not until the straw is released will it have opportunity to fall; it must then fall with the straw, and, but for the perfect operation of the shakers, be carried away with it. The shaker, however, remedies this disadvantage; it therefore falls into the winnower, and, being lighter in proportion to its bulk than the

severe. The pr
ing process op
comparative vel
different specific
resistance, wher
municated to t
trated by wrap
thin paper; to t
plied, the bullet
distance, while t
left. If one hun
and in a cluster,
velocity, the eff
all. We admit
impulse is comm
in the ratio of th
difficult to accom
tion of power, no
hundred of these
jected to the scu
tion, while it m
those immediatel
the sharp edge w
pense of power,
be repeated agai
come into conta
an unyielding s
husks of corn, be
retard the perfec
process, unless
an interval not
bulk of each.
trary, do not r
through or betw
they only need t
to confine the s
centrifugal force
range of the beat
fore, narrowed to

a series of experiments which we
ough the kindness of practical agri-
s, been attempting, we are of opi-
t although the operation of scutch-
be performed at less expense of
f partially executed, and that a
uantity of straw may pass the ma-
d consequently more corn may be
in a given time, yet, unless the
are placed very near the concave,
will be imperfectly performed,
h of the corn will remain in the
d escape. But, if placed so near as
te for clean thrashing, the liability
off the ears will be increased, which
lve the need of re-thrashing; and
on, from the narrowness of the in-
ill then require, to the full, as great
the beaters.

one acquainted with this subject
ware of the difficulty with which
this implement are necessarily at-
the labour and loss of time attach-
utting up and taking down heavy
nts to fix others in their place
if the experiment is to be fairly
h grain of the same quality and in
condition, cannot be dispensed
e difficulty of getting men equally
t to manage them, and the trouble
d to the manager or owner, are so
wbacks upon the facility with which
evidence can be obtained to guide
conclusions on the respective merits
rieties of these machines. And to
be added, that, under certain cir-
es, machines, which will do their
nirably when every thing may be
le for them, — such as the corn in
lition and the straw not of too great
are sometimes found under adverse
nces to do their work very incom-
; while the slower and heavier-
machines, which in the first instance
t keep pace with them, are found
n the latter. We instance this to
t with all the care and pains we may
n, and it has not been little, it is
hat comparative trials under other
nces and in different hands may
o the same results. The impression,
produced on our minds, by a care-
ing and balancing of evidence, is
or heavy corn, loose in the husk,
eas, and beans, the beating prin-
ecidedly the best, the most perfect,
ned at least cost. For barley and
cutching principle is more adapted.
have still considerable doubt whe-
for these, the operation is so per-
ith the beaters. Our experiments,
in fairness be stated, were made
tchers on a drum only seventeen inches in diameter, being about the same size as the drum with beaters; and it is not impossible that the scutching principle may be used to better effect on a drum of larger diameter. We have thus expressed our own impressions, and trust that we have said sufficient to induce the comparison to be made by the experience and observation of others, the results of which we shall be glad to learn. Should further trials prove that either the scutching or beating principles may be used, under certain circumstances, to greater advantage than the other, it would not be difficult so to construct a drum as that the change should be readily effected.

Having thus briefly described the machine as regards its thrashing operation, it will be expected we should address our attention to the moving power, and consider which is most advantageous in connection with what is most readily available. The uncertainty of wind renders this power, if for an object to be performed at certain times, comparatively of little value; and, as one prominent advantage of this machine lies in its ability to do a great quantity of work on an emergency, we may conclude it is less available as a general principle than either water, steam, horses, or manual labour.

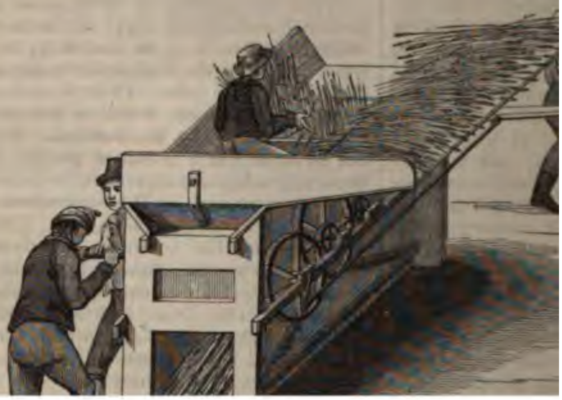
Where the locality admits of the use of a water wheel, this power is most economical and easily managed; but the advantage is limited to peculiar situations.

Where the quantity of work to be performed is sufficient to repay the interest of outlay, expense of wear and tear, &c., a steam-engine would be most advantageously employed on the farm. Of its economy, as compared with either horse or manual labour, there need be no question. But as few farms in this kingdom at present have these appendages, the question for consideration is narrowed to the comparison between horses and manual labour. On the authority of Dr. Gregory, the dynamic power of a horse at a dead pull may be calculated in the main as equivalent to that of six men, or to 420 lbs., if exerted in a direct line; but the result of experiments made by Tredgold tend to prove that sustained effort at the rate of three miles per hour must not be calculated at more than equivalent to 120 lbs. drawn over a pulley. This, taking six hours of labour per diem, as the utmost he would recommend, would be the maximum of useful effect. Under the circumstance of any deviation from a straight line, this must be materially reduced; and in describing a circle of eighteen feet radius, the cramped position of the horse will probably prevent his power from being ad-second, or about two miles and a half per hour.

Animal power is, however, so varied by the character of the exertion, that it is difficult to arrive at a correct calculation. The late Robertson Buchanan ascertained that in the action of working a pump, of turning a winch, of ringing a bell, or rowing a boat, the dynamic results were respectively as the numbers 100, 167, 227, and 248. See STRENGTH.

Having caused a machine with beaters to be constructed, worked by four men whose force should be exerted as in the manner of rowing a boat, the results, as compared with a machine requiring the force of four horses in a circle of eighteen feet radius, we found might be taken on an

lowing is a drawi
hand thrashing-
bited at the Ro
meeting at Liver
mendation of the
It is worked by
power being obtai
the one side, and
other, the men w
other by change c
man to feed the
of hands necessar
remove the stra
distance it has to
straw is short, a
yield and in goo
at the rate of twe
hour



esent day. The following are
the Agricultural Reports:—

	Thrashing per Day.
Roxburgh and Sel- Douglas states that or with 4 horses, xecution.	25 or 30 bolls, or from 150 to 180 bush.
f Norfolk in 1804, s an account of ma- ged to the follow-	
n, built by Wigfull, d by 7 persons and	40 co. wheat. 50 co. barley. 60 co. oats or peas.
, built by Wigfull, rsons, and by 4, 5,	20 co. wheat. 30 co. barley. 40 co. oats or peas.
g, built by Wigfull, , worked by 6 per- 6 horses.	32 co. wheat. 64 co. barley. 80 co. peas.
built by Fordyce ost 200*l*., worked by horses.	24 co. wheat. 55 co. barley. 63 to 84 co. oats.
rth, engineer from , worked by 10 men	40 co. wheat. 40 co. barley. 50 co. oats.
ost 600*l*., worked by rses.	64 co. wheat.
d, built by Assby, 00 guineas, worked es.	30 co. wheat. 32 co. barley. 40 co. peas.
sham, cost 300*l*., rsons and 8 horses.	80 co. wheat. 120 co. barley, peas, or oats.
Kent, R. Boys, in the only thrashing t, which, by a num- ents, and after many finds to answer ex- nd he states that it es and 12 men to	24 qrs. wheat. 32 qrs. barley. 40 qrs. oats.
r's "System of Hus- hed in 1812, we find R. Kerr's machine, horses, 4 men, and thrash	50 bolls, or about 300 bushels of wheat.

le improvements have since
In the statements of the
ements at the Royal English
Society's meeting at Cam-
341, the quantity of wheat
two four-horse portable ma-
actured by J. R. and A. Ran-
ich, and R. Garrett and Son,
respectively sixty-one bushels
rters of a peck, and sixty-one
quarter of a peck; and the
n-thrashed and uninjured.
not be taken as a criterion on
d an average, as it was doubt-
t of stimulated exertion; but
ual with machines of this con-
h reaped wheat in fair condi-
h 100 co. or 400 bushels in a
urs, and the same quantity of

however, be observed, that
neither rakes nor fans, the
h is done by hand, would re-
en and five boys, and a change
he day.

A local term signifying a
ndle, or a pottle.

E. A quantity of grain, consisting of twenty-four sheaves. It is sometimes written thrave.

THRIFT. (*Statice*, from *statizo*, to stop; in allusion to the powerful astringency of some of the species.) The species of thrift ought to be in every garden, on account of their lively little flowers. There are three indigenous species of thrift or sea-lavender, all perennial, viz:—

1. The common thrift, or sea gilliflower (*S. Armeria*), which is a common ornament of rustic gardens, where it serves for edgings of flower beds; nor does this plant suffer much from the smoke even of London. The flowers are numerous, rose-coloured, inodorous.

2. Blue spiked thrift, or common sea-lavender (*S. Limonium*), which grows plentifully on muddy sea-shores, and about the mouths of large rivers. The root is woody and tough. Leaves leathery, glaucous, usually two or three inches long. Panicle of spikes of imbricated, upright, fine blue flowers.

3. Matted thrift (*S. reticulata*), growing on muddy sea-shores, chiefly on the eastern coast of England. (*Smith's Eng. Flor.* vol. ii. p. 115.)

THRUSH. (*Turdus.*) A name applied to several British birds. The missel thrush (*T. viscivorus*) is one of the largest native species. The general colour of the plumage is brown; the under surface of the body is white, tinged with yellow, and covered with numerous black spots. The eggs are four or five in number, of a greenish-white colour, spotted with dark red brown, one inch three lines long, by eleven lines broad. The whole length of an adult bird is eleven inches.

The song-thrush (*T. musicus*) is not only well known, but a general favourite. Its song, next to that of the nightingale, is the sweetest in our woods:

> —— "The thrush
> And woodlark, o'er the kind contending throng
> Superior heard, run through the sweetest length
> Of notes."
> THOMSON.

It forms a nest of green moss and fine roots, and lays four or five eggs of a beautiful light blue, with a few black spots; the eggs are one inch one line in length, by ten lines in breadth. The whole length of this species of thrush is rather less than nine inches. Mr. Yarrell includes, in his *History of British Birds*, a new but rare species, White's thrush (*T. Whitæ*), which measures twelve inches and a half in length. (*Yarrell's Brit. Birds*, vol. i.) See FIELDFARE and REDWING.

THYME, GARDEN. (*Thymus vulgaris*, from ϑυμός, courage, being considered a reviver of the spirits; or from ϑύω, to sacrifice, being employed as incense.) The

The great tit (*P. major*) is an insecti-
bird, which is well-known, frequent-
oods, the vicinity of gardens, and
sheltered situations, in summer. It
a nest of moss, lined with hair and
rs, in the hollow of a tree, or a hole
all, and lays from six to nine eggs,
are white, spotted with pale red,
ines and a half in length and seven
n breadth. The whole length of this
is rather less than six inches.
he crested tit (*P. cristatus*) is a very
pecies, about four and a half inches

he marsh-tit (*P. palustris*) is about
me size as the last-mentioned, and,
name implies, frequents moist mea-
nd marshes.
he long-tailed tit (*P. caudatus*) is a
nown and common species, which re-
in this country the whole year, fre-
ng woods and shrubberies, &c. The
lays from ten to twelve eggs. The
length of the bird is about five inches
half. (*Yarrell's Brit. Birds*, vol. i.
)

HES. By the statute 6 & 7 W. 4.
entitled "An Act for the Commuta-
Tithes," a great and wholesome re-
n has been effected in the law with
to this ancient impost. By this act
provided, that the commutation of
hall be carried into effect by certain
ssioners, who are by the act em-
d to carry it into effect, with the
certain assistant commissioners. By
., meetings may be now called by
ners or payers of one third in value
tithes, at which two thirds in value
owners may agree upon the sum to
to the tithe-owners by way of rent-
, and they can bind the whole parish.
is then introduced various directory
ery for working the act. By sect. 29.,
ot exceeding twenty acres may be
in lieu of tithes. By sect. 32., valuers
be appointed who, by sect. 33., are to
ion rent-charge. By sect. 37. the
of the rent-charge is to be calculated
n average of seven years, and are to
ued without any deduction on ac-
of parochial or county rates. By
8. the commissioners have the power
ease or decrease the sum to be paid
estimated annual average value. By
0. the tithe of hops, fruit, and garden
e is to be valued, "according to the
e rate of composition for the tithes of
ruit, and garden produce respectively,
seven years preceding Christmas
within a district to be assigned in
ase by the commissioners." And
are other enactments with regard to the valuation of coppice wood, newly-enclosed barren land, moduses, &c. The commissioners are empowered to hear and determine disputes; subject, however, to appeal by an issue at law, or by taking an opinion of a court of law thereon.

By sect. 50. the commissioners are, after the value of the tithes is ascertained, to proceed to award the sum to be paid for the whole tithes of the parish, and which shall be a rent-charge to be paid in respect of the tithes of the parish; and by sect. 57. it is declared, that every rent-charge shall be deemed to be of the value of such number of imperial bushels, and decimal parts of an imperial bushel, of wheat, barley, and oats, as the same would have purchased at the prices (ascertained in the way pointed out by the act) in case one third part of such rent-charge had been invested in the purchase of wheat, one third part thereof in the purchase of barley, and the remaining third part thereof in the purchase of oats; and the average prices for the seven years preceding the January in every year, shall be the data by which the rent-charge will in consequence be regulated. By sect. 62., owners of lands chargeable with rent-charge may give land instead thereof, not exceeding twenty acres in any one parish. By sect. 67. all lands so rent-charged are thenceforth free from tithe. By sect. 69. such rent-charges are made subject to county and parochial rates. By sect. 79., if a tenant at rack-rent dissents from paying the rent-charge, the landlord may take the tithes during the tenancy. Sect. 81. gives the power to the owner of rent-charge, after twenty-one days, to distrain for it.

By the 1 *&* 2 *Vict. c.* 64., certain facilities were afforded for the merging of tithes in the land: and by the 2 *&* 3 *Vict. c.* 62., further facilities were afforded to the same end, and power is given to make parochial agreements for Easter offerings, mortuaries, or surplice fees, or of the tithes of fish or fishing, or mineral tithes. By sect. 12. power is given to subject crown lands to a certain rent-charge; and by sect. 13. provision is made for the tithe of Lammas lands, &c.; and in the following sections are certain regulations with regard to the rent-charge on fruit plantations.

TOAD. (*Rana Bufo.*) A well-known and much dreaded, though perfectly innoxious, reptile of the frog genus, which feeds on insects, flies, ants, &c. It is preyed upon by owls, buzzards, snakes, &c.: otherwise the toad attains to a considerable age, some remarkable instances of which have been recorded.

TOAD-FLAX. A name applied to two perennial species of *Antirrhinum*. 1. The creeping pale-blue toad-flax (*A. repens*) is a rare species, growing on chalky banks or rocks near the sea. The herbage is smooth and glaucous, stem panicled, leaves linear, scattered, partly whorled; flowers sweet-scented.

2. Common yellow toad-flax (*A. Linaria*), which is common about hedges and the borders of fields. The leaves are linear-lanceolate, crowded, stem erect; spikes terminal; flowers terminal, inodorous. (*Smith's Eng. Flor.* vol. iii. p. 133.) See FLUELLIN and SNAP-DRAGON.

TOAD-FLAX, BASTARD. See BASTARD TOAD-FLAX.

TOMATO, or LOVE APPLE. (*Lycopersicon esculatum.*) There are two species of the tomato at present in cultivation in this country: the red-fruited and the yellow-fruited. Of each of these there are several sub-varieties, chiefly differing in the size and shape of their fruit. The most esteemed is the common large red, though for pickling some of the smaller fruited varieties are preferable.

Of the red there are —

1. The common large. 2. Small. 3. Pear-shaped. 4. Cherry-shaped.

Of the yellow there are —

1. The large yellow. 2. Small or cherry yellow.

The soil best suited for this love apple is rich, light, and mouldy, in a dry subsoil; for although a regular supply of moisture is a chief requisite, yet stagnant water is very injurious. Sea-weed may be applied with advantage to the border on which it is grown, as may kelp or common salt in small quantities. The situation must be sheltered It is propagated by seed, which may be sown at the close of March or early in April, in a hot-bed or stove, which latter is to be preferred. The hot-bed must be of a moderate durability, earthed about six inches deep. The sowing must not be performed until the requisite time has elapsed for guarding against the danger of a violent heat arising. If a hot-house is employed as the nursery of the seedlings, the seed must be sown in pots or boxes set on the flues or round the edges of the pits.

In whatever situation sown, the seed must be scattered thin, and not buried more than half an inch below the surface. The plants are not long in appearing; when of two or three weeks' growth, in which time they acquire a height of as many inches, they must be thinned to three inches apart, and those removed, if wanted, pricked at the same distances, in a similar bed to that from which they may be removed; shade and water being afforded as may appear necessary. Air must be afforded freely in every stage of their growth; for if, fr the want of this, a due exposure to t light, or any other cause, they be spindling and weak, they seldom or ne are productive. Their removal into t open air and their final situation must n take place until May or early June, acc ing to the geniality of the season. To p pare them for this, the heat of the hot-b should be allowed gradually to decl or if in a hot-house, the pots may by d grees be removed into its cooler parts, u at length they can endure the temperatu of the green-house, where they may b kept until finally moved. But before th time arrives, another thinning will be re quisite; those in the hot-bed to six inch apart, and those in the store, each pla separate, into tolerable sized pots.

They are to be finally planted five fe apart, beneath a south paling or wall, t which their branches must be trained; fo if allowed to trail on the ground, the fr scarcely ever ripens, and never is in pe fection. The transition is rendered le sudden if planted over holes filled with h dung, earthed over eight inches deep. The ought never to be planted very near fru trees, as they are particular impoverishe of the soil. The removal should be ac complished with as little disturbance a possible to the root; and for effecting thi their being in pots is eminently adva tageous. Water and shade during mid-da must be afforded until they are established; and if the nights are cold during the fir week or two, or the weather tempestuous, the shelter of a hand-glass, or even of an inverted garden-pot, is advantageously af-forded. The training may commence a soon as the branches are a foot long, and continued throughout their growth. If the plants are strong, an horizontal direction is best; if weak, a more upright one. In case of a want of space of wall or paling, they may be trained with stakes as espaliers, but much rather on sloping banks of earth, which is the practice of Mr. J. W of Islington: upon these they are pegged down, and, striking root from their joints, the support themselves. (*Trans. Hort. So Lond.* vol. iii. p. 345.) It would be an im-provement to cover the banks with slat or tiles.

Care must be taken throughout the summer to clear away all lateral shoots, as well as to thin the leaves so as to expo the fruit to the full influence of the sun.

The berries begin to ripen about th middle of August, and continue to do s until October, or the arrival of the fir frosts, which always destroy the plants. For producing seed, some of the most f

ies must be left until perfectly
e seed must be separated from
by washing, as directed for the
er." (*G. W. Johnson's Kitchen*

NTOSE. In botany, covered
e, close, white hairs, or down.

S. See IMPLEMENTS.

HWORT. (*Lathræa squamaria.*)
urious little indigenous plant,
with white fleshy scales in the
leaves. It grows wild in dry
es, mostly at the roots of hazels
It is very shy of cultivation, but
creased by carefully dividing the
axton's Bot. Dict.)

RESSING. A term applied to
ires as are laid upon land with-
turned in: and also to the
f dressing the surface of grass
ther crops, with some kinds of
uced manure, that can be evenly
t or sown equally over them by

variety of substances are in use
urpose, such as soot, ashes, the
igeons and other birds, rape dust,
&c., the benefits of which are
der their respective heads.

AL. A gardening term, signify-
or confined to a place.

ENTIL. (*Tormentilla*, alluding
sed efficacy in toothache, as well
lief that it could cure diseases of
.) The British species are two;
nnial. They are now regarded
ing to the genus *Potentilla*, and
l order *Rosaceæ*.

mon tormentil or sept-foil (*P.*
or *tormentilla*) grows in barren
heaths, and bushy places. The
nder, ascending, branched. The
most sessile, dark green, com-
of three oblong, acute, deeply-
aflets, accompanied with stipules
t. The flowers are small, bright
ith the parts of the calyx and
fours, on slender hairy pedicels
n the leaves. The carpels are
l when ripe. The woody red roots
tringent as to be used in the
les of Scotland for tanning leather,
purpose they are superior even
rk. The root is likewise one of
fficacious of our indigenous aro-
ingents, and may be used with
ct in cases where medicines of
are proper; namely, in chronic
It is usually given in decoction,
administered in powder.

ing tormentil (*T. reptans*). This
ows sparingly about the borders
nd hedges. The stems are two feet long, hairy, prostrate, but not creeping; the leaves composed of five leaflets, obovate, strongly serrated, bright green, on long hairy footstalks. Flower of a full yellow, twice the size of the foregoing. Stipules undivided. It is also astringent, but less so than its congener. (*Smith's Eng. Flor.* vol. ii. p. 426.; *Paxton's Bot. Dict.*)

TOUCH-ME-NOT. See BALSAM.

TOWER-MUSTARD. (*Turritis*, from *turris*, a tower; the foliage is so disposed on the stems as to give them a pyramidal form, and for the same reason the plants are called tower-mustard.) The species are hardy annuals: one, the smooth tower-mustard (*T. glabra*), is indigenous, and grows wild on banks and by road sides, in a dry gravelly soil. The root is tapering; the stem two or three feet high, erect, slender, leafy. The radical leaves are numerous, spreading, toothed, rough; the rest are entire, glaucous, smooth, clasping the stem, oblong, arrow-shaped. The flowers are numerous, closely corymbose, pale sulphur-coloured. Pods very long and slender, on short stalks. Seeds about sixty in each cell, very small. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. iii. p. 215.)

TRACTION. See CARTS, ROAD, STRENGTH, HORSE, &c. The reader may also consult a very able essay "On Draught" in Professor Youatt's work on *The Horse*, of which our space will not allow us to give even an outline.

TRADESCANT, JOHN, a celebrated collector of plants, was born in Holland. He was gardener to Queen Elizabeth, as his father was before him. He settled in England, and founded his garden at Lambeth. About 1629, he was appointed gardener to Charles I.: he died about 1652. His son John, who followed the same trade as his father, made a voyage in pursuit of plants to Virginia, and brought many new ones back with him. He died in 1662. They introduced many new species into England, and, among gardeners, "Tradescant's spiderwort," "Tradescant's aster," &c., are still recognised. They were the first who made any considerable collection of natural curiosities in this country, which their delight in the pursuit enabled them to do, aided as they were by the liberality of contemporary men of wealth. Their museum, called "Tradescant's Ark," was an object of general curiosity, and was the constant resort of the great and learned. A description of it was published in 1656, entitled "*Museum Tradescantianum*, or a Collection of Varieties preserved at South Lambeth, near London. By John Tradescant." 12mo.

TRAVELLER'S JOY. See CLEMATIS.

TREACLE-MUSTARD. (*Erysimum*, from *erion*, to draw and cure: it is popularly reckoned a cure for a sore throat, and is also said to draw and produce blisters.) An extensive genus of plants, possessing warm and pungent qualities. The leaves are simple, often lanceolate, and nearly entire. Flowers corymbose, yellow, sulphur-coloured, or white. Pods in very long upright clusters. There are three indigenous annual species. 1. The worm-seed treacle-mustard (*E. cherianthoides*); 2. the garlic treacle-mustard (*E. alliaria*), known also under the local names of Jack-by-the-hedge, or sauce-alone; 3. hare's-ear treacle-mustard (*E. orientale*). The second is the most common. The whole herb is smooth, shining, deep green, and exhales, when bruised, the smell of garlic; and the seeds are stronger than the other parts of the plant. The stem is a foot high, somewhat branched. The leaves stalked, cordate, acute, veiny, and broadly serrated. The flowers are white. The pods erect, smooth, on a spreading stalk. The peasantry eat the young leaves with bread and butter. (*Smith's Eng. Flor.* vol. iii. p. 200.)

TREES are divided naturally into two principal classes, namely, fruit and timber trees: the former includes all such as are raised chiefly, or entirely, for their edible fruit, an account of which, together with their modes of cultivation, the reader will find in alphabetical order, and also in the articles FRUIT, ORCHARD, PRUNING, &c.

The second division comprehends those trees the wood of which is employed in ship-building, machinery, or for other use-

Chancellor King.
& C. 897.)

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of the soil on whi
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v. *Coats*, 1 M. &
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8 Swanston, 509.)
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e timber, yet the general property
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and, therefore, the landlord cannot
an action of trespass against a
for cutting bushes and thorns grow-
hedge, if the tenant afterwards
(*Berriman* v. *Peacock*, 2 M. &
4.) The tenant or lessee has no
cut timber; and in an action for
defendant cannot give in evidence,
mitigation of damages, that the
as cut for the purpose of necessary
or, that after it was cut the timber
anged with the lessor's consent for
ore fit for the purpose intended.
s v. *Norton*, 7 Bingham, 640.) But
ut timber without waste which has
within twenty years; and in Kent
in the habit of cutting trees of
ix or twenty-eight years' growth.
ll's Land. & Ten. 461.) Windfalls
the lord, and the Court of Chan-
, if necessary, order it to be pre-
r him who has the first estate of
ce in the land. (*Bewick* v. *Wint-*
. W. 268.) See TIMBER, FORESTS,
URSERY, &c

-MALLOW. (*Lavatera*, named
efort in honour of his friends, the
aters, famous physicians and na-
of Zurich.) The species of this
e mostly arborescent, soft, and
owny; the pubescence in some in-
tarry.

ea tree-mallow, or velvet-leaf (*L.*
, is an indigenous, but rare biennial,
on the sea-shore, flowering from
ctober. The root is much branched,
deep into the ground. Stem from
n feet high, straight, upright, thick,
anching into a leafy head. Leaves
reen, downy, with seven angles, al-
on long footstalks. Flowers not
e common mallow. Capsules seven
reticulated, smooth. If allowed to
s seeds in a garden this species will
for many successive years, and the
ants will now and then survive one
mild winters; but having once blos-
t perishes.

mallows deserve to be more gene-
tivated, both in gardens and fields,
for their elegant flowers, which
with honey, but chiefly for the
substitute for hemp which their
extile stalks afford. (*Smith's Eng.*
l. iii. p. 248.; *Quart. Jour. of Agr.*
. 185.)

ALLOW. A local term, signify-
lough land the third time before

OIL. (*Trifolium*, from *tres*, three, and *folium*, a leaf. All the species have trifoliate leaves. The French call it *trefle*, and the English *trefoil*, or clover.) An extensive and well-known genus of herbaceous plants, natives of cold or temperate climates, either perennial or annual. Many of the species are highly important as food for cattle, either fresh or in the state of hay, often acquiring a fragrant scent in drying. The white, red, and yellow clover are amongst the most valuable herbage plants adopted in European agriculture.

Lucern has been recommended as superior to clover and sainfoin, and various other leguminous plants have been highly extolled; yet the red clover for mowing, and the white for pasturage, far excel all other plants in these respects. All the species thrive in common garden soil, and many of them being very showy are well suited for ornamenting the flower border. The perennial kinds are readily increased by dividing the plants at the roots in spring, or by seeds. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 296.; *Sinclair's Hort. Gram.*) See CLOVER, MELILOT, and BIRD'S-FOOT TREFOIL.

TREFOIL, THE MARSH. See BUCK BEAN.

TRENCH PLOUGH. See PLOUGH.

TRENCHING. See SUBSOIL PLOUGHING.

TRICHONEMA. (From *thrix*, a hair, and *nema*, a filament; the filaments are hairy.) A genus of very pretty bulbs when in flower. They should be planted out in a pit or frame, in a mixture of sandy loam and peat, and increased by offsets.

One species (*T. bulbocodium*) is indigenous to the channel islands. The bulb is ovate, with two membranous coats; eatable. Leaves several, spreading, three or four inches long. Flowers blue or purplish, on simple or branched stalks. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. i. p. 47.)

TRIFOLIUM INCARNATUM. A well-known and much esteemed species of trefoil. See CLOVER and TREFOIL.

TRITICUM See WHEAT-GRASS.

TROUT. (*Salmo furio.*) A small well-known fish, inhabiting the British lakes and rivers, varying in weight from five or six ounces to four pounds. Trout are taken at all seasons of the year, but the best time for angling is in the months of June and July.

TRUFFLE. (*Tuber cibarium.*) A round fungus growing under ground, destitute of roots and leafy appendages. It absorbs nutriment at every point on its surface. The truffle is composed of globular vesicles, destined for the reproduction of the vegetable, and short barren filaments, called by Turpin *tigellules*; and the reproductive bodies, to scent it; so that on smelling the truffle, they bark and scratch it up. Truffles are highly esteemed at the tables of the luxurious, where they are served up, either roasted in a fresh state like potatoes, or they are dried, shred, and dressed as ingredients in soups and ragouts.

TRUSLER, JOHN, LL.D., was born in London in 1735. He died in 1820. Among his other compilations are: 1. The Art of Gardening. 8vo. London, 1793. 2. The Lady's Gardener's Companion. 18mo. London, 1816.

TRUSS. A bundle of hay, straw, &c. It may be observed that a truss of hay must contain fifty-six pounds, or half a hundred weight; a truss of straw thirty-six pounds: thirty-six trusses make a load. In June, July, and August, a truss of new hay must weigh sixty pounds. See HAY and STRAW.

TULIP. (*Tulipa.*) A genus of celebrated and much-prized florists' flowers. They succeed well in rich loam and sand, and are increased by offsets; new varieties are obtained from seed. The choicer kinds require to be taken up and dried after they have ceased flowering, and planted again in the autumn. They should be slightly protected in very rainy or frosty weather, as they are very liable to rot. One species, the wild tulip (*T. sylvestris*), is indigenous, growing about old chalk-pits. It bears sweet-scented, bright yellow, somewhat drooping flowers in April. (*Paxton's Bot. Dict.*) Although the *Tulipomania*, which rose to such an absurd height in Holland in the 17th century, is long since extinct, yet the rage for producing fine tulips still exists. The finest tulips are reared at

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Jethro Tull presents us with
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oeing *Husbandry*, which will
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f English farmers; as a pa-
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Jethro Tull will, indeed, well
eful and often repeated study
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ford not only instruction, but
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ces: for, if such a cultivator
, thin, hungry soil,—so did
if he farms in a remote and
ict,—if he has ignorant and
urers,—if he is visited by sick-
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en incurable diseases,—so, let
d, was that great farmer whose
the subject of this memoir.
intrepidity, and perseverance,
should always be remembered
r. Knowing, as he did, the
f the principles for which he
tended, he never relaxed in
s to induce their general adop-
it was only after the lapse of
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at those principles and those
ventions for which he so ener-
ended were commonly adopted,
not Tull's, but must be at-
he ignorance and the apathy
which he made his important,
d, discoveries.

f gratitude which all modern
to Tull is indeed a large one; he was the first who boldly and zealously contended for the adoption of improved machinery in all agricultural operations; the ploughs which he depicts in the engravings which accompany his *Horse-hoe Husbandry* have not been very materially improved in the last century. He invented several varieties of hand and horse-hoes. He was very nearly, if not quite, the first who produced a practically useful drill. He shared the fate of all those who, as discoverers, have the temerity to disturb old systems. He was regarded by the bulk of his contemporaries as an idle, restless innovator. He was ridiculed, thwarted, and opposed in every way, not, as might have been reasonably expected, by the most ignorant, but by those who either did know, or ought to have known, better things. His neighbours regarded him as almost a lunatic; and the tradition of the neighbourhood of Shalborn still is, that he was even wicked enough to attempt to banish the flail from his farm, and that he had a machine in his barn at Prosperous, which worked a set of sticks so readily as to thrash out his corn without the assistance of the labourer. This, there is little doubt, was an attempt to construct a thrashing-machine; and that it was, in those quiet days for agriculture, regarded as a wonder, is proved by the existence of the tradition. When thus located in a remote rural parish, on the borders of the counties of Berks, Hants, and Wilts, Tull wrote his *Husbandry*, a book which is not nearly so well known as it ought to be; for, though the progress of science has rendered a considerable portion of Tull's writings obsolete, yet much, very much, remains unaltered by the progress of discovery, to amply repay the farmer for a careful and often repeated perusal.

Tull wrote with all the modesty and diffidence of genius: he tells us, in the preface to his *Husbandry*, that he knew that he had undertaken a task of which he was incapable, and that it was produced during a long confinement within the limits of a lonely farm, in a country where he was a stranger. And when we remember that he was through life an invalid,—obliged to abandon his sedentary profession of the law, and seek for health by foreign travel, and by country pursuits,—when we think of these things, we cannot but still more admire the energy of mind he betrayed, and the difficulties he overcame. He feelingly alludes to some of these, when he says, with regard to his great work—"'Tis no wonder that the style is low as the author, or as the dust that is here treated of, since the whole was written in pains of the stone, and other diseases as incurable and almost as cruel; but fine lantionaries. He was afflicted soon after his call to the bar with a pulmonary disorder, and, in consequence, abandoned his Oxfordshire farm, and for some time travelled on the Continent. He was for a considerable period at Montpelier, in the south of France. Returning to England, he took into his own hands the farm called Prosperous, at Shalborn, in Berkshire, where, again resuming those agricultural efforts which he had commenced in Berkshire, he wrote his *Horse-hoe Husbandry*.

During his tour on the Continent, Tull carefully compared the agriculture of France and Italy with that of his own country, and omitted no occasion to observe and note every thing which supported his own views and discoveries. He particularly, on more than one occasion in his work, alludes to the similarity of the practice followed by the vine-dressers of the south of Europe, in constantly hoeing or otherwise stirring their ground, and his own horse-hoe husbandry. Finding that they did not approve of dunging their vineyards, Tull readily adduced the fact in favour of his own favourite theory, that manuring a soil is an unnecessary operation.

After Tull's decease, his lands in Berkshire found their way into Chancery, and were sold, by order of the court in 1784, to Mr. Blandy, the father of the present owner. It consists of about seventy acres of freehold land, but Tull held about 130 acres in addition, by a different tenure. The house in which he dwelt has been modernised, but the old-fashioned brewhouse yet remains as Tull had it, and when I visited Prosperous in July 1840 was still in very

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says (p. 50.), that
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ınds of seed; but when I added er an exceedingly light plough, x channels eight inches asunder, two pounds of seed to an acre l, the ground was as well planted. as easily drawn by a man, and y a boy."

ull's great improvements in tilled in the use of his drill, and in n of such wide intervals bews of turnips (several feet, three the horse-hoe could be easily ıtly employed. He ridiculed, the delusions under which the n laboured with regard to the vantages of thick sowing. He that they "did not grudge to e or four pounds in the buying of dung for an acre, but that ht themselves undone if they extraordinary eighteen-pennyrth to the wide intervals of an nsidering that earth is not only ıt also the cheapest entertainan be given to plants." And other place (p. 32.), he told the g broad-cast cultivators of those must have not a little astonished every row of vegetables to be ought to have an empty space of thirty inches on one side of it l of nearly five feet in all sorts ınd he was very justly suspivhat he was going to advance n shocking to them before they trials."

the first English farmer who o its fullest extent the decided of constantly pulverising and soil, to illustrate which almost riments were directed. His exhowever, of his own discoveries, ways so good as the object he , although there is little to find n his theory of the advantages "I have had," he says (p. 24.), ence of a multitude of instances, rm it so far, that I am in no ıny soil, be it rich or poor, can de too fine by tillage; for one of this minute powder may have ıal superficies than a thousand of the same or any other earth common manner; and I believe le earths in the world do exceed in their natural riches twenty is, one cubical foot of the richle to produce an equal quantity es, *cæteris paribus*, to twenty of the poorest; therefore, it is that the poorest, where, by pulhas obtained one hundred times superficies of the rich untilled land, should exceed it in fertility; or, if a foot of the poorest was made to have twenty times the superficies of such rich land, the poorest might produce an equal quantity of vegetables with the rich. Besides, there is another extraordinary advantage when a soil has a large internal superficies in a very little compass; for then the roots of the plants in it are better supplied with nourishment, being nearer to them on all sides within reach, than it can be when the soil is less fine, as in common tillage, and the roots in the one must extend much farther than in the other, to reach an equal quantity of nourishment; they must range and fill, perhaps, above twenty times more space to collect the same quantity of food. But, in this fine soil, the most weak and tender roots have a free passage to the utmost of their extent, and have also an easy, due, and equal pressure everywhere, as in water."

He did not confine his attention to the advantages of thoroughly pulverising the land: he was also an advocate for much deeper ploughing than was usual in his time, and in one or two places laments the supineness of the farmers in this respect, and the idleness of the ploughmen, in only half penetrating the soil, for fear of injuring the appearance of their horses: and he illustrated the advantages of his proposed mode of ploughing by the best means in his power, not only by general observation, but by also appealing to several very ingeniously-contrived little experiments upon the habits of plants.

Tull saw very clearly that this theory of the advantages of pulverising and deepening soils would be strongly supported if it could be shown that the roots of the commonly cultivated grasses would, under favourable circumstances, penetrate to more considerable depths than the ordinary shallow soils of the farmer allowed them. He paid, therefore, considerable attention to the roots of plants, not only in his small experimental glasses and pots, but in his fields. He found, by some observations on the roots of some wheat plants growing in a deeply-loosened soil, that their roots had penetrated to more than double the depth of the commonly ploughed land of the farmer; and all this I can support from my own observations on the roots of the crops growing on the edge of chalk and loam pits, and in other situations where the soil has been loosened to great depths. Tull, too, noticed the very considerable and rapid extension of the roots of trees growing near to old dunghills, sewers, &c., and he hence adduced another argument in favour of the advantages which are derived from assisting, in the best ordinary way then known, of his workmen, the apathy of his neighbours, the ridicule of those who understood him not, and the anger of the indolent. The principles, however, which he inculcated have survived and overcome all these obstacles; are yearly more prized, because better understood. Tull thought that the earth, and the earth alone, did every thing for vegetation: astonished at the effects which were produced by merely deepening and pulverising, he allowed his enthusiasm to carry him too far. "Every plant," he tells us, "is earth, and the growth and true increase of a plant is the addition of more earth;" and in another place he adds, "too much nitre corrodes a plant, too much water drowns it, too much air dries the roots of it, too much heat burns it; but too much earth a plant never can have." Thus impressed with the value and the all-sufficient powers of earth to support vegetation, it need hardly surprise us that Tull soon came to the conclusion, that, under a proper management of the plough and the scarifier (for a rude instrument of this kind was known in Tull's days), the land might be so pulverised and deepened as to bear its crops without the addition of any decomposing manures.

Tull deceived himself in this instance, by not attending to the quantity of finely divided, slowly decomposing substances, which all cultivated soils contain in some shape or other. By ploughing and pulverising, the progress of the putrefaction of these organic matters was accelerated, they were rendered more soluble, and then the succeeding crop was, by their decomposition, sufficiently nourished. But these opera-

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machinery, I have already spoken. Five chapters of his only work that I am acquainted with, *The Horse-hoe Husbandry*, were published in folio in 1731, the chief volume in 1733; and in the same year some additions were printed which are not found in many of the copies of that year, or even in that of 1751. Cobbett, however, was careful to add it to an octavo edition which he printed in 1829. In this, he omitted only the plates of the ploughs and other agricultural implements; but he added an introduction, in which he did little except laud Tull, and vituperate those who had adopted Tull's plans, without acknowledging the source of their obligation; not remembering that many a Tullian improvement has been often made since our author's time, by plain practical farmers, who never even heard the name of Tull mentioned.

Tull, as I have before remarked, published his "addenda" to his *Husbandry* in the same year that the first edition appeared; in these he takes more notice than was perhaps necessary of certain attacks which had been made upon his book, by the members of a certain "equivocal society," amongst whom was the celebrated Stephen Switzer, the most talented seedsman, gardener, and horticultural author of his day. It appears, too, that a society of gentlemen in Dublin had, without his leave, reprinted for distribution his five "specimen chapters," all of which annoying circumstances evidently irritated him; besides these controversial notices, and certain corrections of the errors made by the printer, the long addenda do not contain any thing very valuable. Time has settled pretty well the respective merits of the contending parties; the fame of Tull is still steadily increasing, while the name and works of even the classical, the elegant Switzer, are much too little known amongst modern cultivators.

Twenty-four years after the death of Jethro Tull, a paper appeared in the *Gentleman's Magazine*, vol. xxxiv. p. 522., dated at Hungerford, about four miles from the farm where he lived and died, and signed with the initials D. Y., which details almost all that is known of the life of the great introducer of the drill system. It was written by one of his neighbours, who had known and associated with him, and valued very properly his services in the cause of agriculture. He describes in that essay the sensation produced by the unheard-of attempts of Tull. He says, "Novelty always excites curiosity — many gentlemen came from different parts on the fame of this new method of farming, some of whom were persuaded by the weight of

Mr. Tull's arguments, to go hand in hand with him in the course of his experiments, while others, who thought themselves more wise, and more discerning, took every occasion of ridiculing the practice, and of representing it as a fanciful project that, after a great expense, would end in nothing but the ruin of the proprietor. In general, the whole body of farmers and husbandmen pronounced the man as a conjuror, who, by sowing a third part of his land, would make it produce a quantity equal to that of sowing the whole."

The farm of Jethro Tull will ever be an object of interest to the lover of agriculture. Arthur Young made a pilgrimage to Prosperous (*Annals of Agr.* vol. xxiii. p. 173.), and William Cobbett did the same. More persons would visit it, if they knew where it was to be found. To such it will be interesting to know that the rural parish of Shalborn is situated under the Coomb Hills, about four miles south of Hungerford; that the roads are tolerable, and the present holder of the farm obliging, and not insensible of Tull's great merits. If Tull was deceived in his belief of the powers of the plough, to render the soil fertile without the asssistance of manure, he was yet fully justified in almost every thing that he predicted, with regard to the advantages of thoroughly pulverising and increasing the depth of the soil.

"The difference betwixt the operation of the spade and that of the common plough," he observes, "is only this, that the former commonly divides the soil into smaller pieces, and goes deeper;" and he adds, "how easy and natural it is to contrive a plough that may equal the spade, if not exceed it, by going deeper, and cutting the soil into smaller pieces than the spade commonly does." The explanation, too, which Jethro Tull gave of the advantages or theory of deep ploughing was excellent, considering the chemical knowledge of his days; for the modern cultivator must remember that, in his time, the composition of the atmosphere was almost entirely unknown. Tull could not have known any thing of the three gases,—nitrogen, oxygen, and carbonic acid, of which it is now found to be constituted; and of the existence of its insensible aqueous vapour he was equally unacquainted; he did not know how important these are to the roots of plants, and how the access of them all is naturally promoted by pulverising the land on which they vegetate. But though Tull did not know these things, yet it is certain that he had carefully observed many facts which proved that vapour was absorbed by the soil, and that this absorption was promoted by pulverisation. "To demonstrate," he says (pp. 27, 28.), "that dews moisten the land when fine, dig a hole in the hard dry ground, in the driest weather, as deep as the plough ought to reach; beat the earth very fine, and fill the hole therewith; and after a few nights' dews, you will find the fine earth become moist at the bottom, and the hard ground all round will become dry. Till a field in lands: make one land very fine by frequent deep ploughing, and let another be rough by insufficient tillage alternately; then plough the whole field crosswise in the driest weather, which has continued long, and you will perceive, by the colour of the earth, that every fine land will be turned up moist, but every rough land will be dry as powder from top to bottom. In the driest weather, good hoeing procures moisture to roots; though the ignorant and incurious fancy it lets in the drought, and therefore are afraid to hoe their plants at such times."

These enlightened observations of Tull have been verified and illustrated by the progress of agricultural discovery, by the improved modes of practice adopted by modern farmers, and by the march of chemical philosophy. Evelyn had observed the advantages of continually keeping the ground of fruit-orchards hoed or dug. Sir Henry Steuart attests, with Sir Walter Scott, Withers, and a hundred others, the same fact, as applicable to timber plantations. The farmers of even the most sandy soils of Norfolk, on the very same principle, keep the ground between their rows of turnips constantly stirred, just as Tull proposed and practised a century since. And when, long after Tull was in his grave, Dr. Priestley discovered the oxygen gas of the atmosphere, it was soon found that its presence was essential to the growth of plants; that it was highly grateful to the roots of plants, either when applied to them in its simple state, or when combined with the aqueous matters of the atmosphere; and that this application was very sensibly indeed promoted in either form, by increasing the finely divided state of the soil; and further, that without this division of its particles, the earth was totally incapable of absorbing either the necessary gases or the watery vapour.

The subsoil-plough of Mr. Smith of Deanston, and the subturf-plough of Sir Edward Stracey, which have both proved so successful in our days, only illustrate the truth of Tull's principles and Tull's sagacious observations. Tull was an advocate for deep ploughing, and for internal pulverisations: he did not, it is true, see the necessary limits, on ordinary soils, and with common ploughs, to the realisation of this theory: he forgot that the inert nature of many substrata would render it impossible to bring them at once to the surface; but though he omitted to take this into his calculation, yet still he argued correctly enough, when he so strenuously urged his brother farmers to increase the depth of their soils by every practicable means, to let in the air to the roots of their crops, and to give every facility possible to the growth of the roots of the plant; for, by so doing, he very plainly told them they derived benefits which exclusively belong to the vegetable world. "There is yet," he said (p. 28.), "one more benefit hoeing gives to plants, which by no art can possibly be given to animals; for all that can be done in feeding an animal is, to give it sufficient food at the time it has occasion for it; if you give an animal any more, it is to no manner of purpose, unless you could give it more mouths, which is impossible; but, in hoeing a plant, the additional nourishment thereby given enables it to send out innumerable additional fibres and roots; so that hoeing, by the new pasture it raises, furnishes both food and mouths to plants."

To every agricultural operation, in fact, of a mechanical nature, Tull's genius was admirably adapted; his ploughs, his hoes, his drills, were all of a description far superior to those of the rest of the farmers of those days. It was only where he attempted to reason upon the habits and food of plants, involving chemical truths, that Tull made great blunders. Thus believing, as he did, that earth, and earth alone, was the sole food of plants of all kinds, he ridiculed the opinion of Dr. Woodward, that all the constituents of plants were conveyed to them through the agency of water. Woodward thought, very justly, "that water is only the *agent* that conveys the vegetable matter to the bodies of plants, that introduces and distributes it to their several parts for their nourishment." This theory seemed absurd to Jethro Tull, who believed that all plants fed upon the same kind of food, and that that food was earth, and only earth. It is true that Tull had a very indistinct idea that something else was requisite for the food of plants, and that certain "materials contribute in some manner to the increase of plants." And he then specifies five substances, at the head of which it is not a little singular that he places saltpetre or nitre. But how this salt operated as a fertiliser, was not at all more clear to Tull than to any who have succeeded him in the investigation. "Nitre," he says (p. 10.), "is useful to divide and prepare the food, and may be said to nourish vegetables, in much the same manner as my knife nourishes me, by cutting and dividing my meat; but when nitre is applied to the root of a plant, it will kill it as certainly as a knife misapplied will kill a man. Nitre is, in respect of nourishment, just as much the food of plants as white arsenic is the food of rats." Tull, however, had a high opinion of the powers of common salt, when used as a steep for seed-corn, to prevent the smut in wheat; and he gives (p. 66.) this account of the origin of the practice. "Brining of wheat, to cure or prevent smuttiness, was accidentally discovered about seventy years since, in the following manner: A ship-load of wheat was sunk near Bristol in autumn, and afterwards at the ebb tide all taken up, after it had been soaked in sea-water; but it being unfit for making of bread, a farmer sowed some of it in a field, and when it was found to grow very well, the whole cargo was bought at a low price by many farmers, and all of it sown in different places. At the following harvest, all the wheat in that part of England happened to be smutty, except the produce of the brined seed, and that was all clean from smuttiness." He then gives the farmer directions for drying the brined seed, by rolling it in quicklime, just as is now commonly practised by the farmer.

Water, Tull thought, was not a food for plants, because it commonly contains earth, to which he attributed the origin of the common opinion that water is a *food* of plants. And as to air being their food, which it certainly is, Tull considered this a complete "phantasie"—quite an "airy hypothesis." In common with many of the learned of his days, Tull here strangely confused himself, by not attending to observations and experiments with regard to plants, and to these only. The merit, however, of Tull, amid his occasional mistakes, was enhanced by his modesty; and it is impossible for us, when we reflect upon the difficulties he had to encounter in the prosecution of his researches, and in the production of his book, to be insensible to his appeal, where he tells us, at the conclusion of his preface, "One cause that made the three parts of this book (that is to say, the theory, or speculative part, the practical part, and the description of the tools) the more defective was, that all three were too many for me to make perfect at once, and two would have been useless without the third: therefore, it was better to give but a sketch of all than to have made any two of them never so full and perfect, leaving out the other."

Such was the modesty, such were the merits of this great father of the drill and the horse-hoe husbandry, to whose memory something, I hope, will one day be erected,—some memorial, to indicate the agriculturist's gratitude, worthy of the English farmer. Tull lies buried without even a stone to indicate that such a benefactor of agriculture reposes beneath it. His grave is even doubtfully placed. If Tull died at Shalborn, as Chalmers asserts, he was not buried there. There is no trace of him in the parish register; the tradition of the old people of the neighbourhood is, that he died, and was buried in Italy. His deeds, his triumphs, it is true, were of the quiet peaceful kind, with which the world in general is little enamoured; but their results, their value to the land of his birth, were of no mean order. His drill, his horse-hoe, have saved his country, in seed alone, the food of millions; and when used as a distributor of manure, it has done, and it will hereafter accomplish still greater things. It has brought into cultivation thousands of acres of the barren craig, the wolds of Lincolnshire, of the deep sands of Norfolk; and its powers are not yet nearly exhausted, for, as fresh fertilisers are discovered, the drill evenly and economically distributes them; and as improvements in its construction are continually taking place, there is evidently much yet to be achieved by its use. The same remarks apply, in a great measure, to his hoe, and to his system of attempted cultivation without manure; for, although the last was a complete failure, yet even this bold attempt was not unattended with benefit to agriculture; for the farmer was hence taught, that although, by deep ploughing and complete pulverisation of the soil, the use of manure could not be entirely avoided, yet that by these means a much smaller quantity was sufficient than under the old and indolent mode of tilling the land. The efforts, too, of Tull were productive of advantage in other and in indirect ways;—his researches, his successes, his example, excited a spirit of inquiry, which, since his days, has hardly ever entirely slumbered. He was certainly the first who dared to boldly quit the beaten track, which had been used by the farmer for ages, and follow a way of his own. And although he has been well followed and imitated by succeeding cultivators, who have availed themselves of new discoveries and machinery of which Tull had not the assistance, yet there have been none who have since excelled, or perhaps equalled him, in the boldness and originality of his conceptions, or in the energy with which he realised them. (*Quart. Journ. of Agr.* vol. xi. p. 342.)

TUMBREL. A sort of dung-cart, convenient for many purposes.

TUMBRIL. A machine employed chiefly in the county of Lincoln, for the purpose of giving hay to sheep during the winter. It resembles the basket fish-pots used by fishermen, and consists of a circular cage or crib, which may be made of osiers, willows, or other pliant brushwood of any kind. The whole is about ten feet in circumference, and closely wattled to the height of about one foot, above which it is left open for the space of eighteen inches, it is then wattled again to the height of eight or ten inches, and an opening, about eighteen inches in breadth, is left at the top, for putting in the roots or other food, whether green or dry. The staves which form the skeleton of it are ten inches asunder, so that twelve sheep may feed at the same time in each tumbril.

TURF. A term often applied to the green surface or sward of grass lands. Also the name given to peat, which is used in several parts as fuel. It varies much in its nature in different places, being sometimes hard and of a dark or black colour, while in others it is soft and spongy. It is a substance very useful in burning calcareous stones into lime. See Moss, Loam, Peat.

TURKEY. (*Meleagris gallo-pavo.*) A wild fowl, originally introduced from the West Indies and America. They are very useful and domestic birds, but they require care in their infancy. The black turkey is the best sort, both for size and delicacy. Turkeys are particularly clean birds, loving sweet food and delighting in air. They prefer roosting in trees, for which reason an evergreen, such as a yew tree, spruce fir, &c., is a great advantage, planted in the centre of a poultry-yard. Turkeys and pea-fowl hop up gradually from the low branches, and are sheltered from frost. But where this is not the case, the turkey-house must be dry and warm in winter, and cool in summer; it must be kept free from vermin, and the dung and litter of feathers, &c. should be often swept away. The perches must be large for their talons to grasp; and there should be plenty of ventilation, by gratings or holes bored in the floor.

Turkeys seek quiet places to lay in, and often stray far from home. Their nest must be watched, and the newly laid egg exchanged for one made out of chalk, every day. The turkey hen lays from twelve to twenty eggs; and when she desires to sit, place her in the turkey-house on her eggs, and coop her up with them, if she is unwilling to remain, till she becomes settled. Do not disturb the hen while sitting or attempt to assist the chick in piercing the hell. When the young ones are born, keep hem in the nest for some time, as they love warmth, but do not handle them. Keep hem warm and dry. When the red colour of the head appears, they are considered safe from the diseases of their infancy. Do not llow a turkey to sit twice in a season; the young ones never succeed unless they are full feathered before Michaelmas. Feed young turkeys three or four times a day, and let the food be a thickish paste made of fine barley meal, mixed with finely hopped onions, nettles, and pot-herbs. The French give their turkeys plentiful supplies of nettles, of which they are very fond; t is a warming and nutritious herb. Let he food be given fresh every day, and place t on a board with a shallow pan of water. Coop the hen while the young ones feed, or she will eat it herself. When the chicks begin to follow the turkey into the poultry-yard, do not let them out till the dew is off he ground. Vetch and marrowfat peas are poisonous to young turkeys; lettuce brings on looseness; and hemlock and henbane should be destroyed near all poultry-yards.

Turkeys love oats, boiled potatoes mashed with the meal of buckwheat, barley, or beans; or plain barley like other fowls. Let the water always be sweet and clean. A turkey is six weeks fattening; if possible, feed two or three together, as they do not love solitary confinement. Let them eat as much as they like, but let the food be fresh every day, and let it be the paste above mentioned, softened by melted lard. Cramming turkeys is a cruel practice, and is not often done. They will feed well enough and fast enough, if plenty of sweet food is placed before them, and if they are allowed some little space to move about in. It is a curious fact, that turkeys in America feed on the caterpillars that are found on the tobacco plant with impunity.

Turkey eggs are very good in pastry, and mixed with hen eggs they improve omelets. Turkey's dung, properly mixed with other composts, makes a valuable manure.

TURNIP. (*Brassica rapa.*) No vegetable has had such influence in advancing the husbandry of Great Britain as the turnip. By whom and at what period turnips were first used in England as the food of cattle, however, does not appear; but from various accounts, their culture and uses were known in the Low countries as far back as there are any records. The ancients appear to have been well acquainted with the value of this root; Columella, speaking of the several kinds of vegetables adapted for the farm, recommends the cultivating of rapa in plenty, because, says he, those roots that are not wanted for the table will be eaten by the cattle. Worledge, in his *Mystery of Husbandry*, &c., printed in 1669–81, says, that "although turnips be usually nourished in gardens, and be properly a garden plant, yet are they, to the very great advantage of the husbandman, sown in his fields in several places in England, not only for culinary uses, as about London and other great cities, but also for the food of cattle." Again, he says, "that in Holland, they slice their turnips with the tops, and rape-seed cakes and grains, &c., and therewith make mashes for the cows and give it them warm, which the cows eat like hogs." He likewise complains of the very great neglect and deficiency of English husbandry in this particular. Some time since, a very excellent paper "on the Cultivation of the Turnip Crop on Light Soil, by Mr. M. Milburn," appeared in the *Transactions of the Yorkshire Agricultural Society*, from which this paper is chiefly extracted.

It is generally supposed that the cultivation of turnips, as a field crop, was introduced into Norfolk by Lord Townshend; but there is still further evidence that they were known as such some time before the date assigned for their introduction. They are mentioned in *Houghton's Collection of Papers*, vol. i. p. 213., as food for sheep, in 1684. Since that period considerable improvements in their cultivation have taken place, and a great variety of very inferior soils have been made capable of growing considerable crops of them by judicious management and proper selection of manure.

On the value and importance of the turnip crop it is unnecessary to expatiate. Not only does it enable the farmer to supply the consumer with fresh meat during the winter, instead of the salted food upon which our ancestors had almost exclusively to depend, but also partially supplies the place of a fallow; it imparts to the land a degree of fertility which ensures, under proper management, a succession of crops for the following years of the rotation. It is indeed the sheet-anchor of light soil cultivation, and the basis of the alternate system of husbandry, to which every class of the community is so much indebted.

Preparation of the Soil.—Turnips generally succeed a crop of wheat. In some cases, on very poor soils, the clover leys are broken up for turnips; and on others, a crop of winter tares, either mown or depastured, are taken off between the wheat crop and ploughing for turnips. As a regular system, the former cannot be pursued; for the frequent recurrence of the turnip and clover crops would operate injuriously, and defeat the object of the cultivator; and the latter is only applicable to soils quite free from root weeds, of a superior staple, or in a very high state of cultivation.

As soon as the corn crop is secured, and the stock have passed over the stubble, it is desirable to have it ploughed, to subject the soil to the ameliorating influence of the frosts of winter. In all cases the plough should be below the couch grass, which is usually most abundant on inferior soils, but seldom below the mould. In ordinary cases, nothing is more necessary than to prevent the water from standing in any part during the winter; where the land is intended for Swedes, an effort should be made to have it partly or entirely cleared of weeds before the winter.

When the land is free from weeds, the cross-ploughing may be begun, as soon as the dryness will admit of it. It may take place in February with advantage; inasmuch as it exposes a new and more extensive surface to the action of the frosts which generally succeed. If allowed to remain a month or two longer, it may advantageously be crossed with Finlayson's harrow. Where the couch grass, however, is abundant, it is positively injurious to cross-plough early, as the operation breaks the roots, and renders the clearing of the land afterwards tedious and difficult. Where very abundant the operation should be delayed until the soil is dry, even if it should be the latter end of April or the beginning of May; more will be effected by one ploughing in this case than by two under different circumstances.

When the dryness admits of it, usually in two or three days, the land should be harrowed across; first with the patent or hinge harrows, and subsequently with the loose harrows, which separate the rubbish more effectually from the soil; and then the weeds should be raked off, which is generally performed by women.

As soon as the couch roots, &c. are cleared off, either by carting into large, or burning in small heaps, the land may be dragged with Finlayson's or any approved drag; and the same course followed alternately, so long as any roots remain. When they are unable to rake them off, they should be hand gathered, and no dependance whatever should be placed on the destruction of any by the sun's rays, until the 25th of June, a time when, on most soils, the sowing should be concluded. It is desirable that the land should lie a week or ten days before the last ploughing is given to it, as it admits of the germination of such seeds of weeds as may be lying dormant in the soil, and is likewise favourable to the accumulation of moisture in a dry season. The turnip seed should be sown immediately, however, after the last ploughing.

Manure.—In treating of the manure with which the turnips should be dressed, farm-yard manure stands the foremost, because it is what every farmer possesses, and, with the exception of the calcareous soils in the East Riding of Yorkshire, is almost invariably employed in the cultivation of turnips. In general, it never will, and never can be superseded; and though every deference is due to the practical knowledge of the East Riding farmers, there can be no doubt that if their straw were *more carefully made into manure*, and applied to the turnip crop, in conjunction with bones, it would be decidedly advantageous. It is unnecessary to say that house-made manure, and by fattening cattle, especially such as are consuming artificial food, is the best; and that of horses, cows, pigs, &c. should be mixed as intimately as possible, the hot character of horses' dung neutralising the coldness of that of the cow, and *vice versâ*. It is desirable to cart this mixture to the fields intended for turnips in January and February, during the frost, or at such other times as convenience may dictate; but the earlier the better. About three weeks before used it should be turned over; the sides of the mixen being carefully turned into the middle. Without entering in particular into the much disputed question of the fermentation of dung being useful or otherwise, thus much every farmer will know well the truth of, that on *light soils*, and *for turnips*, well rotted dung is indispensable, where it is used at all. When fermentation is progressing so fast as to induce destructive heat, or mouldiness, it may be checked by treading the mixen and covering it with soil; and when it is sluggish, it may be excited by turning and watering.

For sandy or gravelly soils, farm-yard manure is an almost necessary ingredient in producing a crop of turnips. The rapid decomposition of vegetable matter which takes place on such soils requires that there should be a supply for that succulent crop; and, as before stated, there can be no doubt of its utility to calcareous soils; but for peaty descriptions, where there is abundance of vegetable matter, it is less useful.

The time for laying on the manure depends on the method of sowing adopted, and clearness of the land from weeds. If the plough drill be used, it is desirable to immediately precede the plough; if the Norfolk or large drill, it is better to lay it on a week or two before sowing, to allow it to mix intimately with the soil, especially if other manure is intended to be used, and the soil pretty free from weeds. The quantity to be applied will vary with circumstances; twelve to fourteen tons per acre may be stated as an average, and more if the soil be poor, and no other manure intended; while less may be used, in proportion as other manures are applied.

Lime stands next in importance, as a dressing. The object of all manure is to supply some deficiency, remedy some mechanical inconvenience, or correct some detrimental agent in the soil. When dung, for instance, has been applied for several successive crops, a quantity of undecomposed vegetable matter accumulates, which the natural soluble properties of the soil cannot dissolve, and it remains inert. A dose of lime will correct this, and bring every particle of such inert matter, with which it comes in contact, available as food to the plants. It also assists in the intimate pulverisation of the soil, as well as corrects any acidity which may exist in it, from causes which the agriculturist can seldom foresee, nor correct, except by its use. It is also destructive to weeds in the soil, and hence exceedingly valuable; for every farmer knows that weeds, being indigenous, are much more ready to grow in the soil than his crops, which are artificial, and often exotic. For peaty soils, an occasional dressing of *quick* lime is invaluable, especially if there is an addition of clay, road scrapings, &c., to give the requisite firmness to the soil. It should be laid on as soon as convenient after bringing from the kiln, and in as hot a state as possible. The time for laying on lime is a few weeks before the sowing, in order that the subsequent ploughings may mix it thoroughly with the soil, and thus its effects be more immediate after the sowing. The quantity per acre entirely depends upon the character of the lime in the locality. Two to four chaldrons per acre are used; but as it is applied for turnips generally in conjunction with other fertilisers, the former may be stated as the better quantity. If dung is also applied, they should be used at as great a distance of time between each other as circumstances will admit of, and the latter not long before the sowing.

Bones form one of the most valuable manures for turnips on all light soils, on account of their portable and stimulating character; they are least useful on a gravelly or loamy soil. They have converted barren moor lands into rich fertile and productive farms, luxuriating in every valuable product of the earth. Their value is beyond all praise. The East Riding of Yorkshire affords a specimen of what they have effected; and they require only to be known to be extensively applied. In many cases they are used alone; in others, in conjunction with farm-yard manure, with ashes, and with lime. Ashes are sometimes drilled with them as a substitute, by diminishing the quantity of the bones. Lime is a valuable auxiliary, on "old going land," or soil which has been long under cultivation. On peaty soils, having a substratum of sand, they have produced wonderful crops, by supplying them with the necessary animal matter. The quantity varies from twelve to thirty bushels per acre. Sixteen bushels per acre will produce a fair crop, on average soils; and some farmers say that more than that quantity is waste. It is desirable to mix them with a quantity of ashes, when they are drilled in the above quantity. This facilitates the early progress of the plants, and supports them until the bones become available. English bones are generally preferred to foreign; but from experiments made by the writer, he prefers foreign to English, and also to recent bones; for, although the latter have more of their juices than the former, the former sooner decompose; and the fat and animal juices require considerable chemical changes before they are available as food for the plants. A mixture might be judicious, but he has not tried it, nor is he aware of the trial having been made.

Other manures of a miscellaneous character are used for turnips. Pigeon's dung is most valuable; rape dust has been used successfully; and animalised carbon has also been advantageously employed. Sixteen bushels per acre, when drilled, is the quantity generally applied. Malt culms are useful as a top-dressing. (*Trans. York. Agr. Soc.*)

A machine for sowing turnip seed with bone dust is described in the second volume of *Trans. High. Soc.* p. 205.; and the results of some experiments with different manures is given, *Trans. High. Soc.* vol. i. p. 66. 72., vol. iv. p. 233.

Varieties. — There are numberless varieties and subvarieties of turnips, which arrange themselves under four heads: — 1. Swedish turnips, or *Ruta baga;* 2. Yellow and white turnips; 3. Yellow turnips; and 4. White turnips. Professor Low has divided them into three classes, distinguished by their form: — 1. The round, or globular; 2. The depressed; and 3. The fusiform. These may be considered as types, to which the different cultivated kinds more or less approach. Many varieties are cultivated which are more fanciful than useful. For the main particulars of the following list I am chiefly indebted to an interesting *Essay on Turnips* published by Dr. William Ellis of Caistor, Lincolnshire, and to Messrs. Lawson's excellent *Agriculturist's Manual*.

Swedish Turnips.—The Swedish turnip is hardier and more nutritious than any of the common sorts, and in addition to its being more esteemed as food for horses throughout the turnip season, is better adapted for spring feeding generally. It, however, requires a somewhat deeper and superior class of soils, together with a greater allowance of manure. Swedish turnips are generally sown from about the middle to the end of May, and two to two pounds and a half of seed per imperial acre are, under ordinary circumstances, considered sufficient. They possess an advantage over the others in being easily transplanted, so that the blanks in the rows, either of the Swedes or other sorts (when they occur), are by that means easily filled up.

Skirving's new improved Purple-topped Swede.—Mr. William Skirving of Walton Nursery, near Liverpool, who has for many years directed his attention to the improvement of agricultural roots and plants, introduced last season for the first time the above variety. From comparison with every known variety of turnip, which Mr. Skirving has been at pains to collect from all quarters, both in this country and the continent, it appears to have shown itself to possess all the good qualities of a turnip, and gives a greater weight per acre of sound nutritive bulb: it is also hardier, and keeps longer than any other variety. The leaves of Mr. Skirving's Swede appear to partake considerably of the character of those of the common turnips, being less smooth and more serrated at the edges, and deficient in that glaucous bloom which distinguishes the leaves of the genuine Swedish turnip, which leads me to suspect that he has attained the size by hybridizing with some of the larger varieties of yellow turnips.

Ballantyne's new improved Purple-topped Swede.—This improved variety takes its name from its original introducer, Mr. Ballantyne, nursery and seedman, Dalkeith. It is, for symmetry of shape, equality of size, and for the uniform deep purple colour of its top, unsurpassed by any other variety which has come under our notice.

Scott's Prize Purple-topped Swede.—The introducer of this approved variety is Mr. Scott of Southend, near Tranent, in East Lothian. It is ox-heart shaped, purple above ground, and yellow fleshed, with a small top.

Laing's new Purple-topped Swede is a decidedly distinct variety. It has a leaf something like that of a lettuce. The leaves are so inserted in the top of the turnip as to give it much the appearance of that of a pine-apple. It grows to a good size, keeps well, and bears a very high character among the agriculturists of Berwickshire and Northumberland, where it is extensively cultivated. The crop has a most beautiful appearance when in full leaf.

Green-topped Yellow Swede.—This variety is of longer standing than the purple-topped, since the introduction of which less attention has been bestowed by cultivators in procuring improved stocks of the green-topped Swede, which has on that account fallen somewhat in the estimation of growers; but, where the same care is taken in selecting the roots grown for seed, the green-topped may be considered as being equal in merit to the purple.

Scott's Prize Green-topped Yellow Swede is an improved variety of the above. The purple-topped Swedes are at present more popular, as we before mentioned; but where, as is the case with Mr. Scott's, equal care has been bestowed on the selection of stocks, and in the subsequent management, the green is in no way inferior to the purple-topped variety.

Hillyard's Thorpeland Swede.—This variety was introduced some years ago by Mr. Hillyard. It has the appearance of a true Swedish turnip, and closely resembles one which I saw two or three years ago, the produce of seed procured from the Botanic Garden at Upsal. It is said to be more nutritive, bulk for bulk, than some of the larger varieties, which may or may not be the case. Its dwarfish size, and the impossibility of raising any great weight of food per acre from it, must, notwithstanding its other merits, be a great obstacle to its making its way among the larger sorts which now invite the attention of cultivators.

Cox's new Imperial Swede.—This variety may be considered as intermediate in colour between the purple and green-topped sorts; its roots often attain a large size, but are rather irregular, and of a somewhat coarse-like quality.

White Swede.—The roots of this turnip are very irregularly shaped, with numberless fangs: they are white under the surface of the ground, and greenish above. It is impossible to say what improvement may do for even this kind, but at present we are acquainted with no variety of white Swede worthy of cultivation.

Yellow and White Turnips.—Common turnips are divided into two important classes, viz. the white and yellow-rooted; the former comprehending those which are

arrive soonest at maturity,
est fitted for using during
the season; and the latter,
eptions, such as from their
riod of arriving at perfec-
ediate between the white
edes, and, like the latter,
hat superior soil and an
ace of manure. The period
on turnips should be re-
g to the length of time that
e grown requires to arrive
when allowed to remain in
hat may be termed grow-
efore winter sets in, after
ull size, they become soft,
ferior quality. A general
s, to commence with the
ut a fortnight after the
t the beginning of June,
h the white sorts from the
ls the end of that month.

rs.—*Altringham Yellow.*—
ough from its being rather
n size attained by yellow
l, it is more particularly
culture—is also in good
uarters as a field turnip.
led for its fine globular
perior solidity of its flesh.
enish top, very small neck,

Sugar Yellow.—This is a
ip; it buries itself con-
ground, is highly nutri-
the most approved of the
troduced.

ial Purple-topped Yellow.
as first introduced by Mr.
and seedsman, of Dunse,
The following particulars
e given by Mr. Hogg:—
sesses all the qualities of
the advantage of being a
er. It succeeds well on
turnip soil, produces a
the white globe, is a good
ls the winter better than
on yellows. It is in full
ng in February, and con-
a period as the Swedes;
latter fail, the border im-
as late as the month of
crop equal, if not superior,
ve been expected from the
succeeded."

Bullock Yellow.—This
medium size. Its shape
mewhat flattened, with a
ot; it is an old variety,
erved estimation.

Bullock Yellow.—This
om the former chiefly in the colour of the top; the size, shape, and quality of the roots being pretty nearly the same. It is also highly esteemed, and is considered by some to come nearest to the Swedes in hardiness and solidity of texture.

Skirving's improved Purple-topped Bullock Yellow.—This improved variety of the above obtained for its introducer—Mr. William Skirving, of Liverpool—the medal of the Highland Society of Scotland. It has been generally grown for a number of years by the first agriculturists in Lancashire and the north-western counties.

Green and Purple-topped Yellow Scotch differ but little in any of their essential properties from green and purple-topped bullock yellow. The roots are flatter, and grow more in the ground.

Ox-heart Yellow is an excellent turnip; although it comes early to maturity, and attains a considerable size, it is by no means deficient in hardiness.

Yellow Globe.—This is a superior turnip, both for field and garden culture. Its roots are of medium size, globular, and always nearly under the surface of the ground; top greenish, leaves rather small and spreading.

Yellow Sone.—This variety differs from the last in growing more out of the ground, and having a greener top; in other respects it is pretty similar.

Brown-topped Tankard Yellow.—Root bright yellow, with a purple or brownish top, of a somewhat irregular long or tankard shape. This variety is in great repute in Aberdeenshire. A sub-variety, of not so very long a shape, is preferred by some growers. They are both excellent turnips.

Green-topped Tankard Yellow differs from the above chiefly in the colour of the top. Of this there is also a sub-variety, of a flatter shape.

Large Laurencekirk Yellow Tankard, introduced by Mr. Robert Scott, of Laurencekirk. It resembles Dale's hybrid in many particulars, like which it grows a good deal out of the ground, but is distinguished by its more oblong and more uniformly shaped roots. Like Dale's hybrid, it arrives early at maturity, but is generally considered as rather less hardy, although it yields an equally bulky crop.

Dale's Hybrid.—This highly esteemed variety, which is a cross between the green-topped Swede and white globe, procured by repeated impregnations, was first raised and brought into notice by Mr. Robert Dale, an intelligent farmer, at Liberton Mains, near Edinburgh. Mr. Dale obtained a few ounces of the seed of a new hybridal variety from Berwickshire, but which is supposed to have found its way thither from Aberdeenshire, from the stock of that indefatigable veteran improver of turnips, Mr. Gordon, of Orrok. Its most distinguishing characteristics are as follow:—foliage strong and luxuriant, roots of a large size, oblong shape, and of a lightish yellow colour, with light green top, having also a small neck and tap-root. The form of the root however, although generally oblong, is rather apt to vary, being sometimes almost globular; but its more material characteristics, of large size and luxuriance of growth, are always the same. Compared with any other of the yellow field sorts, it is found to arrive sooner at maturity, and consequently may be sown at a later period of the season; while at the same time it is equally hardy, or at least has been found sufficiently so, to withstand the severest winters which have occurred since its introduction.

Gordon's Yellow.—This very superior variety derives its name from Mr. Gordon, of Orrok, the father of turnip husbandry in Aberdeenshire. It is of a rather oblong shape, deep green colour on the top, which is generally very slightly tinged with red. It is very nearly allied to Dale's hybrid, being a cross between the Aberdeenshire bullock yellow and the Swede. Sir F. A. Mackenzie, Bart., upon whose extreme accuracy as an experimentalist the utmost reliance may be placed, grew last year a considerable number of the most approved kinds of turnips, on his farm at Conan Mains, near Dingwall, in Ross-shire, with the view of selecting such as might be found most worthy of being kept in cultivation as best suited to the soil and climate of Ross-shire. The result of his experiments was, that of Swedes, Skirving's is decidedly the best, Gordon's yellow the best of the yellow-fleshed, and Scott's purple-topped hybrid and the old white globe, of the white-fleshed kinds.

Hood's new large Yellow is a very superior, large, globular-shaped, hardy turnip, remarkably perfect in symmetry, with rather a lightish green top. It was introduced by Charles Hood, Esq., an eminent farmer at Inverbrora, Sutherlandshire, a gentleman who has devoted much attention to the cultivation and improvement of field turnips generally.

Pollexfen Yellow.—This turnip derives its name from its introducer, Thomas Pollexfen, Esq., of Cairston. From his peculiar method of selecting and transplanting the bulbs, as well as of stacking and preserving the seed, the turnip seed of Mr. Pollexfen's growth has long been held in deserved estimation in Scotland, and has commanded the highest prices. The insular situation of Orkney, although in latitude 59° north, renders its climate less exposed to the extremes of heat and cold than in more continental situations farther south, the winters being mild, and the frost so gentle, that the ice is seldom sufficiently strong to sustain the weight of a man. Its climate is on that account peculiarly favourable to the growth of turnips, and turnip seed grown in Orkney is accordingly highly prized by the Scotch farmers. The Pollexfen yellow is a green-topped turnip of a large size, rather flattish in shape, skin very smooth and thin; the flesh is firm and nutritious, being slightly impregnated with the green-topped Swedish. It is adapted for winter and spring feeding, and is not liable to injury from frost. This turnip obtained the prize at the meeting of the Highland and Agricultural Society of Scotland, held at Inverness in 1836, in the report of which it is highly commended.

White Turnips.—*White Globe.*—Roots globular; skin smooth, and perfectly white, neck and tap-root small. Although the above description embraces the principal characteristics of the white globe turnip, yet there is a considerable variety in those to which the name is applied, arising from the degree of care and attention bestowed by growers in selecting their seed-roots, and the shape is often not a little affected by the kind and state of the soil in which they are grown. Thus globes of any kind, and particularly the variety here mentioned, when grown on a very superior rich soil, may be said to be forced beyond their natural size, and thereby acquire something of a monstrous or overgrown appearance, losing in a great measure their natural symmetry of shape.

Pomeranian Globe.—This variety was introduced some years since from Pomerania, and may be considered the most perfect globe turnip in shape, as well as the most regular or uniform grower. Its skin is of a smooth white, and somewhat shining or transparent-like in appearance; leaves smoothish, of a dark green colour, with whitish nerves.

Green Globe.—Roots of a fine globular shape, with a small neck and tap-root; very white beneath, and green above the surface of the ground, of medium size, hardy and firm of texture, but scarcely so much so as the green round, although it arrives at maturity rather earlier.

Stone Globe.—This is considered to be the hardiest of all the entire white globe turnips. It grows naturally deeper in the soil than the others, and has stronger and darker green foliage.

Red Globe.—Roots medium-sized, globularly shaped, and firm in texture. The old, and, in some districts, a pretty sively cultivated variety. It is me- early, and generally allowed to be cularly well suited for light soils and sed elevated situations.

hite Round is known in Lincoln by the e of spring white. It is the largest of ound turnips, and at the same time the st and most irregular in shape. It is rally hollowed towards the neck, and, g so, is apt to be injured by retaining sture, which renders it unfit for using, ept in the beginning of the winter sea-

reen Round. — The round turnips are of a peculiar flattish shape, rather hol- ed towards their neck, as also on their er side, and when grown to a large size become more or less of an irregular d, or somewhat cornered shape. The n-topped variety possesses these cha- rs in a less degree than the former, is generally of a pretty regular round e, flattened, but not much hollowed, on pper and under surface, the former of h is of a green colour, and the latter e. It is also the hardiest of the round ips.

d Round. — This sort is inferior in o the two former, but rather firmer in re, and more regular in shape. It d also be used in the early part of the n.

hite Tankard. — The tankards, like the preceding kinds, are unsuitable for r feeding, not so much on account of softness, as from their standing mostly e ground, and being thereby much sed to frost. They are generally earlier riving at maturity than the others. white tankard has its roots more than ut of the ground, oblong, or tankard- d, but often bent or crooked. It is argest of the tankards, but is also in texture than either red or green; ves are large and luxuriant: it is the st in maturing of any, but will not the frost.

een Tankard.—The roots of this species lso more than half above ground; of a ish colour, except on the under sur- which is white.

d Tankard. — In size, form, and tex- this variety may be considered as oc- ing an intermediate place between the and green tankard. It is of a bright olour on the upper surface, and white under.

on Hybrid. — This variety, which sed by James Wright, Esq., of Law- ar Perth, may be considered as bear- same relation to the Swede as Dale's Its leaves are darkish green, rather small and smoothish, roots roundish, or somewhat heart-shaped, being often tapered on the under side; white below and green above the surface of the ground: they are hardy, and possessed of more solidity and firmness of texture than most of the white sorts. (*Quart. Journ. of Agr.* vol. v. p. 618.)

Scott's improved Purple-topped Hybrid. — This variety, which obtained the prize of the Highland Society of Scotland at the meeting at Glasgow, in 1839, owes its origin to the exertions of Mr. Scott, of Southend, near Tranent. For a white-fleshed turnip it is remarkably solid, and attains a great size. This turnip was decidedly the best in point of size, symmetry of shape, uniformity of growth, and quality of flesh, of all the white-fleshed varieties grown by us last season in our experimental ground. It occupied the same pre-eminent place among those made trial of by Sir F. A. Mackenzie, Bart.

Lewisham Green-topped Ox-heart.—This is an excellent variety, grown in some of the southern districts of England and in Scotland. It acquired this name from having been first introduced by Messrs. Willmot and Co. of Lewisham.

Autumn, Stubble, or *Six Weeks.* — Roots much above ground, rather large, of an irregular globular shape, or in form between the white globe and white round, and rather soft. This sort arrives sooner at maturity than any of the others, the tankard turnips perhaps excepted; and from its natural softness of texture should always be sown late, and used before the severe frosts set in. As descriptive of its forwardness, it has received the above names, being suited for sowing in early situations in autumn after the corn crop has been removed, and it is also valuable for making up blanks in turnip fields, where the first sowing may have partially failed.

The comparative nutritive powers of the different varieties of turnips appear to be as follow:—

	Grains of Nutritive Matter.
64 drachms of the Swedish turnip afford - - -	110
Stone or garden turnip - -	85
Norfolk white turnip - -	83
Common or white loaf - -	80
Tankard or long rooted - -	76

(*Sinclair's Hort. Gram.* p. 406.)

Methods of sowing.—The modes of sowing are various; but the general principle to be attended to is, to get the seed into the nearest possible connection with the manure used, so that it may have all the advantage of its fertilising influence in the earliest stage. This is forestalling, because it decides the drill method to be the most valuable, before we describe the others; but it is a principle so necessary and obvious as to strike every reflecting person at the outset. The old broadcast plan was, to spread on the manure, plough it in, and then very carefully sow the seed with the hand. This practice is almost every where abandoned, nor can it be justified or recommended in any case.

The plough drill is used where farm-yard manure only is employed. The manure is spread on the ground, and the plough follows with the drill, being fixed to the right-hand side of the plough, and thus deposits the seed immediately in the seam made by the plough, and directly upon the manure just covered by the plough. The plough-drill is only useful where very bulky manure alone is applied. See Drill.

The ridge or Scotch method is used with success, especially on inferior and thin soils, and has its decided advantages. The ridges are made either with a single cast of the double mould-board plough, or a double one of the common or ribbing plough, and from twenty to twenty-eight inches apart. A cart with manure follows, and women are generally employed to drop the manure into the seams made by the plough. The plough again follows, and closes the ridges, covering the manure; and the drill succeeds, drawn by one horse, and sows one ridge at a time. A light roller goes over the sown ridges to cover the seed, and sometimes the ridges are rolled before the sowing. This plan takes more time and labour to effect it, but the turnips generally succeed; and if they should be destroyed by the flea-beetle, they can be resown with more probability of success than by any other method. See Fly.

The general and most expeditious way is by the large drill. This is constructed to deposit the bones, ashes, &c. with the seed, upon the level surface, drilling six or seven rows at once. It is drawn by three horses, and will drill twelve acres per day. The seed does not run down the same funnel as the bones, but has a separate apparatus immediately behind the latter, and the coulters of the drill generally cover the whole. A pair of light harrows are usually passed over once, after the sowing; and should much heavy rain succeed, it is desirable to give it another turn with the harrows immediately before it is dry, to prevent it from scarping. The quantity of seed sown, by each of these methods, is from two to three pounds per acre.

After Culture.—When the turnip plants are of about three weeks' growth they
require to be thinned, and th
stroyed. This is usually p
hand-hoeing; but in some c
are hand-thinned by women,
quently horse-hoed, which ca
all cases where they are sown i
is a considerable saving of labo
plants should be left togethe
hoeing, but they should be
singled; and a second hoeing
place about two or three weeks
to destroy the weeds. For ord
they should be left seven to t
distant, according to the richnes
of the soil; if the latter is the
should be at shorter distances, a
grow to a smaller size. The wh
ground should be gone over, as
the earth, and promotes the grow
plants. The double operation i
performed for from 6*s.* to 7*s.*
Sometimes the crop requires hand
in the autumn, especially if the s
fested with charlock.

Diseases.—The extensive and
culture of the turnip has fostered
increase of its natural enemies;
all the pains, labour, and expen
cultivator, he often sees his crop
destroyed, or seriously injured.
medies he can apply for many of
only be termed palliative; but st
much in his power; and as the k
of natural history and field-entom
vances, he may expect more s
assistance. See Insects.

The turnip flea-beetle (*Haltica*
is one of the worst enemies whi
the turnip plant, which it does
its seed-leaf state, and often de
crop, and even the second and th
ings. Various steps have been
order to prevent its attacks, and
steeps for the seed used, but with
cess; top-dressings of a saline an
gent character have been applied, b
failed; machines have even been i
but none of these have succeede
only directions which can be giv
sow plenty of seed; use stimulati
nure, to excite the plants to vigorous
in their first stages, and secure
ciency of moisture in the soil at t
of sowing; especially keeping seed
turnip fields clear of charlock, which
the flea.

The black caterpillar, larva of the
centifoliæ, also preys upon the lea
more advanced stage, appearing
plants when they are about thre
old. See Saw-Fly.

Another disease to which the t
liable, is vulgarly called "fingers an

a month after the plants have made ppearance, they begin to flag their and in a few sunny days literally acres together. On examination, res of the roots are found enlarged, ıe root covered with tumours and cences of every conceivable shape. NBURY.) A naked fallow is a remedy but all applications to the soil and have been ineffectual. The reader onsult some articles on this disease, *High. Soc.* vol. ii. pp. 232. 242, *Quart. Jour. Agr.* vol. i. p. 429.

wire-worm is a sad enemy. (See -WORM.) The swarms of aphides, or lice, severely injure the turnips; and, he smallness of their size, are often erved. In 1836 they committed ter- avages. They suck the juices of the and appear in countless numbers. are both oviparous and viviparous, ıcrease with amazing rapidity. Hap- hey are always followed by swarms of ows, which feed on them, as well as ivorous birds, which destroy vast num- No remedy can be applied with any bility of success. Every farmer should lly protect swallows, red-breasts, &c., are great destroyers of the aphides.

gs are, especially on newly ploughed great devourers of the turnip plant in stages. Ducks will devour them, ways injure the plants. Three bushels ick lime per acre, scattered over the early in the morning, when the slugs tive, is a certain method of destroying

Perhaps the very best preservative ll the above diseases may be stated —liberal manuring, adapted to the thorough clearing of the land from ; and, in short, pursuing the steps detailed for securing a full crop. igour of the plants in such cases, and rapid vegetation, often enable them to me many serious attacks.

ring. — There are different modes of ming this useful practice. The com- ay is to take up the turnips, choosing eather, cutting off the leaves and tap- (provincially called topping and tail- which operation should be performed s much exactness as possible, so as wound the bulb, as this would cause rnip to rot; nor yet to leave much of aves, as this would make the turnip te on receiving a slight degree of after this the turnips are placed in a ired situation, adjoining to the feed- re, in a narrow tapering ridge, similar tato pits, and this is covered with and secured with ropes. The situ- chosen for the store should be as dry sible. The heaps must not be covered with earth, like potatoes; for this would cause the turnips to heat and completely destroy them.

But as this practice of storing is only adapted for the Swedish and yellow varieties, the white globe variety possessing too much water to be preserved for any length of time, another method is often practised by what is called *placing*. The tap-roots being taken off, the bulbs, with the leaves, are placed close together in the position they grew, upon some dry place near to where they are to be consumed. In this way they will keep longer than if they had been left in the field, as they are not so apt to run to seed.

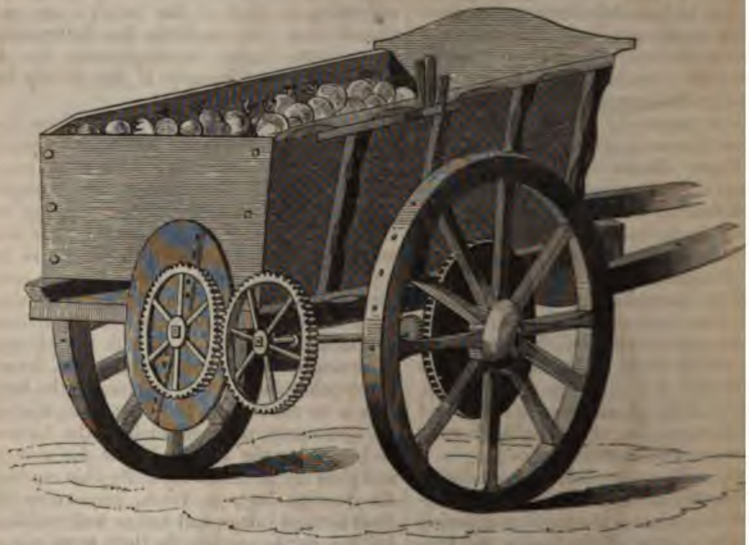
But even the *placing system* has its objections; for if a tract of dry weather set in, the turnips, from being merely on the surface, become soft and shrivelled, and not so palatable to the cattle, and will even continue so for a considerable time, although the weather should be rainy, until the fibres begin to take hold of the soil; and another objection is, that if the turnips are not placed near the steading, the destruction from game, hares, wood-pigeons, &c. is very great, particularly if the turnip be Swedish.

In order, therefore, to remedy these objections, another method has been adopted, which has been found to answer every purpose intended. The turnips are brought from the field, without either "topping or tailing," to a piece of dry ground near the straw-yard; then a man with one horse in a plough makes a straight furrow; the turnips are then placed in the furrow quite close together, till the whole is filled from end to end; then the man with the plough moves round to where he commenced, drawing another furrow just as close to the turnips as to enable him to cover them, and so on alternately, the men making the furrow and covering the turnips, while the women and girls lay in the turnips. By this method the turnips keep as fresh, preserving all their natural juices, and are as well relished by the cattle as though they were taken from the field; thus allowing the land to be sowed with wheat.

The report of the Harleston Farmers' Club for 1839 affirms that the best method of preserving roots during the winter, is by clamping them, both as regards protection from frost and maintaining their quality; and that the following is a very effectual method of making the clamps: — Select a convenient and dry situation, and pack the roots carefully, with their crowns outside, in a row about six feet wide at the bottom, and terminating in a narrow ridge at the top; then dig a trench, commencing imme-

diately at the edge of the roots, two feet wide and one deep, turning the mould from the heap; thatch the latter carefully with straw, commencing in the trench, so that all the rain may drain off the heap into it. The clamp may be left two or three weeks in this state, that the evaporation from the roots may escape; the mould already taken out of the trench is then to be laid on the straw, commencing at the bottom of the thatch, and covering the heap twelve inches thick throughout, finishing with a sharp edge. Half the trench originally made will, of course, by this plan be filled up with straw and mould; the other half will remain as a channel for the water falling off the heap; and, as sufficient mould will not have been raised from the original excavation, it will be advisable, in procuring more, to make the channel left round the heap a few inches deeper, as well as wider. If the roots are stored late in the season, and the probability of frost setting in, renders it
necessary to cover the heap with
soon as it is made, it would be
leave the top uncovered for a w
days longer, that the heat ma
There is no objection to the r
wet and dirty when they are cla
tops should be cut off, but not t
the crown; the roots and fibres
left on. (*Quart. Journ. of Ag*
p. 271.; *Low's Elem. of Pract. Agr*
York. Agr. Soc.)

TURNIP CART. We here
sketch of an ingenious adaptati
disc turnip cutter to the turnip ca
disc is put in motion by a face-wh
upon the nave of the cart-wheel,
it revolves communicates by means
wheels with the axis of the cuttin
It offers a very convenient mode of
sheep on pastures or lawns, and wa
duced about the year 1834, by Arth
dell, farmer, of Playford, the invent
well-known scarifier, which bears hi



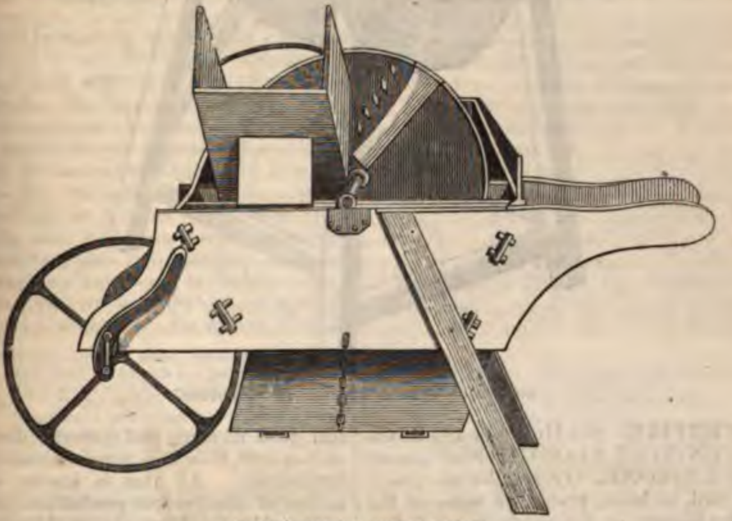
TURNIP CART, WITH CUTTING APPARATUS ATTACHED.

TURNIP CUTTERS. Although there are several kinds of turnip cutters, the principles upon which they are constructed do not embrace much variety: setting aside the simple application of the knife with a lever handle, the others may be divided into two classes; first, those which have their knives placed on a disc; and secondly, those with their cutting edges arranged on a cylinder.

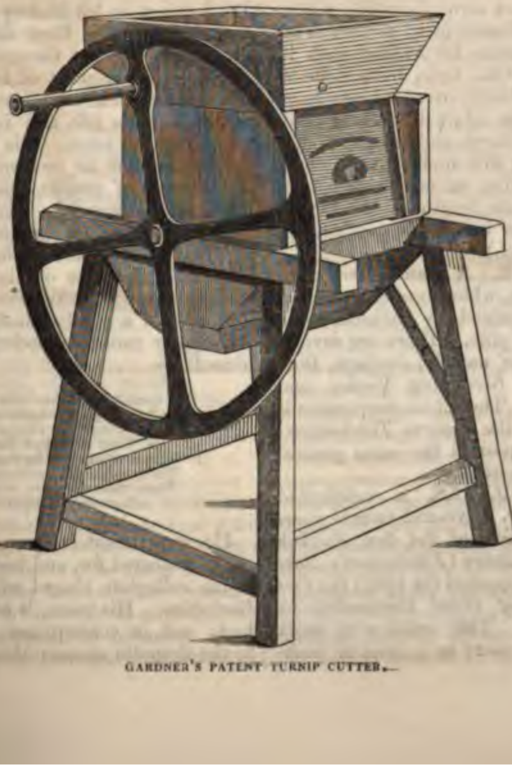
As the object to be effected is simple, and involves little mechanical contrivance,
a short description will suffice. W
join a sketch of that one which app
us the most convenient of any with
we are acquainted: the disc is attach
the side of a barrow, which serves
hopper; the knife is nearly the len
the radius, and when required to c
turnip in slices is alone used; if it b
cessary to cut small slices for shee
small cross-knives are by a simple co
ance adjusted to dissect the slice;
this case the barrow is useful, as it is

ved from trough to trough, into which small slices may be made to fall.

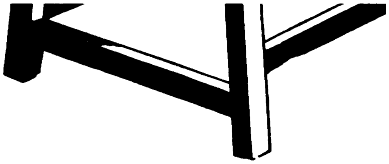
The illustration we adopt for the cylincal cutter is one which though of recent ention, yet is now so generally known as need no further description than is af- ded by the wood-cut given below. It is intended to cut into small slices for sheep, and is generally acknowledged to be the best implement for the purpose that is at present in use. Our farming readers will not fail to recognise in it *Gardner's Patent Turnip Cutter.*



RANSOME'S BARROW TURNIP CUTTER.



GARDNER'S PATENT TURNIP CUTTER.



INTERIOR OF GARDNER'S PATENT TURNIP CUT

TURNPIKE. See Highway and Road.

TURN-REST PLOUGH. See Plough.

TURNSTONE. (*Strepsilas interpres.*) This bird, in habit, resembles some of the smaller plovers or the sanderling. It frequents our coast, either singly or in small flocks, from August throughout the winter till May, when it leaves us to go northward to breed, and returns in August with its young, which, at that time, have none of the fine rich red, black, or white colours so conspicuous in the adult birds. It feeds on the smaller crustacea, and the soft-bodied animals inhabiting thin shells, turning over stones, and searching among sea-weed for its food. The whole length of the bird is nine inches and a half. (*Yarrell's Brit. Birds*, vol. ii. p. 422.)

TURPENTINE. A transparent oleo-resinous substance, which exudes naturally, but is chiefly obtained by incision, from various species of pine. There are several kinds of turpentine, namely, common, Bordeaux, Canadian, Strasburg, Venice, and American white. The Chian turpentine is the production of the *Pistacia Terebinthus*;

ical good farm
and axioms, th
agriculture.
author of this
collected by Dr
Tusser's book, a
W. Johnson, in
dening; and b
obliged to con
Tusser's own a
ser did what fe
wrote his own
more rare, in
adventure; for
restlessness of
habits too con
tinued change

He was bor
Rivenhall, a vi
tween the town
in Essex, of a
the higher ran
himself,—

> " It came t
> Of Heng
> In Essex
> Th

choir of St. Paul's Cathedral. He
ks feelingly of a chorister's miseries:

> " O painfull time, for every crime!
> What touzed ears, like baited bears!
> What bobbed lips, what jerks, what nips!
> What hellish toys!
> What robes how bare, what college fare!
> What bread how stale, what penny ale!
> Then Wallingford, how wert thou abhorr'd
> Of seely boys!"

rom London he was sent to Eton, and
me a student there, under Udall, about
, whose severity of discipline he has
rded. He then proceeded to Trinity
, Cambridge; but leaving it on account
health, he was dissuaded from returning
by William Lord Paget, who kept him
t the court, as one of his retainers
st likely as a chorister), for ten years:
eft that nobleman, however, without
improvement of his fortune. Retiring
atwade (Catiwade), in Suffolk, he took
m, and it was here that he composed his
k on Husbandry. He says of himself:

> " When court 'gan frown, and strife in town,
> And lords and knights saw heavy sights;
> Then took I wife, and led my life
> In Suffolk soil.
> There was I fain, myself to train, —
> To learn too long, the farmer's song,
> For hope of pelf, like worldly elf,
> To moil and toil!"

e ill state of his wife's health induced
after some years, to quit his farm, and
e at Ipswich, where she died. He was
married a second time, to a Miss Amy
n, and settled at West Dereham, in
olk, —

> " A place for wood, that trimly stood;
> With flesh and fish as heart could wish."

the temper of his youthful wife, and
harshness of his landlord, induced him
ove to Norwich, where, under the
onage of Dean Salisbury, he appears
more to have become a chorister. He
alludes to his second marriage, and its
nses:

> " For lo! for guile, what haps the wile,
> Through Venus toys, in hopes of joys,
> I chanced soon to find a Moon,
> Of cheerful hue.
>
> * * *
>
> Behold of truth, with wife in youth,
> For joy at large, what daily charge,
> Through children's hap; what opened gap,
> To more begun:
> The child at nurse, to rob the purse,
> The same to wed, to trouble head;
> For pleasure rare, such endless care,
> Hath husband won."

health induced him again to remove;
he then took the glebe land of Fair-
l in Essex, near his native village.
ing the death of the clergyman, he
ed to London; but hastened thence, in
, to Trinity College, Cambridge, that
ight be beyond the influence of the
e. The time he spent at Fairstead was evidently far from agreeable to Tusser, for he says, —

> " From thence so sent, away I went,
> With sickness worn, as one forlorn,
> To house my head at Fairsted,
> Where whiles I dwelt
> The tithing life, the tithing strife,
> Through tithing ill of Jack and Gill,
> The daily pays, the miry ways, —
> Too long I felt.
>
> " When charges grew, still new and new,
> And that I spy'd, if parson dy'd,
> (All hope in vain) to hope for gain,
> I might go dance;
> Once rid my hand, of parsonage land,
> Thence, by and by, away went I,
> To London straight, to hope and wait,
> For better chance."

He returned, however, to the metropolis, and died there, about 1580, certainly before 1585, as is proved by the title-page of the edition of his work published that year. That he possessed religious and moral feelings of the most excellent kind, peeps out in many parts of his works. He thus concludes, for instance, the sketch of his own life:

> " Friend, all things weigh'd, that here is said,
> And being got, that pays the shot,
> Methinks of right, have leave I might,
> (Death drawing near)
> To seek some ways, my God to praise,
> And mercy crave, in time to have,
> And for the rest, what He thinks best,
> To suffer here."

He was buried in the church of St. Mildred in the Poultry, according to Stowe, with this epitaph:

> " Here Thomas Tusser, clad in earth, doth lie,
> That sometime made the Points of Husbandry:
> By him then learn thou may'st; here learn we must,
> When all is done, we sleep, and turn to dust:
> And yet through Christ to heaven we hope to go;
> Who reads his books, shall find his faith was so."

This is an outline of all that is known of this extraordinary man. In whatever capacity he at various times lived he acted with ability, yet never so as to benefit his fortune. That he excelled as a singer is certain; for none but those of more than ordinary powers are admitted into the royal choir. As a courtier he was unfrowned upon till the disgrace of his patron. As a farmer it is evident that he possessed a correct knowledge, from his work upon the subject. The same book testifies that, as an author and a poet, he was far above mediocrity. Fuller, in his *Worthies of Essex*, describes him, in his usual quaint manner, as "a musician, schoolmaster, serving man, husbandman, grazier, poet, more skilful in all than thriving in any vocation. He spread," he adds, "his bread with all sorts of butter, yet none would stick thereon." The testimony of Fuller to the excellent private character of Tusser is valuable as coming from one who must have been the contemporary of many persons who well remembered our author. "I hear," says Fuller, "no man to charge him with any vicious extravagancy or visible carelessness." The true reason of his ill success in life is to be found, perhaps, in the verses of a poet almost his contemporary. Peacham, in his *Minerva*, a book of emblems, published in 1612, has a device of a whetstone and a scythe, with this beneath:

> "They tell me, Tusser, when thou wert alive,
> And hadst for profit turned every stone,
> Where'er thou camest thou couldst never thrive,
> Though hereto best couldst counsel every one;
> As it may in thy *Husbandry* appear,
> Wherein afresh thou liv'st among us here.
> So, like thyself, a number more are wont
> To sharpen others with advice of wit,
> When they themselves are like the whetstone blunt."

With the remarks of Dr. Mavor on the ill fortune of Tusser, I will conclude this rapid sketch of his life:—"The precepts of Tusser, indeed, are so excellent, that few can read them without profit and improvement; but between the cool collected good sense that sometimes appears in an author's works, and his conduct, as influenced by the temptations and perplexities of life, the discordance is often extreme. Some men are the shuttlecocks of fortune, and, with the best intentions, are always wrong; with the most serious resolutions of consistency and propriety, are easily driven from their course when they come in contact with the world. Between a courtier and a practical farmer the contrast is so great, and especially between a poet and a plodding man of business, that we need not be surprised our author was unsuccessful in the management of rural affairs. Yet he appears to have possessed such a degree of pious resignation to the will of God, of Christian charity, and of good humour under all his miscarriages, that his character rises high in our esteem, independent of his merits as a writer."

Tusser's work first appeared in 1557, entitled "*A Hundreth Good Pointes of Husbandrie*:

> "A hundreth good points of husbandry
> Maintaineth good household, with huswifry.
> Housekeeping and husbandry, if it be good,
> Must love one another like cousinnes in blood.
> The wife, to, must husband as well as the man,
> Or farewel thy husbandry do what thou can.

Imprinted at London, in Flete strete, within Temple barre, at the sygne of the hand and starre, by Richard Totell, the third day of February, An. 1557. Cum privilegio ad imprimendum solum."

A copy of this edition, which Dr. Mavor considers to be unique, is in the British Museum. It consists of only thirteen quarto leaves.

The *Book of Huswifry*, it is supposed, was at first printed by itself; it was afterwards added to the editions of the *Husbandry*.

Editions of this work appeared
1562; and another, "newly corre
amplified," 1570, 1571 (Watts).
succeeded an enlarged edition be
following title: "Five hundred
good husbandry, united to as
good huswifery, first devised and
augmented with diverse approve
concerning hopps and gardening
needeful matters, together with an
before every moneth containing t
effect of the sayd moneth, with
and a preface in the beginning,
cessary to be reade for the bette
standing of the booke. Set forth by
Tusser, gentleman, servant to th
able lorde Paget of Beudesert. In
at London, &c., by Rychard Tottel
1573." Reprints appeared succes
1577, 1580 (the first complete
1585, 1586, 1590, 1593, 1597, 159
1604, 1610, 1614, 1620, 1630, 163
1692, all in quarto, black-letter, exc
of 1600, which is stated to be
Martyn mentions another edition, i
One, entitled *Tusser Redivivus*, wa
by a Mr. Hilman, in 1710, 8vo. an
further notes in 1744. An editi
edited by Dr. W. Mavor in 1812, 4
8vo. with many notes and additions.

To this I am indebted for near
whole of the preceding informatio
cerning the editions of Tusser.

To this *Book of Husbandry*, says W
is often joined *The Booke of Regard*
taining the Castle of Delight, the Gar
Unthriftinesse, the Arbour of Virt
the Castle of Repentance. Another w
ascribed by Haller to the pen of T
viz. *Tractatus de Agricultura Versib*
glicis. London, 1638-72. Both these
mentioned works are extremely rare.

Tusser dedicated his book first to
William Paget, in an acrostic, and af
death to "the Lord Paget of Beaude
his son and heir. From this we fin
Tusser shared an author's very com
fate, for he tells us—

> "By practice and ill speeding,
> These lessons had their breeding,
> And not by hearsay or reading,
> As some abroad have blown;
> Who will not thus believe me,
> So much the more they grieve me,
> Because they grudge to give me,
> What is of right mine own."

Its price, when first published, a
scribed in his prefatory address to
reader, was only 4*d*. or 8*d*. He says,

> "What is a groat
> Or twain to note,
> Once in the life,
> For man or wife!"

The style in which Tusser wrote his
is plain, and sometimes rather bold

same time, it is a metre easily ed; and verse is well adapted to on the memory the mass of use- and rural directions contained in In the rhyming preface, "to the his book" (for Tusser seemed to hing in verse), he says, —

look ye, I pray you shew what?
rms pointed with rhetorick fine?
husbandry seeketh not that,
r is't any meaning of mine."

th chapter consists of a series of e excellent "Good Husbandry vorthy to be followed of such as ." He omitted no opportunity occasion for seasonable reflec-

, by appearing, betok'neth the spring,
f, by her falling, the contrary thing;
h bids us labour to get as we can,
is a burden to labouring man."

mends the system of moderate , and was evidently no enemy to of the field:

ters and hawkers take heed what ye say,
swer with courtesy, drives them away;
re a man's better will open a gap,
ot with rudeness, for fear of mishap."

ins his monthly husbandry with , for that was then the period, as arable land was commonly en- by the farmer. He says, in his anza, —

haelmas lightly, new farmer comes in,
sbandry forceth him; new to begin;
mer, still taking, the time to him given,
August to last untill Michaelmas even."

erance of his object, that of giving minute directions to the incoming even gives a catalogue of farming s in verse, in which he manages adroitness to include several ap- npracticable names, such as, —

arrow, wheel-barrow, shovel, and spade,
omb, mane-comb, and whip for a jade."

he approved practice in Tusser's sow timely thy white wheat, sow dust." They were used also to eal into their wheat-flour:

t not mixed to grow so on land,
tarry wheat till it shed as it stand."

nd thin sowing had even then ctive advocates:

eans be in sowing; but scattered in,
t, rye, and peason, I love not too thin:
y and dredge with a plentiful hand,
, stead of seed, overgroweth thy land."

ident that in those days the far- not able to grow their corn on where the modern holders find es. Thus he speaks of the diffi- found in producing barley in the Brantham, in Essex, where he e land; and, again, he tells us, what will surprise the modern skilful Suffolk farmers, —

"In Suffolk, again, whereas wheat never grew,
Good husbandry used, good wheat land I knew."

And he adds, —

"As gravel and sand, is for rye and not wheat."

He mentions several varieties of wheat then grown by the farmers of the reign of good Queen Bess, such as white and red rivet, white and red pollard, Turkey and grey. But of this last he says, —

"Oats, rye, or else barley, and wheat that is grey,
Brings land out of comfort, and soon to decay."

The land, however, was evidently farmed with little skill:

"Two crops of a fallow, enricheth the plough,
Though t'one be of pease, it is land good enough:
One crop and a fallow some soil will abide,
Where, if ye go further, lay profit aside."

He warns the farmers to beware of corn-stealers, and to keep their soil in good heart; to manure their land with the earth from headlands and old banks: he commends the use of night-soil for gardens; and recommends the manure of the farm-yard to be laid up "round on a hill." And he had the wisdom to perceive the advantages of shed-feeding live-stock:

"The houseing of cattle, while winter doth hold,
Is good for all such as are feeble and old;
It saveth much compass and many a sleep,
And spareth the pasture for walk of thy sheep."

Grazing has, since Tusser's days, been more and more on the decline, as soiling has been better appreciated. A distinguished modern witty divine, in a letter to a friend, thus zealously denounces the grazing system: "Grazing is an absolute barbarism; it is just the same as if you desired your servants to trample and roll over your bread and butter."

For faint cattle he recommends the use of bay-salt; and in his February's husbandry gives some directions for the management of their dung, which betrays a deplorable want of knowledge in its economy:

"Who layeth on dung, ere he layeth on plow,
Such husbandry useth, as thrift doth allow:
One month ere ye spread it, so still let it stand,
Ere ever to plow it, ye take it in hand.

Place dung-heap alow, by the furrow along,
Where water, all winter-time did it such wrong:
So make ye the land to be lusty and fat,
And corn thereon sown, to be better for that."

In another place, however, he recommends the farmer to use the mud from ditches and ponds as a dressing for their land.

They harvested their corn, it seems, then, much after the same manner as at the present day. They reaped their wheat and mowed their stubbles; and this they carried as we do now, as soon as possible after harvest:

"For fear of destroying with cattle or rain,
The sooner ye load it, the more profit ye gain."

And as to barley, Tusser says, —

"The mowing of barley, if barley do stand,
Is cheapest and best, for to rid out of hand:
Some mow it, and rake it, and set it on cocks;
Some mow it, and bind it, and set it on shocks."

They let out, at the period when Tusser wrote, it seems, the harvest-work either by the great or by the day: of which modes of getting in the corn he seems to prefer the latter.

"By great will deceive thee, with ling'ring it out,
By day will dispatch, and put all out of doubt."

His directions to the farmer with regard to the treatment of his harvestmen and the poor gleaners, and his warm hopes for the farmer's success, betray the excellent benevolent spirit with which he was actuated. He says, —

"Corn carried, let such as be poor go and glean,
And after thy cattle, to mouth it up clean;
Then spare it for rowen till Martin be past,
To lengthen thy dairy no better thou hast.

In harvest-time, harvest folk, servants and all,
Should make all together good cheer in the hall;
And fill out the black bowl of blythe to their song,
And let them be merry all harvest-time long.

Once ended thy harvest, let none be beguil'd;
Please such as did help thee — man, woman, and child.
Thus doing, with alway such help as they can;
Thou winnest the praise of the labouring man.

Now look up to God-ward, let tongue never cease
In thanking of Him for his mighty increase.
Accept my good will — for a proof go and try;
The better thou thrivest, the gladder am I."

Having commenced his directions with [illegible], his last stanza concludes with a reference to the incoming:

"Now [illegible] each day,
[illegible] the farmer be [illegible] away

[illegible]
[illegible]
[illegible] Tusser."

The Book of Husbandry of Tusser is also interesting from the information it gives us with regard to the customs and habits of [illegible]. It is evident that they then [illegible] upon salt fish, for in his [illegible] for the farmer's [illegible] he mentions [illegible] herrings and salt fish — at [illegible] Martinmas beef — [illegible] the feast of St. John [illegible] at Michaelmas — [illegible] sprats — [illegible] seemed to have all the [illegible] —

"[illegible]
[illegible]
[illegible]
[illegible]"

[illegible] generally [illegible]

"[illegible]
[illegible]
Quod Tusser."

They bought, in Tusser's time
of salt fish as would amaze a mo
in these protestant days, when
crease of green winter food, catt
are kept easily through the
fresh meat is always to be had.
would now think of undertakin
to buy fish; yet he directed th
the sixteenth century, —

"When harvest is ended, take shipping
Ling, salt-fish, and herring for Lent
Get home that is bought, and go stac
With pease-straw between it, the safe

They had a rude way of meas
it seems:

"As huswives are teached, instead of a
How winter nights passeth by crowing

The care of the garden evid
the wife's share, who had also t
feeding of the household. It see
labourers had then a great fondne
ridge, for Tusser tells us, —

"No spoon-meat, no bellyfull, labourer

In other days, too, it is evident
ning was no mean part of the
avocation, for it is here said, —

"Wife, pluck fro thy seed hemp the fimble
This looketh more yellow, the other mor
Use t'one for thy spinning, leave Michel
For shoe-thread and halter, for rope and
Now pluck up thy flax for the maidens t

Tusser never seems to have for
any occasion, to recommend to
holder the payment of his just d
the question of the tithes, once so
to the farmer, was not overlooke
He advised his farming brethren t

"Tithe duly and truly, with hearty good w
That God and his blessing may dwell with
Though parson neglecteth his duty for t
Thank thou thy Lord God, and give e

The Points of Huswifery, unit
comfort of *Husbandry*, by Thomas
Gentleman, was, it is concluded, f
lished with *The Husbandry* in 156
It is written in rather a more liv
than the former, and has an epist
tory, "to the right honourable a
especiall good lady and mistress, th
Paget," which he thus commences:

"Though danger be mickle,
And favour so fickle,
Yet duty doth tickle
My fancy to write,
Concerning how pretty,
How needful and how witty,
Good huswifery is, and pithy,
From morning to night

This work contains an abundan
notions, in his usual style of versi
for the conduct of household affa
directs the servants, before breakfa
set to work:

"Let some to peel hemp, or else rushes
Some others to card, or to seething [illegible]

At breakfast time the wife was, in those days, the carver for the farm-servants:

> "Let huswife be carver, let pottage be heat,
> A mess to each one with a morsell of meat."

In the cookery department the now nearly extinct race of turnspits were indispensable attendants upon the cook:

> "Good diligent turnbroche, and trusty withal."

In his washing section he is rather more terse than gentle in his conclusion: —

> "Maids, wash well, and wring well, but beat, ye wot how,
> If any lack beating, I fear it be you."

In his directions for malt-making he alludes to the use of straw and wood, but does not mention the modern fuel, coke, or cinders. They used, it seems, to dine at noon:

> "By noon, see your dinner be ready and neat;
> Let meat tarry servant, not servant his meat."

The mistress of the house then made, as now in some parts of England, her own candles, it seems: —

> "Provide for thy tallow, ere frost cometh in,
> And make thine own candle, ere winter begin."

Twice a week, Sundays and Thursdays, the ploughmen were entitled to roast meat for supper; and to a harvest goose when the corn was gathered in. At harvest-home the mistress was enjoined, —

> "Remember thou therefore, though I do it not,
> The seed-cake, and pasties, and furmety pot."

In Tusser's time a very unwholesome custom prevailed, in the absence of carpets, of strewing the citizens' houses with rushes, and those of the country with flowers. He gives, therefore, a list of "strewing flowers of all sorts," in which we find only the common sorts of flowers now cultivated, such as cowslips, daisies, lavender, roses, sage, tansy, violets, &c.

Such were the works of Tusser, writings which were long in the hand-book of the English country gentleman. That they were popular is evidenced by the rapid succession of copious editions which fell to their lot; that they were read with delight is shown by the way in which he is commonly quoted by the farmer of all grades. If he had spoken in prose, as has been sometimes suggested, he might certainly have been more instructive to the few, but he would not have been read by the many.

The popular details and histories of all nations escaping from rudeness are commonly written in verse; and multitudes can learn these by heart who never were taught to read. Tusser, therefore, is deserving of the gratitude of the English farmer, for his labours tended to improve, to refine, to elevate the profession he celebrated in his verses. The attempt at any thing like a systematic treatise on farming had not, when Tusser died, been deemed possible. (*Quart. Journ. Agr.* vol. xii. p. 69.)

TUTSAN. See John's Wort.

TWAYBLADE. (*Listera;* named in honour of Martin Lister, M.D. a famous English physician and naturalist; best known as a conchologist and entomologist.) A genus of curious little native plants, growing wild in shady places. They may be grown in a mixture of peat and loam, and are increased by divisions of the roots. (*Paxton's Bot. Dict.*)

TWIFALLOW. A term applied to a second ploughing over, or fallowing the land.

TWIG-RUSH. (*Cladium,* from *klados,* a branch or twig, referring to the appearance of the plant.) This is a genus of hard, harsh, rushy, often prickly-edged plants, whose stems, whether round or triangular, are more or less clothed with alternate sheathing leaves or scales. Spikes numerous, brown or blackish, aggregate, generally panicled: one species only is indigenous. The prickly twig-rush (*C. mariscus*), which is perennial, and grows about fens and in boggy places, flowering in July and August. The long and creeping roots stretch under the moss, and throw up erect, polished, angular stems, from three to four feet high, bearing keeled, taper-pointed, sharply serrated leaves. The flowers are in erect corymbose panicles, with furrowed branches, consisting of two flowering spikes of a rusty brown hue. The fruit is a drupe, containing a hard, brown, angular nut. (*Smith's Eng. Flor.* vol. i. p. 36.)

TWITCH. See Couch.

TWITE. See Linnet.

U.

UDDER. The glandular organ of a cow, mare, ewe, or other animal which is destined for the secretion of milk. There are four teats, each of which consists of two granular lobated glands, comprehending bloodvessels, nerves, and milk ducts, all of which first unite into eight or ten principal ducts, and these again into one, which perforates the skin of the teat at its apex. The granular part is the secreting organ; but how the milk is separated from the blood is not known. It is known to be affected in the vesicles of the granules, which open and pour the secretion into the ducts; but how or in what manner the chemical change takes place to form blood into milk, is a mystery which may never be solved. See Cattle, Milk, &c.

ULCER. See Cancer.

ULMUS. See Elm.

UMBEL. In botany, a particular arrangement of the flowers in certain plants, of which the carrot is a familiar example; the peduncles and pedicles spring from a common centre, and rise till they form a somewhat flat tuft. The umbel is a loose inflorescence, the primary axis of which is short, and the secondary long; and the umbel becomes compound when the secondary axes are developed, in the same manner as the primary. Both the primary and the secondary umbel is generally furnished with bractes at the point of its divergence. The secondary umbel is termed *umbellule*. The difference between an umbel and a corymb is, that in the latter the flowers form a flat head, the secondary axes arising alternately from different points of the primary, not, as in the former, springing from a common centre. See Inflorescence.

UMBER. See Grayling.

UNDERWOOD. A term applied to coppice, or any wood not accounted timber. See Coppice, Forest, and Plantation.

URE. A provincial term applied to the udder of a cow, sheep, &c.

URINE. A saline fluid secreted from the blood of animals by the kidneys, collected in the urinary bladder, and emitted by the canal of the urethra. Urine differs in different animals, and varies in its characters, according to the kind of food employed. The usual salts contained in it are, sulphates, phosphates, and chlorides, all of which are fertilising substances. The urine also of oxen and horses is alkaline; it undergoes decomposition less rapidly than that of carnivorous animals: it contains hippurates, but no lithic acid, that substance which forms red gravel in man. Hippuric acid contains 7 per cent. of nitrogen. Urine, therefore, is of much use as a manure, improving most kinds of soil. Columella has asserted that, stale, it is excellent for the roots of trees. And Hartlib commends the Dutch for preserving the urine of cows as carefully as they do the dung, to enrich their lands.

It is a fluid capable of being employed with great benefit both on *meadows* and on *arable* land. (*Com. Board of Agr.* vol. iv. p. 416.) See Liquid Manure and Night-soil.

URITH. Provincially the etherings or bindings of hedges.

URIVES. A term applied to nets to catch hawks with.

URRY. A kind of blue or black clay, lying near a vein of coal.

USTILAGO. (From ustus, scorched appearance.) A genus of fungi, parasitical, which are found preying upon the cereal and other grasses. See Smut.

V.

VAGS. A term provincially applied to turfs cut and dried for fuel.

VALERIAN. (*Valeriana.*) A genus of plants, most of the species of which are very ornamental in flower borders. The perfectly hardy kinds succeed well in common garden soil; those from warmer climates should be grown in pots, in a mixture of loam, sand, and peat, and placed in a frame or green-house in winter. They are all readily increased by division at the root. There are three perennial indigenous species.

1. The red valerian (*V. rubra*), a perennial which grows on chalk cliffs and old walls, bearing a corymb of elegant rose-coloured scentless flowers from June to September. The plant is glaucous, and rises two feet in height; the leaves are lanceolate and entire, occasionally toothed near the base.

2. The small marsh valerian (*V. dioica*), which is also perennial, very common in moist boggy meadows, flowering in June. It is a small plant, seldom more than eight inches high. The leaves are entire. The flowers are flesh-coloured, with short, blunt spurs.

3. Great wild valerian (*V. officinalis*), a perennial, found in marshes, and about the banks of pools and rivers, flowering in June. The roots are attached to a creeping rhizome; the stem four feet high, bearing coarsely serrated leaves, broad and ovate below, and becoming linear as they rise on the stem. The flowers are in corymbose panicles, and of a pale black colour. The odour of the root is strong. It contains oil, resin, and an acid: being considered eminently antispasmodic, it is very frequently prescribed with success in hysterical cases. The unpleasant flavour of valerian is best counteracted by a small addition of mace; but this flavour is useful in hysterics.

4. The heart-leaved valerian (*V. pyrenaica*) grows in various woods in Scotland. It is not so tall a plant as the last, the stem is furrowed, and the stem-leaves heart-shaped, serrated, and the upper ones on downy footstalks. The flowers are of a light rose colour, with a short spur. It exhales nearly the same odour as the last species. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. i. p. 42.)

VALERIAN, GREEK. See Jacob's Ladder.

VALUATION. See Appraisement.

VEGETABLE CHEMISTRY is that

of the science of chemistry which
to vegetable substances. Under
ads ANALYSIS, CHEMISTRY, ORGANIC
STRY, GASES, EARTHS, WATER, SALTS,
RATURE, &c. I have endeavoured to
e all the facts supplied by this im-
t science for the assistance of the
with which I am acquainted; I shall,
ore, merely insert in this place the
al analysis of the inorganic sub-
s found in several of the commonly
ted crops of the farmer; and this I
rom p. 318. of the valuable *Lectures*
ricultural Chemistry and Geology,
F. Johnston; see also Liebig's *Or-*
Chemistry.

ides the elements of the organs of
other substances, obtained from in-
c nature, are necessary for certain
destined to special functions pecu-
each family of plants. In the ashes
plants left after burning them, these
nces are found. Almost all plants
n acids, in combination with soda, po-
ime, alumina, or magnesia. The quan-
these salts varies at different periods
growth of the plant: thus unripe
contain more bitartrate of potassa
he ripe, and the potato more potassa
it blossoms than afterwards. The
of a soil, as has already been de-
alters the quantity of salts found in
The *Salsola Kali*, raised from seeds
nts near the sea, in an inland garden,
ns both potassa and soda; but the
from the seed of this contain potassa
But these facts I have detailed under
ad SALTS, &c.; I shall therefore only
n the following tables.

examining the results of these ana-
ns, the farmer must remember, that
ids and their bases do not exist in
in an uncombined state, but in com-
on with each other; that is, as salts.

Of the Ash of Wheat. — According to
alysis of Sprengel, 1000 lbs. of wheat
11·77 lbs. and of wheat straw 35·18
ash, consisting of —

	Grain of Wheat.	Straw of Wheat.
sh - -	2·25 lbs.	0·20 lbs.
- - -	2·40	0·29
e - -	0·96	2·40
nesia - -	0·90	0·32
mina, with a trace iron - -	0·26	0·90
a - -	4·00	28·70
hurie acid -	0·50	0·37
sphoric acid -	0·40	1·70
rine - -	0·10	0·30
	11·77 lbs.	35.18 lbs.

2. *Of the Ash of Barley.* — A thousand pounds of the grain of barley (two-rowed, *Hordeum distichon*), leave 23½ lbs. and of the ripe dry straw 52·42 lbs. of ash. This ash consists of —

	Grain.	Straw.
Potash - -	2·78 lbs.	1·80 lbs.
Soda - - -	2·90	0·48
Lime - -	1·06	5·54
Magnesia - -	1·80	0·76
Alumina - -	0·25	1·46
Oxide of iron -	a trace.	0·14
Oxide of manganese -	- -	0·20
Silica - - -	11·82	38·56
Sulphuric acid -	0·59	1·18
Phosphoric acid -	2·10	1·60
Chlorine - -	0·19	0·70
	23·49 lbs.	52·42 lbs.

3. *Of the Ash of Oats.* — In 1000 lbs. of the grain of the oat are contained about 26 lbs. and of the dry straw about 57½ lbs. of inorganic matter, consisting of —

	Grain.	Straw.
Potash - -	1·50 lbs.	8·70 lbs.
Soda - - -	1·32	0·2
Lime - - -	0·86	1·52
Magnesia - -	0·67	0·22
Alumina - -	0·14	0·06
Oxide of iron -	0·40	0·02
Oxide of manganese -	0·	0·02
Silica - - -	19·76	45·88
Sulphuric acid -	0·35	0·79
Phosphoric acid -	0·70	0·12
Chlorine - -	0·10	0·05
	25·80 lbs.	57·40 lbs.

4. *Of the Ash of Rye.* — The weight of ash contained in 1000 lbs. of the grain of rye is 10½ lbs. and of the straw 28 lbs. This ash consists of —

	Grain.	Straw.
Potash -	5.32 lbs.	0·32 lbs.
Soda - -		0·11
Lime - - -	1·22	1·78
Magnesia - -	0·44	0·12
Alumina - -	0·24	0·25
Oxide of iron -	0·42	
Oxide of manganese -	0·34	
Silica - -	1·64	22·97
Sulphuric acid -	0·23	1·70
Phosphoric acid -	0·46	0·51
Chlorine - -	0·09	0·17
	10·40 lbs.	27·93 lbs.

5. *Of the Ash of Beans, Peas, and Vetches.* — The ash of the seed and straw of the field bean, the field pea, and the

common vetch (*Vicia sativa*), dried in the air, contains in 1000 lbs. the several inorganic compounds in the followi portions:—

	Field Bean.		Field Pea.		Common
	Seed.	Straw.	Seed.	Straw.	Seed.
Potash - - -	4·15	16·56	8·10	2·35	8·97
Soda - - -	8·16	0·50	7·39	- -	6·22
Lime - - -	1·65	6·24	0·58	27·30	1·60
Magnesia - - -	1·58	2·9	1·36	3·42	1·42
Alumina - - -	0·34	0·10	0·20	0·60	0·22
Oxide of iron - -	- -	0·07	0·10	0·20	0·09
Oxide of manganese - -	- -	0·05	- -	0·07	0·05
Silica - - -	1·26	2·20	4·10	9·96	2·00
Sulphuric acid - -	0·89	0·34	0·53	3·37	0·50
Phosphoric acid - -	2·92	2·26	1·90	2·40	1·40
Chlorine - - -	0·41	0·80	0·38	0·04	0·43
	21·36	31·21	24·64	49·71	22·90

6. *The Ash of the Turnip, Carrot, Parsnip, and Potato.*—These four roots, as they are carried from the field, c respectively in 10,000 lbs.—

	Turnips.		Carrot.	Parsnip.	Potatoes.	
	Roots.	Leaves.			Roots.	T
Potash - - -	23·86	32·3	35·33	20·79	40·28	81
Soda - - - -	10·48	22·2	9·22	7·02	23·34	0
Lime - - -	7·52	62·0	6·57	4·68	3·31	12·97
Magnesia - - -	2·54	5·9	3·84	2·70	3·24	17·0
Alumina - - -	0·36	0·3	0·39	0·24	0·50	0·4
Oxide of iron - -	0·32	1·7	0·33	0·05	0·32	0·2
Oxide of manganese - -	- -	- -	0·60			
Silica - - -	3·88	12·8	1·37	1·62	0·84	49·4
Sulphuric acid - -	8·01	25·2	2·70	1·92	5·40	4·2
Phosphoric acid - -	3·67	9·8	5·14	1·	4·01	19·7
Chlorine - - -	2·39	8·7	0·70	1·78	1·60	5·0
	63·3	180·9	66·19	41·80	82·83	308·4

7. *Of the Ash of the Grasses and Clovers.*—The following table might have been much enlarged. I have thought it necessary, however, to introduce in this place only those species of grass and clover which are in most extensive use. I have also calculated the weights given below for these plants in the *state of hay only*, as the succulency of the grasses—that is, t quantity of water contained in the green c—varies so much, that no correct esti could be made of the quantity of inorg matter present in hay or grass, from a kn ledge of its weight in the green state c The annexed quantities are contained 1000 lbs. of the dry hay of each plant:-

	Rye-grass Hay.	Red Clover.	White Clover.	Lucern.	Sainfo
Potash - - -	8·81	19·95	31·5	13·40	20·5
Soda - - -	3·94	5·29	5·79	6·15	4·3
Lime - - -	7·34	27·80	23·48	48·31	21·9
Magnesia - - -	0·90	3·33	3·05	3·48	2·8
Alumina - - -	0·31	0·14	1·90	0·30	0·6
Oxide of iron - -	- -	- -	0·63	0·30	
Oxide of manganese -					
Silica - - -	27·72	3·60	14·73	3·30	5·
Sulphuric acid - -	3·53	4·47	3·53	4·04	3·4
Phosphoric acid - -	0·25	6·57	5·05	13·07	9·1
Chlorine - - -	0·06	3·62	2·11	3·18	1·5
	52·86	74·78	91·32	95·53	69·5

EGETABLE PHYSIOLOGY is that nce which treats of the vegetable king- n, its habits, properties, and organisa- , in the most comprehensive manner. objects have been clearly stated by Mrs. rcet, in her excellent *Conversations on etable Physiology*, when describing the ures of M. Decandolle on this science; what she has so well described, it is dless for me to give in other words. "So from confining himself to the classifica- of plants, the physiologist examines the etable kingdom in its most comprehen- and philosophical point of view. In de- ibing the structure, he investigates the its and properties of plants, and shows, only how wonderfully they have been med to fulfil the purposes of their own ltiplication and preservation, but how mirably they answer the high purpose ich nature has assigned to them, of minis- ing to the welfare of the animal creation, more especially to that of man. He s his attention particularly to point out means by which the science of botany promote that with which it is most in- ely and importantly connected,—agri- re. He makes ready the soil and sows ed for the husbandman; he extracts the g juices and the salutary poisons for ysician; he prepares materials for the r, colours for the dyer; in a word, as oceeds, there is scarcely an art on he does not confer some benefit, by pointing out a new truth, or ng against an old established error." this description of the objects of the e of vegetable physiology, the reader e that almost all its different branches eated of separately in articles which spersed through this volume. It is therefore, a few scattered fragments I propose to gather together in this See BOTANY, TEMPERATURE, LIGHT, s, GASES, SALTS, WATER, ACCLIMAT- , PUTREFACTION, &c.

e description of the cambium or de- ing sap of plants was omitted in its er place, and the effect of gravity or ction upon plants was referred to this . The sap having ascended into the es, and being in its course gradually al- d into a fluid suitable for the nourish- nt of the plant, descends principally ough the liber, or inner layer of bark, a small portion also descends through young wood or alburnum. This move- nt, especially through the plants with dant branches, is materially facilitated motion, as by the action of the wind. r. Knight," adds Mrs. Marcet, "has de a variety of interesting experiments on this subject. He confined both the stem and branches of a tree in such a manner that it could not be moved by the wind. The plant became feeble, and its growth much inferior to those of a similar tree growing in its natural state. He confined another tree, so that it could be moved only by the north and south winds, and obtained the singular result of an oval stem, the sides accessible to the wind growing more vigorously than those sheltered from its influence. Every species of restraint, and especially such as tend to render plants motionless, impedes their growth. Stakes by which young trees are propped, nailing them to walls or trellises, greenhouses, or confined situations where the air has not free access, check and injure the vigour of vegetation, and render plants diminutive and weakly. The cambium descends almost entirely through the liber or most internal and youngest layer of the bark; if, therefore, a ring is cut completely through the bark this fluid is arrested in its course, and, accumulating around the upper edge of the intersected bark, will cause an annular protuberance. The descent of the cambium thus being obstructed, it will accumulate in that part of the tree above the intersection, afford it a superabundance of nourishment, creating a proportional vigour of vegetation and a corresponding excellence and profusion of produce." This operation, or *ringing*, is often performed on the non-productive branches of fruit trees.

The effect of gravitation or attraction upon plants is of the highest importance to their germination and their growth. From the very nature, however, of this essentially present power, a principle known only to us by its effects, the research is surrounded with difficulties. Mr. Knight, the late excellent president of the Horticultural Society, described some of the effects of gravity upon plants in his usual happy manner, when, in addressing the fellows of the Royal Society, he observed, "It can scarcely have escaped the notice of the most inattentive observer of vegetation, that in whatever position a seed is placed to germinate, its radicle invariably makes an effort to descend towards the centre of the earth, while the elongated germen takes precisely the opposite direction; and it has been proved by Duhamel, that if a seed during its germination be frequently inverted, the points both of the radicle and germen will return to the first direction. Some naturalists have supposed these opposite effects to be produced by gravitation; and it is not difficult to conceive that the same agent, by operating on bodies so differently organised as the radicle and germen of plants are, may occasion the one to descend and the other to ascend." The hypothesis of these naturalists it was the intention of Knight to examine by certain experiments, which he thus proceeds to describe. "I conceived that if gravitation were the cause of the descent of the radicle, and the ascent of the germen, it must act either by its immediate influence on the vegetable fibres and vessels during their formation, or on the motion and consequent distribution of the true sap afforded by the cotyledons; and as gravitation could produce these effects only while the seed remained at rest, and in the same position relative to the attraction of the earth, I imagined that its operation would become suspended by constant and rapid change of the position of the germinating seed, and that it might be counteracted by the agency of centrifugal force. Having a strong rill of water passing through my garden, I constructed a small wheel similar to those used for grinding corn, adapting a wheel of a different construction, and formed of very slender pieces of wood, to the same axis.

"Round the circumference of the latter, which was eleven inches in diameter, numerous seeds of the garden bean, which had been soaked in water to produce the greatest degree of expansion, were bound at short distances from each other. The radicles of these seeds were made to point in every direction, some towards the centre of the wheel, and others in the opposite direction; others at tangents to its curve; some pointing backwards and others forwards relative to its motion, and others pointing in opposite directions in lines parallel with the axis of the wheels. The whole was enclosed in a box and secured by a lock, and a wire-grate was placed to prevent the ingress of any body capable of impeding the motion of the wheels. The water being then admitted, the wheels performed something more than 150 revolutions in a minute, and the position of the seeds relatively to the earth was as often perfectly inverted within the same period of time, by which I conceive that the influence of gravitation must have been wholly suspended. In a few days the seeds began to germinate; I soon perceived that the radicles, in whatever direction they were protruded from the position of the seed, turned their points outwards from the circumference of the wheel, and in their subsequent growth receded nearly at right angles from its axis. The germens, on the contrary, took the opposite direction, and in a few days their points all met in the centre of the wheel. Three of these plants were suffered to remain on the wheel, and were secured to its spokes to prevent th being shaken off by its motion. The of these plants soon extended beyond centre; but the same cause which first casioned them to approach its axis operating, their points returned and again at its centre. The motion of wheel being in this experiment verti the radicle and germen of every seed cupied during a minute portion of time each revolution precisely the same posi they would have assumed had the pla vegetated at rest; and as gravitation a centrifugal force also acted in lines paral with the vertical motion and surface of t wheel, I conceived that some slight obje tions might be urged against the concl sions I felt inclined to draw. I therefor added to the machinery I have describ another wheel, which moved horizontally over the vertical wheels; and to this b means of multiplying wheels of different powers, I was enabled to give many different degrees of velocity. Round the circumference of the horizontal wheel, whose diameter was also eleven inches, seeds of the bean were bound as in the experiment which I have already described, and it was then made to perform 250 revolutions in a minute. By the rapid motion of the water wheel, much water was thrown upwards on the horizontal wheel, part of which supplied the seeds upon it with moisture, and the remainder was dispersed in a light and constant shower over the seeds in the vertical wheel, and on others placed to vegetate at rest in different parts of the box.

"Every seed on the horizontal wheel, though moving with great rapidity, necessarily retained the same position relative to the attraction of the earth, and therefore the operation of gravity could not be suspended, though it might be counteracted in a very considerable degree by centrifugal force, and the difference I had anticipated between the effects of rapid vertical and horizontal motion soon became sufficiently obvious. The radicles pointed downwards about ten degrees below, and the germens as many degrees above, the horizontal line of the wheel's motion, centrifugal force having made both to deviate eighty degrees from the perpendicular direction each would have taken had they vegetated at rest. Gradually diminishing the rapidity of the horizontal wheel, the radicles descended more perpendicularly, and the germens grew more upright, and, when it did not perform more than eighty revolutions in a minute, the radicle pointed about forty-five degrees below, and the germen as much above, the horizontal line; the one always receding from, and the other approaching to, the axis of the wheel.

ild not, however, be understood to
it the velocity of 250 or 80 ho-
evolutions in a minute will always
rately the degrees of depression
ation of the radicle and germen
have mentioned; for the rapidity
otion of my wheels was somewhat
d by the collection of fibres of
against the wire grate, which ob-
in some degree the passage of the
nd the machinery having been the
ship of myself and my gardener,
supposed to have moved with all
larity it might have done had it
work of a professed mechanic.
iceive myself to have fully proved
radicles of germinating seeds are
lescend, and their germens to as-
some external cause, and not by
r inherent in vegetable life; and
e reason to doubt that gravitation
ncipal, if not the only, agent em-
n this case by nature. I shall,
endeavour to point out the means
I conceive the same agent may
effects so diametrically opposite to
r.

radicle of a germinating seed (as
uralists have observed) is increased
only by new parts successively
its apex or point, and not at all
eneral extension of parts already
nd the new matter which is thus
ely added unquestionably descends
state from the cotyledons. On
and on the vegetable fibres and
hile soft and flexible, and whilst
r which composes them is chang-
a fluid to a solid state, gravitation
conceive, operate sufficiently to
nclination downwards to the point
dicle; and as the radicle has been
be obedient to centrifugal force,
rcely be contended that its direc-
d remain uninfluenced by gravi-
I have stated that the radicle is
in length by parts successively
its point; the germen, on the con-
ngates by a general extension of
previously organised, and its ves-
ibres appear to extend themselves
tion to the quantity of nutriment
ive. If the motion and consequent
on of the true sap be influenced
tation, it follows that when the
t its first emission or subsequently,
from a perpendicular direction, the
accumulate on its under side; and
und, in a great variety of expe-
n the seeds of the horse-chestnut,
and other plants, when vegetating
at the vessels and fibres on the
e of the germen invariably elongate much more rapidly than those on the upper side; and hence it follows that the points of the germen must always turn upwards. And it has been proved that a similar increase of growth takes place on the external side of the germen, when the sap is impelled there by centrifugal force, as it is attracted by gravitation to its under side when the seed germinates at rest. This increased elongation of the fibres and vessels of the under side is not confined to the germens, nor even to the annual shoots of trees, but occurs and produces the most extensive effects in the subsequent growth of their trunks and branches. The immediate effect of gravitation is certainly to occasion the further depression of every branch which extends horizontally from the trunk of the tree, and when a young tree inclines to either side, to increase that inclination; but it at the same time attracts the sap to the under side, and this occasions an increased longitudinal extension of the substance of the new wood on that side. The depression of the lateral branch is thus prevented, and it is even enabled to raise itself above its natural level when the branches above it are removed; and the young tree, by the same means, becomes more upright, in direct opposition to the immediate action of gravitation, nature, as usual, executing the most important operations by the most simple means.

"It has, however, been objected by Duhamel (and the greatest deference is always due to his opinions) that gravitation could have little influence on the direction of the germen were it, in the first instance, protruded, or were it subsequently inverted, and made to point perpendicularly downwards. To enable myself to answer this objection I made many experiments on trees of the horse-chestnut and of the bean, in the box I have already described; and as the seeds there were suspended out of the earth, I could regularly watch the progress of every effort made by the radicle and germen to change their positions. The extremity of the radicle of the bean, when made to point perpendicularly upwards, generally formed a considerable curvature within three or four hours when the weather was warm. The germen was more sluggish; but it rarely or never failed to change its direction in the course of twenty-four hours; and all my efforts to make it grow downwards by slightly changing its direction were invariably abortive.

"Another, and apparently a more weighty objection to the preceding hypothesis (if applied to the subsequent growth and form of trees) arises from the facts that few of their branches rise perpendicularly upwards, and that their roots always spread horizontally; but this objection may, I think, be readily answered. The luxuriant shoots of trees, in whatever direction they are first protruded, almost uniformly turn upwards, and endeavour to acquire a perpendicular direction, and to this their points will immediately return if they are bent downwards during any period of their growth, their curvature upwards being occasioned by an increased extension of the fibres and vessels of their under sides, as in the elongated germens of seeds. The more feeble and slender shoots of the same trees will, on the contrary, grow in almost every direction; probably because, their fibres being more dry, and their vessels less amply supplied with sap, they are less affected by gravitation. Their points, however, generally show an inclination to turn upwards; but the operation of light, in this case, has been proved by Bonnet to be very considerable.

"The radicle tapers rapidly as it descends into the earth, and its lower part is much compressed by the greater solidity of the mould into which it penetrates. The true sap, also, continues to descend from the cotyledons and leaves, and occasions a continued increase of the growth of the upper parts of the radicle, and this growth is subsequently augmented by the effects of motion, when the germen has risen above the ground. The true sap is, therefore, necessarily obstructed in its descent, numerous lateral roots are generated, into which a portion of the descending sap enters. The substance of these roots, like that of the slender horizontal branches, is much less succulent than that of the radicle first emitted, and they are, in consequence, less obedient to gravitation, and therefore meeting less resistance from the superficial soil than from that beneath it, they extend horizontally in every direction, growing with most rapidity, and producing the greatest number of ramifications, wherever they find most warmth, and a soil best adapted. As these horizontal or lateral roots surround the base of the tree on every side, the true sap, descending down its bark, enters almost exclusively into them; and the first perpendicular root, having executed its office of securing moisture to the plants whilst young, is thus deprived of proper nourishment, and, ceasing almost wholly to grow, becomes of no importance to the tree.

"As trees possess the power of turning the upper surfaces of their leaves and the points of their shoots to the light, and their tendrils in any direction to attach themselves to contiguous objects, it may be suspected that their lateral roots are by some m directed to any soil in their vicinity w is best calculated to nourish the pl which they belong; and it is well kn that much the greater part of the ro an aquatic plant which has grown in a soil, on the margin of a lake or river, h been found to point to the water, w those of another species of tree which th best in a dry soil have been ascertained take an opposite direction: but the re of some experiments I have made is favourable to this hypothesis; and I inclined to believe that the roots disper themselves in every direction, and only b come more numerous where they find m employment, and a soil best adapted to th species of plant." (*Selection of Papers,* 129.)

A tree growing upon a wall at some distance from the ground, and consequently ill supplied with food and water, has also been observed to adapt its habits to its situation, and to make very singular and well-directed efforts to reach the soil beneath by means of its roots. During the period in which it is making such efforts little addition is made to its branches, and almost the whole powers of the plant appear to be directed to the growth of one or more of its principal roots. To these much in consequence is annually added, and they proceed perpendicularly towards the earth unless made to deviate by some opposing body; and as soon as the roots have attached themselves to the soil, the branches grow with vigour and rapidity, and the plant assumes the ordinary habits of its species.

In some other experiments of Knight to illustrate these highly interesting habits of plants, pieces of alum, and of the sulphate of iron (green vitriol), blue vitriol (sulphate of copper), were placed at small distances perpendicularly beneath the radicles of germinating seeds of different species, to afford an opportunity of observing whether any efforts could be made by them to avoid poisons; but they did not appear to be at all influenced except by actual contact of the injurious substances. The growth of their fibrous lateral roots was, however, obviously accelerated when their points approached any considerable quantity of decomposing vegetable or animal matter; and when the growth of the roots was retarded by want of moisture, the contiguity of water in the adjoining mould, though not apparently in actual contact with them, operated beneficially: but I had reason to suspect that the growth of roots was, under these circumstances, promoted by actual contact with the detached and fugitive particles of sing body and the evaporating

n which plants establish them-
osition to the various obstacles
encounter, as, for instance, in
violent winds, is very remark-
is the author I have already
ich remarks in another place,
th and forms assumed by the
of every species are, to a great
endent upon the quantity of
ch their stems and branches
winds; for the effects of mo-
e growth of the root and of the
ranches are perfectly similar.
rt of a root is moved and bent
other causes, an increased de-
alburnous matter upon that
kes place, and consequently the
immediately adjoin the trunk
ed tree in an exposed situation
ng and rigid, whilst they di-
ly in bulk as they recede from
nd descend into the ground;
en diminution of the bulk of
passage of the descending sap
ir bark is obstructed, and it,
ice, generates, and passes into
roots, and these, if the tree be
agitated by winds, assume a
and consequently divide into
. A kind of net-work, com-
ick and strong roots, is thus
the tree is secured from the
ich its situation would other-
it. In a sheltered valley, on
, where a tree is surrounded
d by others, and is rarely agi-
ids, the roots grow long and
the stem and branches, and
ly much less of the circulating
nded in the deposition of al-
eath the ground; and hence it
ntly happens that a tree in the
ed part of a valley is uprooted,
posed and insulated tree upon
mountain remains uninjured
of the storm." (*Selection of*
3.)

vestigations as these are fraught
tion to the cultivator of the
y not only illustrate the every-
ns of the farmer, but they guard
the adoption of specious no-
unscientific efforts to increase
of the soil. Such researches,
dly fail to instruct and elevate
r of the tiller of the earth in
han one. They will teach him,
long since well remarked, that
ion "is connected in the vast
globe, and that order emanates
ipoise of conflicting phenomena.
Animals carry off the oxygen of the atmosphere, replacing it by carbonic acid gas; and are thus at work to adulterate the constitution of the air and render it unfit for respiration. Vegetables take up carbonic acid gas, retain the carbon, and give out oxygen; and are thus purifying the air tainted by animals, and re-establishing the necessary proportions between its elements. In Europe, while our vegetables, stripped by the severity of the season of their foliage, no longer yield the air contributing to life, the salutary gas is borne to us by trade winds from the southernmost regions of America. Breezes from all quarters of the world intermingle thus the various strata of the atmosphere, and keep its constitution uniform in all seasons and at all elevations. The substances which are produced by the dissolution of animal and vegetable matter are absorbed by plants, and constitute a portion of the nourishment by which they are maintained; plants, in their turn, become the food of animals, and these again the prey of others which subsist on flesh. Yet, in spite of this perpetual state of war and destruction, nothing perishes, for all is regenerated. Nature has ordained that the two great divisions of organised beings should depend the one upon the other for support, and that both the life and death of individuals should be equally serviceable in preserving the harmony of the universe.

"If we come to consider vegetation as it regards ourselves, we shall find that this great agent of nature, subjected in a certain degree to the control of man in a state of society, is the main source of his prosperity or of his misery. How many countries have the greedy ambition of princes, and the degradation and ignorance of the people, made barren! Recollect what Asia Minor, Judea, Egypt, the provinces at the foot of Mount Atlas, have been, and behold what they are at this day. Recollect Greece, once the country of science and of liberty, now that of ignorance and slavery; she can be only recognised in her ruins, and her monuments of the dead. Man had denied his labour to the earth, and the earth her treasures to man: all vanished with agriculture. The traveller who passes that country of so great renown, finds, in the place of the fine forests that crowned its mountains, of the rich harvests reaped by twenty busy nations, of the numerous flocks that enriched its fields, only naked rocks and sterile sands, with here and there a miserable village. He seeks in vain for several rivers recorded in history; they are gone! Thus the rage of conquest and of rule not only overturns cities, depopulates whole countries, and brings back barbarism, but it dries up the very springs from which the natural riches of the earth have flowed. To these melancholy results of our passions we might oppose the more cheerful ones of our industry; but they are more properly within the province of the arts of cultivation than of vegetable physiology."

VEGETABLE MARROW. (*Cucurbita ovifera*, var.) The fruit of the succada gourd is uniformly of a pale yellow colour, and of an elliptic-oblong shape; when full grown it is about nine inches in length and four in diameter, and is by far the best adapted for culinary purposes of any species of the gourd tribe. For culture see GOURD. The vegetable marrow, according to Mr. Sabine, may be used at any stage of its growth: when very young it is good fried with butter; when large or about half grown it is excellent either plain boiled or stewed with rich beef gravy; for either of these purposes it should be cut in slices. The flesh has a peculiar tenderness and softness, from which circumstance it has received its name. (*Baxter's Libr. of Agr.* p. 623.)

VELVET LEAF. See TREE-MALLOW.

VENISON. The flesh of deer. See MEAT and DEER.

VENUS'S COMB. See SHEPHERD'S NEEDLE.

VERJUICE. An acid liquor, prepared from the twigs of the vine, or from grapes or apples that are unfit to be converted into wine or cider. It is also made from the wild crab apples.

VERMIN. A general name for all birds, animals, insects, &c., which prey upon or prove injurious to the cultivator's crops, and to his live stock.

The greatest animal plagues are rats and mice, weasels, stoats, polecats, moles, foxes, and hedgehogs. These are more or less injurious, according to their number, &c. Their habits, and the best modes of keeping them within due bounds, have been already noticed under their several heads.

Among birds, those which come under the term vermin are the kite, sparrow-hawk, and all the granivorous birds. See HEDGE-ROW BIRDS.

The insects, &c. comprise the most extensive and fearful class of depredators. Among these are the aphides, caterpillars, ants, beetles, and their grubs, wire-worm, slugs, earth-worms, &c.

VERNAL GRASS. See ANTHOXANTHUM.

VERSATILE. In botany, signifies swinging lightly on the stalk, so as to be continually changing direction. It is illustrated in the leaves of the aspen.

VERTICILLATE. Disposed in a wh

VERVAIN. (*Verbena*; said to be rived from its Celtic name *Ferfaen*.) T is a genus of extremely beautiful or mental plants while in flower, either w grown in pots in the greenhouse or w planted out in the flower-garden; and t will all succeed well in the open gro during the summer months. The flo of *V. teucrioides* have a delightful jasmi like odour. They all flourish well i light loamy soil, with careful drainage wh kept in pots. The herbaceous peren kinds increase rapidly by cuttings, plan in sand under a glass; the greenhouse ki in a little heat. The annuals and bienni should be raised on a gentle hot-bed.

One species is indigenous, the comm vervain (*V. officinalis*), a perennial whi grows by road sides and in dry wa grounds, or pastures about villages. Th root is woody, somewhat creeping. Ste ascending, one foot and a half high, br roughish, with minute prickles or bristle Leaves deeply cut. Spikes slender, sever composing a sort of panicle of small bluis inodorous flowers. This species has scarcely any aromatic or other sensible quality. The root worn about the neck with a string is an old superstitious remedy or charm for the king's evil. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 71.)

VESTRY. A parochial assembly, com monly convened in the vestry of the church Parish vestries, in the absence of any loc act, are regulated by the 1 & 2 W. 4. c. 6 the 58 G. 3. c. 69., and the 59 G. 3. c. 1 At all parish vestries the minister has right to preside, but his presence is not essential. (*Manley* v. *Barbet*, 2 Espinasse 687.) By this act all persons rated to the poor in respect of an annual rent of not exceeding 50*l.* are entitled to one vote at the parish vestry, and an additional vote for every additional 25*l.* for which they may be rated, not exceeding six votes in the whole. A person is not disqualified from voting in a vestry by non-payment of church-rates. (*Falkener* v. *Elgar*, 4 D. & R. 517.) When vestries are held in the parish church the Ecclesiastical Court has jurisdiction *ratione loci* over their proceed ings. (*Wilson* v. *M'Math*, 4 B. & Ald. 241.) Select vestries may be held by act of par liament or by custom, but it cannot be constituted by a faculty from the bishop (*Berry* v. *Banner*, Peake, 136.); and such a vestry may be continued by custom by self election. (*Golding* v. *Fenn*, 7 B. & C. 765.) To constitute a valid assembly of a select vestry appointed under the 58 & 59 G. 3. a majority of the whole number should be present. (*Brockett* v. *Bland*

.641.) The magistrates are bound
59 G. 3. c. 12. to appoint all per-
inated and elected by the parish-
be members of the select vestry.
The Justices of Kent, 4 N. & M.
ch select vestryman may be either
ate or an overseer, although the
member by virtue of his office.

LES. In botany, inflated hollow
ces, like bladders or blisters.

H. (*Vicia*, from *vincio*, to bind
because the species have tendrils
they encircle other plants.) Some
ecies of this genus are well worth
g in the flower-border for the
their flowers. They are of the
lture in any common garden soil.
nnial kinds may be readily in-
y dividing the root or by seeds.
of the annual kinds only require
vn in the open border in spring.
and its varieties are extensively
, and well known by the common
vetch or tares; they are used as
ler for all kinds of cattle, and are
be more nutritive and profitable
or any other herbage. The seeds
the food of pigeons. There are
enous species of vetch, the prin-
which are the tufted vetch, wood
nmon vetch, and bush vetch. Of
ferent vetches (says Sinclair) that
nitted to experiment, the winter
common vetch (*V. sativa*, var.),
he most nutritive matter. Sixty-
hms of the herbage, cut at the
wering, afforded four drachms four
utritive matter; while spring tares
led three drachms three grains,
firms the justice of that preference
ctice has given to the former.

tufted vetch. (*V. Cracca.*) A
very common in a wild state in
ickets, osier grounds, and bushy
ows. The stems are two or three
furrowed, rather downy, climbing
of their long many-branched
y which they choke and overtop
bs. Leaflets numerous, elliptic-
, downy, or, rather, silky on both
ipules half-arrow-shaped, mostly
lowers numerous, in dense clus-
tifully variegated with tints of
let blue, and some purple. Le-
rcely an inch long, smooth, with
e dark globular seeds, the size of
This vetch is said to be nutritious
ttle, but it has not come into use,
from the difficulty of gathering,
ivating, so pertinacious a climber.
in his *History of Staffordshire*,
this and the *Vicia sylvatica* advance starved or weak cattle above any thing yet known; and Dr. Anderson, in his *Essays*, speaks highly of this plant. It is inferior to the wood vetch, or common tare (*V. sylvatica*), in the quantity of nutritive matter it affords, but contains much less superfluous moisture. This must give it a superiority, in regard to nutrient properties, over tares which contain an excess. But it has a strong creeping root, that will always prevent its admission to arable lands. It might be best cultivated on tenacious soils, and used after the manner of lucern, to which it is much superior in nutritive qualities, though greatly deficient in the weight of crop. Forty-three grains of nutritive matter consisted of—

		Grains.
Saccharine matter, or sugar	-	20
Mucilage - - -	-	12
Insoluble and saline matter	-	11

The tufted vetch flowers about the middle of July or the beginning of August, and the seed is ripe at the beginning of September.

2. The wood vetch (*V. sylvatica*) grows in our woods and hedges, chiefly in the more mountainous parts of Britain, and is one of our most elegant wild plants, well worthy to decorate shrubberies, or to be trained over a trellis or bower. The habits of this vetch are similar to those of the species last described, but it seems more impatient of exposure, and thrives best where it has the support of bushes. The root is creeping, perennial; herbage smooth. Stems numerous, much branched, climbing to the height of six or seven feet, and spreading widely, decorating the bushes which support them with a profusion of delicate flowers, elegantly variegated with blue and white, streaked with grey. Tendrils branched. Leaflets light green, elliptical. Stipules crescent-shaped, deeply toothed. Legume the size of the last, bright brown, minutely dotted. When transplanted to open situations, the produce is inconsiderable compared with that of the tufted vetch or the bush vetch, though in its natural place of growth the produce is six times that of either of these species; it is likewise superior in the quantity of nutritive matter it affords. Horses, cows, sheep, and the South American llamas, ate this vetch with more eagerness than they did the other vetches or natural grasses that were on several trials offered to them. The wood vetch flowers in July and August, and the seed is ripe in September.

3. Common vetch or tare (*V. sativa*) is an annual plant, which is in general culti-

are the narrow-leaved crimson vetch (*V. angustifolia*), spring vetch (*V. lathyroides*), rough-podded yellow vetch (*V. lutea*), hairy-flowered yellow vetch (*V. hybrida*), smooth-podded sea vetch (*V. laevigata*), and rough-podded purple vetch (*V. bithyrica*). These call for no detailed description. (*Sinclair's Hort. Gram.; Smith's Eng. Flor.* vol. iii. p. 279.) See Tare and Vetchling.

VETCH, THE BITTER. (*Orobus*, from *oro*, to excite, and *bous*, an ox; the *orobus* of Theophrastus was the name of a plant used for fattening oxen.) The plants of this genus deserve to have a place in every flower-border, on account of their very elegant papilionaceous blossoms. Any soil suits them, and they are readily increased by dividing the plants at the roots in spring, or raised by seeds. There are two native species, both perennials.

1. The common bitter vetch, or heath pea (*O. tuberosus*), grows in elevated or mountainous pastures, thickets, and woods. The root is creeping, externally blackish, swelling here and there into oblong knobs. Herbage smooth, darkish green. Stems simple, erect, a foot high, compressed and winged. Leaves alternate, pinnate, of two or three pair of elliptic-lanceolate leaflets, the axis projecting beyond them, but not bearing a tendril. Stipules half-arrow-shaped, toothed at their base. Flowers in loose, long-stalked, axillary clusters, elegantly variegated and veined, with purple, crimson, and shades of blue and flesh co-

axillary, eith
ters; either
yellow. Th
good fodder;
any purpose.
species of v
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son vetchling
the rough-p
the yellow m
lasting (*L. p*
lasting pea
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marsh vetchl
species have
the heads
thyrus. Th
ally cultivat
the beauty o
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Eng. Flor.
Dict.; Sincla
VETERI
Highland Sc
tuted a vet
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lege has long
and that use

Bel, a Frenchman, who had
gnalised himself in this country
ry anatomist, by dissecting the
horse Eclipse. This college is
public subscription. The an-
ution is two guineas, but pay-
ity guineas at once constitutes
for life.

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rinary knowledge, in order to
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ng and universally complained
s end, a range of stables, a
tre for dissections and lectures,
uildings, have been erected: a
f superior abilities has been
rofessor, with other requisite

tomical structure of quadru-
es, cattle, sheep, dogs, &c., the
hich they are subject, and the
per to be applied, are investi-
regularly taught; by which
tened practitioners of liberal
whose whole study has been
the veterinary art in all its
y be gradually dispersed over
, on whose skill and experience
ay be securely placed.

ers have the privilege of send-
eased animals to the college,
her expense than that of their
and these in general form a
mber of patients for the prac-
rofessor and pupils. On fixed
ofessor prescribes for animals
subscribers who find it incon-
are them from home, provided
y medicines be furnished and
at the college; subscribers'
lso there shod at the ordinary

S. A term in botany, signify-
with soft, close, long, loose
ling shag.

Vitis, from the Celtic *gwid*,
e best of trees. Wine is de-
he Celtic word *gwin*.) A va-
of plants. The common grape
fera), with its very numerous
ties, is in general cultivation
esteemed fruit. None of the
s are worth cultivating. The
es are chiefly the tartaric and
malic acid is also present in
ton's Bot. Dict.) Mr. Loudon,
clo. of Gardening, thus bota-
ibes the vine: — "The grape
iling, deciduous, hardy shrub,
ted irregular stem, and long flexible branches, decumbent, like those of the bramble; or supporting themselves, when near other trees, by means of tendrils, like the pea. The leaves are large, lobed, entire, or serrated and downy, or smooth; green in summer, but when mature, those varieties in which the predominating colour is red constantly change to, or are tinged with, some shade of that colour; and those of white, green, or yellow grapes as constantly change to a yellow, and are never in the least tinged with purple, red, or scarlet. The breadth of the leaves varies from five to seven or ten inches, and the length of the footstalks from four to eight inches. The flowers are produced on the shoots of the same year, which shoots generally proceed from those of the year preceding; they are in the form of a raceme, of a greenish-white colour, appearing in the open air in this country in June; and the fruit, which is of the berry kind, attains such maturity as the season and situation admit by the middle or end of September. The berry or grape is generally globular, but often ovate, oval, oblong, or finger-shaped; the colours are green, white, red, yellow, amber, or black, or a variegation of two or more of these colours. The skin is smooth; the pulp and juice of a dulcet, poignant, elevated, generous flavour. Every berry ought to enclose five small heart or pear-shaped stones; but as they are partially abortive, they have seldom more than three; and some varieties, as they attain a certain age, as the Ascalon or Sultana raisin, have none. The weight of a berry depends not only on its size, but on the thickness of its skin, and texture of the flesh, the lightest being the thin-skinned and juicy sorts, as the sweet-water or Muscadine."

Although we presume the excellent treatise of Mr. Clement Hoare on the *Culture of the Vine* is in the hands of most of our readers, yet, as there is no other standard work of reference on this subject, we must necessarily draw upon this for our extracts.

Of all the productions of the vegetable world (observes this experienced cultivator), which the skill and ingenuity of man have rendered conducive to his comfort and to the enlargement of the sphere of his enjoyments, and the increase of his pleasurable gratifications, the vine stands forward as the most preeminently conspicuous. Its quickness of growth, the great age to which it will live, — so great, indeed, as to be unknown; its almost total exemption from all those adverse contingencies which blight and diminish the produce of other fruit-bearing trees; its astonishing vegetative powers; its wonderful fertility, and its delicious fruit, applicable to so many purposes, and agreeable to all palates, in all its varied shapes, — combine to mark it out as one of the greatest blessings bestowed by Providence to promote the comfort and enjoyments of the human race.

From the remotest records of antiquity, the vine has been celebrated in all ages as the type of plenty and the symbol of happiness. The pages of Scripture abound with allusions to the fertility of the vine as emblematic of prosperity; and it is emphatically declared, in describing the peaceful and flourishing state of the kingdom of Israel during the reign of Solomon, that "Judah and Israel dwelt safely, every man under his vine and under his fig tree, from Dan even to Beersheba." The source of enjoyment thus mentioned to record the happy state of the Jewish nation may be, with reference to the vine, literally possessed by the greater portion of the inhabitants of this island.

The native country of the vine is generally considered to be Persia. The finest grapes in the world are those of Shiraz and of Casvin. The latter city, says M. Morier, is environed by vineyards and orchards, and the former yield a grape which is celebrated throughout Persia. It is along the line of mountains that stretch from the Persian Gulf to the Caspian Sea, that the best vine districts are situated; but the grape vine has been found wild in America, and has now become naturalised in all the temperate regions of the world. In the northern hemisphere it forms an important branch of rural economy, from the 21st to the 51st parallel of latitude; and by an improved method of culture very fine grapes may be annually grown on the surface of walls, in the open air, as far north as the 54th parallel, and even beyond that in favourable seasons. The vine is supposed to have been introduced into Britain at the commencement of the Christian era. It certainly did not exist before the Roman invasion, as neither Cæsar, Pliny, nor Tacitus notices it in the description of our island. Bede informs us, that in the commencement of the eighth century the cultivation of the vine had made some progress in Great Britain: vines are mentioned in the laws of Alfred. History, indeed, amply proves, that for a long series of ages vineyards were very common in the southern parts of this island, and that the quantity of wine produced from them was so great as to be considered one of the staple products of the land. Lambarde (*Topographical Dictionary of England*) informs us, that at Halling, near Rochester, the bishop's vineyard yielded such excell
a present of it was sent to Ed
he was at Bakingfield. Ther
vineyard at Rockingham, in
of King Stephen; and Willia
bury, speaking of the vale
says, "this district, too, exhi
number of vineyards than an
in England, yielding abunda
of superior quality." The sa
says, that in the Isle of Ely t
vered with vines, which eith
the ground or are trained
supported on poles." In the
chard II., also, the vine grew
in Windsor Little Park, tha
wine made there was sold f
profit. From some cause or
ever, the cultivation of the vi
into general neglect, although
might be grown on vines tra
liers, or in the same manner a
yards abroad, from which e
could be made, at a cost th
exceed that of moderately
Why vineyards should have
disappeared, it is difficult to sa
are many thousands of acres
that are of little value in an
point of view, but on which
flourish, and produce abunda
grapes, and yield thereby a mo
return.

Fruit-bearing Powers of t
From a long course of experi
Hoare has computed the followi
the greatest quantity of grapes
vine can perfectly mature, in pr
the circumference of its stem
just above the ground.

Circum.		lb.	Circum.
3 inches	-	- 5	7 inches
3½	-	- 10	7½
4	-	- 15	8
4½	-	- 20	8½
5	-	- 25	9
5½	-	- 30	9½
6	-	- 35	10
6½	-	- 40	

No vine should be suffered to rip
until its stem measures three inche
In general, vines are allowed to
much greater quantity of grapes th
above scale represents, but in all su
it will be found that they are not p
ripened; and moreover, by produ
superabundance of fruit, the plan
crippled for many years.

Aspect.—The warmer the aspe
greater perfection does the grape att
our climate, provided all other ci
stances are alike; and if the greatest
tity of the sun's rays shining on the s

wall were alone to be considered as
tituting the best aspect, there would,
urse, be no difficulty in naming a due
hern one as better than any other. But
uth alone is not sufficient; *shelter* from
withering influence of the wind is
lly necessary. The best aspects are
that range from the eastern to the
-eastern, both inclusive. The next
are those from south-east to south.

il.—The natural soil which is most
enial to the growth of the vine, and to
erfection of its fruit in this country, is
ht, porous, rich, sandy loam, not more
eighteen inches in depth, on a dry
m of gravel, stones, or rocks. A strong
laceous soil is injurious to the vine: it
s the expansion of the roots, and re-
too much moisture. In calcareous
the vine always flourishes, especially if
ottom be stony or gravelly. No sub-
can possess too great a quantity of
materials for the roots of the vine,
run with eagerness into all the
, crevices, and openings in which such
ils abound. In these dry and warm
tions, the fibrous extremities, pushing
selves with the greatest avidity, and
nually branching out in every possible
tion, lie secure from that excess of
ure which frequently accumulates in
compact soils; and, clinging like ivy
l the porous surfaces of their retreats,
ct therefrom a species of food, more
shing than that obtained by them
r any other circumstances whatever.
orders, therefore, made expressly for
eception of vines, ought to be com-
l of a sufficient quantity of dry mate-
such as stones and brickbats, broken
rately small, lumps of old mortar,
n pottery, oyster shells, &c., to enable
oots to extend themselves freely in
search after food and nourishment;
p them dry and warm by the free ad-
n of air and solar heat, and to admit
vy rains passing quickly through,
t being retained sufficiently long to
e the roots, and thereby injure their
extremities. The sweepings ob-
from a turnpike road, or from any
high road kept in a good state of
by the frequent addition of stones,
which there is a considerable traffic
ses or other cattle, is the very best
t that can be added to any border
d for the reception of vines. Its
ent parts, consisting chiefly of sand,
pulverised stones, and the residuum
g and urine, afford a greater quan-
food, and of a richer and more last-
ure, than can be found in any other
tion of compost that I have ever seen or heard of being used for that purpose. Borders in which vines are planted should never be cropped nor digged.

Manure.—The best species of manure for the vine are those which afford a considerable degree of nourishment, but at the same time slowly decompose in the soil. Such are bones, whole or crushed, the horns and hoofs of cattle, the entire carcases of animals, cuttings of leather, woollen rags, feathers, and hair, and the leaves of the vines themselves. Liquid manures are also valuable, and forcing in their effect; of this class the most powerful are urine, soot water, blood, the drainings of dung-heaps, and soap suds. It should, however, always be recollected, that the more manure is used the poorer the wine procured from the grapes. As a top-dressing, and to be forked into the border, night-soil, refuse fish, stable manure, and the excrements of all birds and animals, will be found highly enriching substances as fertilisers, and their nutritive and stimulating properties have been frequently alluded to in the progress of this work; but if rich manures are used, they should be mixed with turf and sand. In the Alto Douro is a law which prohibits the vine being "littered;" as this operation, though it considerably augments the produce, tends to deteriorate the quality of the wine.

On the Construction of Walls.—No general rule can be laid down as to the height of the wall, which must necessarily vary under different situations and circumstances. Mr. Hoare states, that in unsheltered situations and exposed aspects he has never seen fine grapes produced much higher than eight feet from the ground.

But, in favourable situations, height is no consequence. If built for the express purpose of rearing grapes, low walls of not more than six feet are to be preferred, as more convenient for pruning and training the vines. Brick walls are undoubtedly the best, the surface being smooth and even. A considerable heat is obtained by blackening the wall.

Propagation.—Vines are propagated in the open ground by layers and by cuttings. The former is the most expeditious mode, provided the shoots be laid down in pots, and planted out the same summer. The latter mode is much the best. To provide cuttings to be planted at the proper season, select at the autumnal pruning a sufficient number of shoots of the preceding summer's growth. Choose such as are well ripened, of a medium size, and moderately short-jointed. Cut them into convenient lengths of six or eight buds each, leaving at the ends not less than a couple of inches of the blank wood for the protection of the terminal buds. Stick these temporary cuttings about nine inches in the ground, in a warm and sheltered situation, where they will be effectually protected from the severity of the winter. The best time to plant them out is about the middle of March, but any time from the 1st of that month to the 10th of April will do very well.

Pruning and training are so closely connected together, and so mutually dependent on each other, that they almost constitute one operation. The judicious pruning of a vine is one of the most important points of culture throughout the whole routine of its management. The object is to get rid of all the useless and superabundant wood, for those shoots of a vine which bear fruit one year never bear any afterwards. There are three methods of pruning vines in practice amongst gardeners; namely, the long-pruning, spur-pruning, and the fan or fruit-tree method. The first is considered to be the most eligible method, and is that which is practised and recommended by Mr. Hoare. As the sole object in view in pruning a vine is to increase its fertility, the best method to accomplish this is to leave a sufficient supply of bearing shoots on the least possible proportionate quantity of old wood.

Long-pruning appears to recommend itself by its simplicity; by the old wood of the vine being annually got rid of; by the small number of wounds inflicted in the pruning; by the clean and handsome appearance of the vine; and by the great ease with which it is managed, in consequence of its occupying but a small portion of the surface of the wall.

Mr. Hoare lays down the following practical general rules for the guidance of the pruner:—

1st. In pruning, always cut upwards, and in a sloping direction.

2d. Always leave an inch of blank wood beyond the terminal bud, and let the cut be on the opposite side of the bud.

3d. Prune so as to leave as few wounds as possible, and let the surface of every cut be perfectly smooth.

4th. In cutting out an old branch, prune it even with the parent limb, that the wound may quickly heal.

5th. Prune so as to obtain the quantity of fruit desired on the smallest number of shoots possible.

6th. Never prune in frosty weather, nor when a frost is expected.

7th. Never prune in the months of March, April, or May. Pruning in either of these months causes bleeding, and occasions thereby a wasteful and an injurious expenditure of sap.

8th. Let the general autumnal pruning take place as soon after the first of October as the gathering of the fruit will permit.

Lastly, use a pruning-knife of the best description, and let it be, if possible, as sharp as a razor.

Training.—To train a vine (Mr. Hoare goes on to observe) on the surface of a wall is to regulate the position of its branches, the principal objects of which are, to protect them from the influence of the wind; to bring them into close contact with the wall, for the purpose of receiving the benefit of its warmth; to spread them at proper distances from each other, that the foliage and fruit may receive the full effect of the sun's rays, and to retard the motion of the sap, for the purpose of inducing the formation of fruit-buds. The flow of sap, it must be remembered, is always strongest in a vertical direction, and weakest in a downward one. For this reason, the method of serpentine training may be considered preferable to every other, being calculated in a greater degree to check the too rapid ascent of the sap, and to make it flow more equally into the fruiting shoots, and those intended for future bearers. On walls that are much less than five feet high, a portion of the shoots must be trained horizontally.

Varieties of Grapes.—The following twelve sorts of grapes are those best adapted for culture on open walls in our climate:—

1. Black Hamburgh. As a splendid table fruit, this is, in every respect, one of the most valuable grapes that can be grown on open walls. It is a prolific bearer, hardy in its nature, and under judicious culture will ripen with as small a portion of direct solar heat as any grape we have.

2. Black Prince. This is a very fine grape, and nearly if not quite equal to the black Hamburgh; both of these sorts ripen in a south-eastern aspect, about the middle of October.

3. Esperione. The Esperione vine is very hardy, extremely prolific, and ripens its fruit perfectly in any season, however unfavourable.

4. Black Muscadine. This is also a prolific bearer, but it requires a good aspect to ripen it perfectly.

5. Miller's Burgundy. This is a very hardy and prolific grape, and ripens perfectly in any season. Its leaves, which are very thick, distinguish it from every other sort, being covered on both sides with a hoary down, which, when they are young is nearly white; hence it is called the "*miller's*" grape.

6. Claret grape. This is a very fine wine grape. It requires a good aspect. Early

in the summer its leaves change to a russet red, and die in the autumn of a deep purple blood colour.

7, 8, 9. Black, grizzly, and white Frontignan. The flavour of these three sorts is so extremely delicious, that no good vine wall should be without them. They ripen well in favourable aspects, and where the soil is very dry; but being thin-skinned, and constitutionally disposed to decay after they become fully ripe, they cannot be kept long on the vine, particularly if the wall against which they are growing be destitute of a projecting coping.

10. White Muscadine. This is an exceedingly fine grape, and a prolific bearer; and from its hardy nature, and the certainty with which it ripens in any season, it may be considered as the best white grape that can be grown on open walls.

11. Malmsey Muscadine. This resembles the preceding, except that the berries are smaller, and the branches not so regularly formed; but the juice is sweeter, and possesses a higher flavour.

12. White sweetwater. This is a delicious grape; but, owing to its tenderness when in blossom, the berries sit very unevenly on the branches.

If it be desired to have a very early sort, to the preceding may be added the early black July; which, though the branches and berries are smaller, and the latter in general unevenly set, is a very sweet and also a well-flavoured grape. (*Hoare on the Cultivation of the Grape Vine on open Walls*, 3d edition; *Phillips's Hist. of Fruits*, p. 177.)

VINEGAR is the acetous and acetic acids of the chemist, containing a variety of foreign admixtures, some colouring matter, and an ethereal substance or spirit, which gives it a grateful aroma. Vinegar has been known from a very early age. It was by far the earliest known acid of commerce. That it was drunk in remote periods, diluted with water, by the labourers and soldiers, is very certain. It is repeatedly mentioned in the Old Testament. But then they had several descriptions, one of which, a kind of small wine, which they called *pesca* or *sera*, is supposed to be that offered to Ruth (*Ruth*, ii. 14.), and to our Saviour by the Roman soldiers (*Matt.* xxvii. 48.). The stronger variety of vinegar is alluded to in another place (*Prov.* x. 26.). They mixed it also with nitre, or properly speaking natron, which was an alkali that by neutralising destroyed its sharpness. "As vinegar upon nitre, so is he that singeth songs to an heavy heart." (*Prov.* xxv. 20.) They made it in those days from wine. (*Numb.* vi. 3.) It is known to every one, that when wine or beer is exposed to the influence of the atmosphere, it becomes sour or acid; now this acid is the acetic. In the wine countries it is chiefly made from the produce of the vine, weak or low wines; the shoots of the vine, &c. being also employed for that purpose. It may be readily made from merely sugar and water. That of commerce in England is usually made from wort from malt liquor or cider. Vinegar is of a yellowish or reddish colour, an acid taste, and pleasant odour. Its specific gravity is commonly between 1·0135 and 1·0251. It usually holds in solution various foreign substances, such as colouring matters, sulphate of lime, mucilage, sulphuric acid, and the ethereal spirit already mentioned. Vinegars differ greatly in strength and in purity. The best known in this country for domestic purposes are, the French white wine vinegar; but the Vinaigre d'Orleans, made from the red wine of the Orleanois, is that most esteemed in France; and that imported from Bourdeaux, although named Champagne vinegar, is often made from red wine. The density of French vinegars varies from 10·14 to 10·22. The free sulphuric acid in British vinegar is permitted by the English excise laws to the amount of one part in one thousand, but it is often added to four times that amount.

Vinegar is readily purified from its impurities by distillation, and in this form is the transparent distilled vinegar of commerce. But even then it is united with a considerable portion of water.

The specific gravity determines this point. Thus, at 10·14 it contains 10 per cent. of real acetic acid, at 10·22 15 per cent., at 10·25 18 per cent., at 10·35 26 per cent., at 10·60 50 per cent., and so on, until it reaches 10·635, which is the strongest liquid acetic acid.

When deprived of all impurities and water, by chemical means, pure acetic acid is composed, according to the analysis of M. Berzelius, of—

	Parts.
Carbon - - -	46·83
Oxygen - - -	46·82
Hydrogen - - -	6·35
	100

Some plants contain acetic acid naturally. M. Vauquelin found it in the sap of various trees, and in the chick pea. Scheele detected it in the elderberry. It has been found also in the date palm tree, and in several others; and few plants exist in which acetic acid in the form of salts, such as the acetates of lime or potassa, is not found.

In England, for domestic purposes, it is prepared in several very considerable manufactories from a mixture of barley or malt with water, by keeping the wash exposed in open vessels to the influence of the atmosphere, in rooms heated to a particular temperature. The formation of the acetic acid in this manner is in these works promoted by the addition of a certain small proportion of acetic acid.

An excellent vinegar for domestic purposes may be readily made by exposing a mixture of one part of brown sugar by weight with seven parts of water and some yeast, in a cask whose bung-hole is only slightly covered over (as by a piece of gauze pasted down to keep out insects), for some weeks to the action of the atmosphere and the sun. The acetic fermentation and the goodness of the vinegar are promoted by the addition of vine leaves.

Although vinegar is familiarly used in small quantity as an agreeable and useful addition to food, yet in large quantities it interrupts digestion, and induces emaciation. In combination with water, it is an excellent cooling and invigorating substance when employed for sponging the body, especially in febrile conditions of it: its vapour inhaled with the vapour of hot water relieves hoarseness; and when moderately diluted it forms an excellent gargle in inflamed or sore throats. See Acids and Pyroligneous Acid.

VIOLET. (*Viola.*) All the species of this genus deserve to be cultivated, either for the beauty or the scent of their flowers. The hardy perennial kinds are well fitted for ornamenting the front of flower-borders or rock-work, but the smaller species succeed best when grown in pots, in a mixture of loam, peat, and sand. The species natives of America thrive best in vegetable mould or peat, and are readily increased by parting the roots or by seeds. The greenhouse and stove species should be grown in a mixture of loam and peat; the herbaceous kinds are increased by seed or dividing the roots, and the shrubby kinds by cuttings, which root readily when planted under a glass. The annual species may be sown in the open borders or on rock-work. The Neapolitan violet may be made to flower throughout the winter and early in spring, by placing it in a stove or warm pit. The dog's violet (*V. canina*) is said, but without truth, to be a famous agent for removing cutaneous diseases. There are eight native species of violet. The hairy violet (*V. hirta*), the sweet violet (*V. odorata*), the marsh violet (*V. palustris*), the dog's violet (*V. canina*), the cream-coloured violet (*V. lactea*), the dwarf yellow-spurred violet (*V. flavicornis*), the fancy violet, or heart's ease (*V. tricolor*), and the yellow mountain violet, or pansy (*V. lutea*). The common sweet violet is highly fragrant, and gives its name to a peculiar deep purplish-blue colour, as well as to a delicious scent, resembling its own, or that in the root of *Iris florentina* and a few cryptogamic vegetables. A syrup prepared with the petals is used as a test for alkalies. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. i. p. 300.)

VIOLET, CALATHIAN. See Gentian.

VIOLET, DAME'S. See Damewort.

VIOLET, WATER. See Featherfoil.

VIPER'S BUGLOSS. See Bugloss, Viper's.

VULTURE. (*Neophron percnopterus.*) The Egyptian vulture has on one or two occasions been captured in this country, and has hence been included in his *History of British Birds* by Mr. Yarrell. Vultures are most numerous in warm countries, where a high degree of temperature induces rapid decomposition. Their food is chiefly animal substance in a decaying state; and their business in nature, as observed by Mr. Vigors, is to clear away with rapidity those putrefying remains which, if allowed to accumulate, might produce pestilence and death. The same services rendered to man by numerous storks in the cities of India, and by troops of dogs in Constantinople, are performed on a much more extended scale by vultures. So valuable are those services, that vultures are almost universally protected from molestation or injury, either by local legislation or by common consent.

In the adult bird, the whole length from the point of the beak to the end of the tail is from twenty-six to twenty-nine inches; and specimens from Africa are observed to be the largest in size. The general colour of the plumage is white. (*Yarrell's British Birds*, vol. i. p. 1.)

W.

WAGER. See Gaming, Horse-Racing, &c.

WAGES. The price or hire paid to labourers or servants for performing different sorts of farm work.

These differ greatly in different districts and situations, and according to the character and employment of the workmen, but in all they are considerably increased within the last fifteen or twenty years. They may perhaps be stated as varying, under different circumstances, from 9*s.* to 18*s.* by the week, and from 9*l.* to 15*l.* or 18*l.* by the year. See Labour, Farm Servant, and Master and Servant.

WAGGON. A wheel carriage, of which

there are several varieties, accommodated to the different uses which they are intended to serve.

In the business of husbandry, waggons constructed in different forms, and of various dimensions, are made use of in different districts or parts of the kingdom; and mostly without much attention to the nature of roads, or the articles which are to be conveyed by them; being in general heavy, clumsy, and inconvenient. There is, however, a waggon much employed in Berkshire, which is constructed on a more simple and convenient principle than those mostly met with in the other southern parts of the island, not having the height or weight of them, while it possesses sufficient strength, and is easy in the draught.

Waggons require more power in the draught than carts, which is certainly an objection, though they carry a much greater load, and are far from being so handy and convenient; and Mr. Parkinson is of opinion, that more work may be done in any particular time, with the same number of horses, by carts than by waggons, in the general run of husbandry business, especially where the distance is small between loading and unloading; a fact which has long been known and attended to in Scotland.

Where waggons are used for husbandry, they should be made wide and low. Manures may be carried in this sort of waggon almost as well as in carts. Broad wheels are improper for passing and repassing upon tillage lands; for, if in fallow, they press the land too much, and make it so hard as to prevent its being ploughed till wet comes; but on grass land broad wheels are proper for all uses, as there they operate as rollers.

Waggons are probably the best conveyances for different sorts of heavy loads to a distance; but for home business, especially harvest and other work, which requires to be speedily performed in the field, carts with proper shelving will be found preferable. See CART and HIGHWAY.

WAGTAIL. (*Motacilla.*) Of this well-known bird the following British species have been described

1. The pied wagtail (*M. Yarrellii*, Gould) of this country, though a very common bird, is deservedly admired for the elegance of its form, as well as for the activity and airy lightness exhibited in all its actions. It is ever in motion, running with facility by a rapid succession of steps, in pursuit of its insect food, moving from place to place by short undulating flights, uttering a cheerful chirping note while on the wing, alighting again on the ground with a sylph-like buoyancy, and a graceful fanning motion of the tail, from which it derives its name. It frequents the vicinity of ponds and streams, moist pastures, and the grass plots of pleasure-grounds, and may be frequently seen wading in shallow water, seeking for various aquatic insects. The nest is formed of moss, dead grass, and fibrous roots, lined with hair and a few feathers; the nest is sometimes placed on the ground on a ditch bank, sometimes in a hole of a wall, or thatch of an outbuilding, and it is frequently fixed in the side of a wood stack or hayrick; occasionally it has been found occupying a cavity in a peat stack, or a wall of turf sod, but always in the vicinity of water. The eggs are four or five in number, white, speckled with ash-colour, nine lines in length, and seven lines in breadth. The pied black and white plumage is too well known to need description. The whole length of a male bird is seven inches and a half. The female is half an inch shorter. The pied wagtail is exceedingly common over the whole of the United Kingdom, and in all the southern parts it is resident throughout the year. The continental white wagtail (*M. alba*), which has generally been confounded with *M. Yarrellii*, has some slight but peculiar distinguishing characters.

2. The grey wagtail. (*M. boarula.*) The habits of this bird are, in many respects, very similar to those of the pied wagtail last described; but, as a species, it is far less numerous, and, with some exceptions, it may be generally considered as a summer visiter to the more northern counties, migrating in autumn, to become a winter visiter in those of the south; these changes of locality being generally made in September and April. It is even rather more an aquatic bird than our pied wagtail, being seldom seen except about marshes and water meadows, or on the banks or sides of streams. The nest of this bird is placed on the ground, seldom very distant from the stream it frequents, and generally on some rugged place on its banks; the inequalities of the ground affording concealment. The eggs are from five to six in number, yellowish white, mottled with pale brown, varying sometimes in the depth of the tint: they are eight lines and a half in length, and seven lines in breadth. The whole length of this species is seven inches and three quarters, of which the tail-feathers measure nearly half.

3. The grey-headed wagtail. (*M. neglecta.*) The food of this species is flies, moths, small green caterpillars, and aquatic insects. The length of the male is six inches and a half.

4. Ray's wagtail. (*M. Rayi.*) The common yellow wagtail of England, first described by our countryman and naturalist

tage. The nest is placed on the ground, and is generally formed of dried bent and fibrous roots, lined with hair. The eggs are from four to six in number, of a whitish colour, mottled nearly all over with yellow brown and ash brown; they are eight lines and a half long, by six lines and a half broad. The whole length of the bird is six inches and a half. (*Yarrell's Brit. Birds*, vol. i. pp. 362—383.)

WAIF. An old feudal term signifying a strayed animal, &c., which, for want of the owner's appearance after it had been cried and published in the neighbouring markets, is forfeited to the lord of the manor.

WAIN. A name applied to an ox cart, without any side rails, or ladders, in some districts; but in others shelvings are added, and the body is large and open. They are rarely met with at present. In Gloucestershire they adapt them to harvest work by fixing ladders and rathes on them. In the lower part of the vale they are called *dung-pots*; but in the forest districts, where drawn by oxen, wains.

WAKE-ROBIN. See Cuckow-pint.

WALL-CRESS. See Cress, Wall.

WALL-FLOWER. (*Cheiranthus.*) These are all ornamental dwarfish plants, and the common kinds thrive well in light soils; the rest require it somewhat richer, and the protection of a frame or greenhouse in winter. There is one indigenous species, the wild wallflower (*C. fruticulosus*), which grows on old walls, flowering in April and May. The stem is shrubby, erect, bushy, branched in a determinate

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usually about the latter end of September. In trees of considerable growth, it is commonly beaten down with long poles; for, as the walnuts grow mostly at the extremity of the branches, it would, in very large spreading trees, be troublesome and tedious work to gather them by hand. As soon as gathered, they should be laid in heaps a few days to heat and sweat, to cause their outer husks, which closely adhere, to separate from the shell of the nuts; after which they should be cleaned from the rubbish, and deposited in a dry room for use, covering them over close with dry straw, a foot thick, where they will keep three or four months. They always command a ready sale at market, in large towns, where, at their first coming in, they are brought with their husks on, and sold by the sack, or bushel, but afterwards cleaned, and sold both by measure and by the thousand.

Plantations of these trees are therefore profitable, in their annual crops of fruit, while growing, and in their timber when felled or cut down.

It is stated in the *Gloucestershire Report*, that "it will grow almost in any soil, wants no pruning nor care, and in less time than the oak it will make a large tree. The wood is too valuable to apply to the usual purposes of timber trees, but is always used either in cabinet work or for gun-stocks; for the latter, indeed, so great has been the demand for a few years past, from the Birmingham gun-makers, that the county has been ransacked for this wood, and high prices have been held out to tempt the sale of it. In consequence of this, the stock has been much diminished, and, with very few exceptions, only here and there is a solitary walnut tree seen growing. In the parish of Arlingham there are more, perhaps, than in many other parishes combined."

Were it only for the oil that these nuts afford, the trees which produce them would be worth some care. It has been observed by Evelyn, that one bushel of them will yield fifteen pounds of peeled kernels, and that these will yield half that weight of oil, which the sooner it is drawn, is the more in quantity, though the drier the nut the better is its quality. He adds, that the lee, or marc of the pressing, is excellent for fattening hogs. Certainly it would be good manure for land; as are the cakes of linseed, rape, &c., after the oil has been squeezed out of them. The green husks boiled, without any mixture, make a good colour to dye a dark yellow brown. The kernel being rubbed upon any crack or chink of a leaking vessel, stops it better than either clay, pitch, or wax. (*Phillips's Fruits*, p. 342.)

WALPOLE, HORACE, Earl of Orford, the youngest son of Sir Robert Walpole, prime minister of George I., was born in 1718, was educated at Eton, and King's College, Cambridge. He died March the 2d, 1797.

That the Earl of Orford was a man of taste and an encourager of the men of genius of his age is the best light in which, as a public character, we can look upon him; that he was gifted with a strong genius, though often asserted, is very doubtful; that his researches were frequently superficial his writings testify. He very powerfully contributed to abolish the mathematical style of gardening, being one of the most strenuous advocates of landscape-gardening, as is manifested in his only literary production that we shall mention, being an *Essay on Modern Gardening*, written in 1770, forming the concluding chapter of his *Anecdotes of Painting in England*, which, though printed in 1771, did not appear until 1780.

In this essay, being determined to demonstrate that rural gardening was the true and new taste, to establish the opinion, historians, both sacred and profane, which appeared to militate against his doctrines, are passed over with indifference and contempt. To his sketch of the improvements introduced by Bridgeman and Kent, and those garden artists their immediate successors, we may afford the best praise. He appears to be a faithful, and is an eloquent, annalist. (*G. W. Johnson's Hist. Eng. Gard.*)

WALTON, IZAAK, was born at Stafford in 1593. Although ranking high as a biographer, he claims our notice here as the patriarch of anglers, and his treatise on that recreation has gone through numerous editions.

The Complete Angler, or Contemplative Man's Recreation, was first published in 1653, and other editions appeared during Walton's life in 1655, 1664, 1668, and 1676. Editions were also published by Sir John Hawkins and his son in 1760 and 1797. It is well remarked, in the advertisement to the ninth edition, that "The English language does not perhaps contain a book of more general and undivided popularity than *The Complete Angler*; it is praised and loved by persons of all conditions; and so far from being confined to those who are devoted to the sport of which it mainly treats, it is a favourite with many men who never handled an angling-rod in their lives." Good honest Izaak Walton died on the 15th December, 1683, and lies buried in the cathedral church of Winchester, close by the bright and swift-flowing trout-waters of the Itchen, whose streams he used to haunt, and whose gallant fish he has so well scribed. (*Farmer's Almanac*, vol. i. p. *Watkins's Biog. Dict.*; life prefixed to *ton and Cotton's Angler.*)

WARBLE. See SITFAST, GALLS, BACK-SORE.

WARBLER. A name applied to se species of native singing-birds. Some of this family have already been noti See BLACKCAP, BLUE-THROATED WAR and DARTFORD WARBLER.

There are six other species which re to be noticed, namely:—

1. The grasshopper warbler. (*Sali locustella*, Selby and Yarrell.) It has ceived its common and specific name its very peculiar and almost inc cricket-like note. This warbler is a vi to us from the south, whence it come this country for the summer, and is fir be heard, and occasionally seen about middle of April, and leaves us again September. The food of the grasshop warbler is small snails, slugs, and inse The top of the head, back, and wi are greenish brown; the centres of t feathers darker brown, producing a spott appearance. Chin, throat, breast, and bel pale brown, spotted with darker brow on the neck and breast; legs, toes, and claws, pale brown. The whole length of the bird is five inches.

2. The sedge warbler (*Salicaria phragmitis*), the second example of this and aquatic division, is more numerous as a species than either of the other two, and is generally to be found during summer in most thick patches of reeds or willows in marshes, or on the low sides of rivers, or on islands, where, from the loose and soft nature of the soil, aquatic herbage grows thick and strong. This bird arrives in this country in April, and leaves us again in September. The nest of the sedge warbler has frequently been confounded with that of the reed warbler; but it is usually placed much nearer the ground, and seldom depends on reeds for its support. The eggs are five or six in number, eight lines long by six lines in breadth, of a pale yellowish brown, slightly mottled, and sometimes streaked with darker brown. The back and wing-coverts are pale reddish brown; chin and throat, white; breast, belly, flanks, &c., buff colour. The whole length of the bird is four inches and three quarters.

3. The reed warbler (*Salicaria arundinacea*) comes to this country in April, and departs again in September; and it is in habits and manner, as well as in the localities it frequents, so similar to the sedge warbler, that wherever one species is found the other is almost certain to be within

ance; and the birds themselves,
rtain resemblance in appearance,
n frequently confounded. The
the male bird is five inches and a

garden warbler (*Curruca horten-*
ummer visiter, closely resembling
ap in habits, being lively, active,
ss, seldom remaining long in any
secreting itself in dense foliage,
ard than seen, but sometimes sing-
a branch at the top of a tree. As
r the garden warbler ranks next
ackcap. These birds arrive to-
end of April or the beginning of
ey frequent thick hedges, shrub-
l gardens, feeding on insects, peas,
uits, cherries in particular, and
ies. Their nest is placed in a low
mong rank herbage; the mate-
h consist of goose-grass, bents, with
ol and moss, lined with fine fibrous
a few hairs, are but loosely put

s are four or five in number, of a
white, spotted and streaked with
and light brown; the length nine
x lines and a half in breadth. The
face of the body is of a uniform
n; the plumage of the under sur-
rownish white. The whole length
d is rather less than six inches.
wood warbler. (*Sylvia sibillatrix.*)
with the willow warbler and chiff-
the only British species now in-
the genus *Sylvia* as at present
They differ from the warblers
scribed in the general colour of
nage, in not being fruit-eaters;
st invariably build their nests on
d, and their nests are covered or
the top. The wood warbler sel-
es in this country till near the
pril, and is generally distributed
he wooded districts, preferring old
s and woods containing tall trees,
ly those of oak or beech. Its food
be insects and their larvæ; some
on the wing, and others are sought
the upper foliage of trees. The
al, always placed on the ground
bage, and is formed of dry grass,
s, and some moss, and invariably
finer grass and long hairs, but
rs, which are used as lining to
nt by both the other species of
, and serve to distinguish their
h are also placed on the ground,
of the wood warbler. This bird
ggs, white, spotted, and speckled
lmost hiding the ground-colour,
le red and ash-colour; the eggs
in length by six lines in breadth.

The adult male has a streak of bright sulphur yellow passing from the base of the upper mandible, behind the nostril, over the eye, and over the ear-coverts; the top of the head, neck, smaller wing-coverts, back, and upper tail-coverts, are olive-green, tinged with sulphur yellow; the chin, throat, breast, and flanks, delicate sulphur yellow; belly and under tail-coverts clear white.

6. The willow warbler (*Sylvia trochilus*) frequents woods, plantations, shrubberies, thick hedgerows, and bushes on commons, is lively and amusing in its actions, hopping or flying from branch to branch, and capturing any small insect that comes in its way. The eggs are six or seven in number, white, with numerous small specks of pale red; they are seven lines and a half long by six lines broad. The food of this species is flies, aphides, and insects generally in their different states; and it is one of the gardener's best friends, from the number of insects it consumes daily. The feathers on the crown of the head, neck, back, and upper tail-coverts, are dull olive-green; wing and tail feathers darker brown; chin, throat, breast, flanks, and under tail-coverts whitish, but strongly tinged with yellow; belly almost white. The whole length of the bird is about five inches. (*Yarrell's Brit. Birds*, vol. i. p. 261—316.) See CHIFF-CHAFF, NIGHTINGALE, REDSTART, REGULUS, WHEATEAR, WHITETHROAT, &c

WARP. A provincial term applied to cows, signifying to miscarry or slink their calves. See ABORTION.

WARP. A slimy deposit or ooze left upon land by the receding sea tides in particular situations. See ALLUVIUM and WARPING.

WARPING OF LAND. A mode of fertilising and improving tillage lands practised in particular situations on the borders of large rivers and waters into which the sea tides flow, and where the level of the ground is such as to admit of their being flooded with great facility. The practice is, for the most part, confined to the districts situate on the coasts of Lincolnshire and Yorkshire. The water of the tides that come up the Trent, Ouze, Dun, and other rivers which empty themselves into the great estuary of the Humber, is muddy to an excess; insomuch that in summer, if a cylindrical glass, twelve or fifteen inches long, be filled with it, it will presently deposit an inch, and sometimes more, of what is called warp: a circumstance which renders them so fertile.

The fertility of Egypt, of the lands bordering on the shores of the Ganges, and some of the large American rivers, I have already shown to be attributable to the raises it in one summer from six to sixteen inches thick, and in the hollows, or low places, two, three, or four feet, so as to leave the whole piece level. Thus a soil of any depth you please is formed, which consists of mud of a vast fertility, though containing not much besides sand."

This is a practice which is begun in the month of July, and is proceeded with during the summer season; and as it can only be performed at that period, every occasion of having it executed should be embraced, by having the work in perfect repair, that every tide may be made to produce its full effect. With regard to the advantage of doing this work in the summer months, it may be remarked that at these times the lands not only become the soonest dry, a circumstance which must always fully take place before the process of cultivation can be carried on, but the tides are less mixed with fresh water, in which situation they are constantly found the most effectual.

The method of executing the work is thus described, in the *Agricultural Survey of the West Riding of Yorkshire*, by Lord Hawke:—

"The land to be warped must be banked round against the river. The banks are made of the earth taken on the spot from the land: they must slope six feet, that is, three feet on each side of the top or crown of the bank, for every foot perpendicular of rise: their top or crown is broader or narrower, according to the impetuosity of the tide and the weight and quantity of water; and it extends from two to twelve feet:

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nds are covered by the tides must be ted according to their levels, and the of the tides in the rivers from which roceed. It may be admitted to the of three or four, or more feet; but posit of sediment is in some measure rtionate to the height of the water, h the same effects may be obtained much smaller quantities of water by uing the process a great number of

expense of this mode of improving must necessarily differ much in dif- cases, according as the circumstances uation and distance vary; but, ac- g to Mr. Young, it can seldom exceed 15*l.* the acre, and in most instances t be greatly below such estimates.

rped lands are found capable of grow- ost kinds of crops in great plenty, but ularly oats, beans, wheat, flax, pota- nd grass seeds.

RRANTY. In horsemanship, &c., n applied to the assurance of the l's being sound when purchased. If on warrants a horse to be sound (and ases in general apply to all other ls, whether sold in a fair, or market, private contract), he does it at his eril, whether he knew the horse to be or not. (*Anon.* Lofft, 146.) And he d by what his servant or agent says ime of the sale (*Helyear* v. *Hawke*, 5 sse, 52.), who has an implied autho- warrant (*Alexander* v. *Gibson*, 2 ell, 555.); and even if a horse- servant was told expressly by his not to do so. But a person not a ealer is not bound by the forbidden his servant (*Scotland* v. *Watson*, 1 g, 45.); and the warranty must begin ime of the sale, and is not binding y given by the servant employed to the horse. (*Hoodin* v. *Burford*, 2 391.) An infant, of course, cannot (*Howlett* v. *Halswell*, 4 Campbell, *reen* v. *Greenbank*, 2 Marshall, 485.) al representation of the seller to the f a horse, in the course of dealing, "may depend upon it that the horse ctly quiet and free from vice," is a y (*Cane* v. *Coleman*, 3 M. & R. 2.); "he could warrant" (*Button* v. 7 Taunton, 405.); but a warranty t extend to manifest and visible de- *Margetson* v. *Wright*, 5 M. & P. proof that a horse is a good drawer, t satisfy a warranty that he is "a rawer and pulls quietly in harness." *rd* v. *Puncheon*, 2 D. & R. 10.) If er says, at the time of the sale, "I warrant, but the horse is sound as know;" this is a qualified warranty, and the purchaser may maintain an action if he can show that the horse was unsound to the knowledge of the seller. (*Wood* v. *Smith*, 5 M. & R. 124.)

In an action on a warranty of a horse the plaintiff must positively prove that the horse was unsound (*Eaves* v. *Dixon*, 2 Taunton, 343.); and this is a question entirely for the jury to determine. (*Lewis* v. *Peake*, 7 Taunton, 153.). Even a temporary lameness, if it renders a horse less fit for service, is a breach of a warranty of soundness. (*Elton* v. *Brogden*, 4 Campbell, 281.) But roaring is not unsoundness, unless it proceed from disease or some organic defect. (*Bassett* v. *Collis*, 2 Campbell, 523.; *Onslow* v. *Eames*, 2 Starkie, 81.) A nerved horse is unsound (*Best* v. *Osborne*, R. & M. 290.); but crib-biting is not. (*Broennenburgh* v. *Haycock*, Holt, 630.) The goggles in sheep is an unsoundness (*Jolliff* v. *Rendell*, R. & M. 136.); and any fraud in the sale of a warranted horse will avoid it, although it does not amount to a breach of the warranty. (*Steward* v. *Cosvelt*, 1 C. & P. 23.) See Buying and Selling.

WARREN. A franchise, or place privileged, either by prescription or grant from the king, to keep beasts and fowls of warren in; as rabbits, hares, partridges, pheasants, &c.

By statute 21 Edw. 3. a warren may lie open, and there is no need of closing it in, as there is a park.

In the forming a warren, great caution is to be used for the fixing upon a proper place and a right situation. It should always be upon a small ascent, if possible, and exposed to the east or the south. The soil that is most suitable is that which is sandy; for when the soil is clayey or tough the rabbits find great difficulty in making their burrows, and never do it so well; and if the soil be boggy or moorish, there would be very little advantage from the warren; for wet is very destructive to these animals. See Rabbit.

WART-CRESS. (*Senebiera;* named by Decandolle in honour of the Rev. John de Senebier of Geneva, an eminent physiological botanist.) Of these interesting plants there are two native species, both annuals.

1. The common wart-cress, or swine's-cress (*S. Coronopus*), which grows plentifully in waste ground and by road-sides. The root is tapering. Stems spreading, quite flat on the ground, branched, leafy, smooth. Leaves somewhat glaucous, deeply pinnatifid. Flowers opposite to the leaves, white, small, densely corymbose. Pouches in dense clusters, much shorter than the leaves, kidney-shaped, elegantly notched

WART-WORT. See SPURGE.

WARTY SPURGE. See SPURGE.

WASP. (*Vespa.*) An extensive genus of insects, of which three species are common to Britain.

1. The hornet (*V. crabro*), which has been already noticed.

2. The common wasp (*V. vulgaris*) is from half an inch to three quarters of an inch long. It is divided into three classes, queens, males, and mules. The queens, or females, are furnished with stings, and are much larger than any other wasp, on account of the numerous eggs they contain. The males are smaller in size than the females, and sting less. The number of these two classes in a nest is nearly equal, amounting, in general, to 200 or 300. The mules are principally employed in constructing the nests, and in providing the other wasps and the young insects with food; like the females, they are furnished with long stings.

Wasps build their nests in the ground, where the females who survive the winter deposit their eggs: these are hatched, and, in the course of three weeks, the young insects are fed and nourished by the mother until they pass through the different states of larvæ or grubs, and of chrysalids, when they become perfect wasps. The mules come first into existence, immediately enlarge the hole, and form the nest with fibres of wood, leaves, &c., sweep out the passages in the nests, and carry out all the filth; they feed the young males and females, adapting the quantity and nature of such provision to the weakness of their stomachs. This

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ontinued to grow, although
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igh 169¼ lbs., although the
h it was planted, when again dried and weighed, was found to have lost only two ounces of its original weight. Here, then, said the contemporaries of Van Helmont, is an increase of 164 lbs., and yet the only food the willow had was water; it is evident, therefore, that pure water, and water only, is quite sufficient to support vegetation.

Various sources of error were, however, speedily discerned to prove that this experiment was totally insufficient to decide this question. The illustrious Bergman, in 1773, showed that the rain water employed by Van Helmont, so far from being chemically pure, contained sufficient earthy matters to supply the whole of that found in the willow tree. And, in addition to this, it was afterwards shown that unglazed earthen vessels readily imbibe and transmit the moisture of the soil in which they are placed; now this moisture abounds with a variety of solid matters, both organic, earthy, and saline. (*Thomson*, vol. iv. p. 313.)

Still more accurate experiments have been since instituted with water *chemically pure*, with very different results. In this way all attempts to raise plants have in every instance totally failed, although, as I have in another place had occasion to remark, I have fruitlessly varied the attempt in several ways. See Liquid Manure.

Although, however, it is, from the result of these laborious researches, pretty clearly proved that water is not the sole food of plants, yet it must be evident to the most casual observer what an indispensable food this universal fluid is to vegetation. To all vegetation, in fact, it is an indispensable necessary of life, although almost every species of plant requires to be supplied with it in varying proportions: some, such as the aërial epidendron, and other Oriental plants, being able to supply themselves from merely the aqueous portion of it which always exists in the atmosphere; while some, such as the rice plant, and the aquatics, cannot prosper without being supplied with it in such copious quantities as would be destructive to the ordinary crops of the farmer. In some proportion or other, however, they all require it, and all attempts have been in vain made to cause plants to grow in situations where moisture was absolutely removed both from the earth and their surrounding atmosphere.

M. Berthollet was of opinion that the leaves of plants have the power of decomposing water when exposed to the light of the sun. The oxygen gas, according to this distinguished philosopher, which is always emitted under these circumstances, is derived partly from the decomposition of

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Statics, vol. i. p. 5. 15.) Dr.
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(*Phil. Trans.* 1699, p. 193.)
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adopted, until the celebrated Lavoisier and Dr. Priestley proved that the flint deposited arose from the water having, by long boiling, partially dissolved the glass. In the same way, even Davy, the most cautious of experimentalists, once thought that chlorine and soda might, by the influence of the voltaic pile, be obtained from water absolutely pure; but more careful and rigid experiments soon convinced him of the extreme difficulty of procuring entirely pure water, the vessels in which the water was procured communicating, with every apparent caution, sundry impurities; and this difficulty I think it very likely the skilful chemists of Germany have not successfully escaped.

Water exists in all cultivated land in some proportion or other. The quantity, however, necessary to be present in the farmer's soils to obtain the maximum advantage, varies with their nature, the climate, and the crop. For instance, the rice fields of India require a degree of moisture which would be utterly destructive to the grain crops of the English farmer. The most porous sandy land in a rainy climate will be prolific, when the same soil in a dry warm country will be absolutely barren. Even the drifting sands of Arabia, for instance, if placed under the incessant rains of the American Andes, would certainly be speedily covered with vegetation. Some of the richest water-meadows of the south of England and of Scotland are formed on subsoils of broken flints, gravel, and the roughest shingle. And again, the meadow lands often need such copious supplies of moisture as would be the means of destroying the corn crops. The surface water which tenants many uncultivated soils is generally surcharged with a variety of foreign substances, very commonly with vegetable matters. That in the gravelly soils is usually surcharged with oxide of iron; that resting on calcareous soils, with sulphate of lime (gypsum); whilst those from peat lands commonly abound with sulphate of iron, or the red oxide of the same metal.

In most of the soils which the farmer has to bring into cultivation, the removal of these waters is his first care; for such an abundance of moisture is not only pernicious from the usual bad quality of the land water, but from the quantity being far too great for the habits of the plants which the farmer intends to cultivate: such waters too dissolve, and sometimes carry off from the soil, in their imperceptible drainage, all the soluble richest portion of the soil. For many reasons, therefore, draining has been long very justly held to be the foundation of all agricultural improvements; since its good effects are not confined to the low marsh land, but its beneficial influence is extended to the most upland soils. It removes the land springs, and dries the surface of thousands of acres of even the most elevated of the English gravels.

Almost to an equally beneficial extent has the addition of water to plants for a lengthened period been carried on by the cultivator in a variety of modes; by the gardener, either in steam in his conservatories, or by the watering-pot in the open ground. Almost endless, indeed, are the varieties of artificial irrigation, from the minor applications of the gardener to the more gigantic efforts of the managers of the water-meads. It is this branch of the investigation of the uses of water to vegetation which is the most interesting to the farmer, and to the head IRRIGATION I must refer the reader. In regarding the uses of water to vegetation in this manner, however, the cultivator must remember that it is not *pure* water that he is thus using for his crops, but, as I have before remarked, water surcharged with a variety of earthy, saline, and organic matters, to whose presence a chief portion of the fertilising effect of such streams must be attributed; for it is found that the most foul and impure waters are much the best for the purposes of irrigation: thus the water of a river below a town is found to be much more fertilising than the same water before it has been mixed with the contents of the sewers. These are facts well known, for instance, to the owners of the fine water meadows of the valleys of the Itchen, the Kennet, and the Avon. That of the Thames above the influence of the tide, is not nearly so valuable to the grazier as it is after it has had mixed with its waters the huge mass of impure matters from the London sewers. Then, again, by far the richest irrigating waters, because the very foulest of all, are those of the sewers of the city of Edinburgh, which produce such singularly luxuriant crops of grass on the Craigintinny meadows. This observation is not confined to the English graziers: those of the duchy of Milan long since made the same remark. Half a century since Mr. Songa, when describing the meads of the banks of the Brembo, says, "that water is found excellent which passes through the fosses of the town of Treviglio, and discharges itself from them by forming a canal of eight or ten feet broad, and one foot, or one foot and a half, deep. The lands irrigated with this water seem to receive every time the advantage of a dunging, and on this account sell from a third to a half dearer than any other of an equal quality of soil." (*Young's Annals*, 1793, p. 182.) Watering the land to add to its fertility is a very ancient practice.

Such, then, are a few of the well ascertained facts with regard to the application of water to vegetation, uses which are so valuable when well understood by the farmer. In all his operations this universal fluid will be found to influence his arrangements; and in a due and regular supply of it to his crops, consists in fact the success of most of his efforts. If, for instance, a farmer would judge of the value of a particular field from merely a specimen of its soil, the attraction of the previously dried earth for the moisture of the atmosphere will afford a very tolerable indication of its comparative value; those soils which attract the most water being commonly those which obtain the highest rents.

All researches like these, in many obvious and indirect ways, are attended with considerable advantage to the cultivator. For, the more he becomes acquainted with the uses and properties of water, the more readily will he be able to avail himself of every opportunity which may present itself for extending its sphere of usefulness. It is idle to conclude that every thing possible has been effected with regard to the agricultural uses of water; for, saying nothing of the inferior extent of our water-meads to those of even the banks of the Italian rivers, much still remains to be accomplished in rendering available, not only the liquid drainage of our large towns, but in the use of the steam-engine for the purposes of irrigation; an agent to which I have in this work already alluded, and for obtaining whose magic assistance the farmers of no other country are so well situated as those of our own island. To the cultivator, therefore, an examination of the powers and properties of water will in many ways be attended with benefit: for if the farmer once seriously contemplates the powerfully invigorating and enriching qualities of the waters near to which he is very often placed, the abundance of organic matters which they contain, and the advantages to be derived from their judicious application, he will speedily devise some means or other by which he may avail himself of this too often neglected agent. The finely divided earthy and organic matters which now so copiously pollute the waters of our rivers are in fact the only great drawbacks upon the otherwise gradually increasing productiveness of the land. (See ALLUVIUM and WARPING.) These, be it remembered, are ever quietly yet incessantly acting as drains upon the fertility of the land; they never cease the work of impoverishment; and it is only by the efforts of the merchant, the fisherman, and the irrigator, that any portion of these finely divided matters ever return again to the cultivated soils of our country. (*Brit. Farm. Mag.* vol. v. p. 157.) See RAIN.

WATER-ALOE, or WATER SOLDIER. (*Stratiotes aloides;* from *stratos*, an army, in allusion to its long sword-like leaves.) An ornamental native aquatic, which fills our ditches in summer with a close phalanx of sword-like leaves, and increases so fast in the ponds where it is planted as to become almost a troublesome weed. In its wild state it inhabits deep ditches and pools, and is a stoloniferous smooth floating herb, with numerous radical leaves, and a solitary central flower-stalk, but no stem. The parent plant sinks to the bottom after flowering, and sends out long simple runners, each terminating in a leaf, bud, or young plant, which first takes root in the mud, by several long fibres, and in the following summer rises to the surface of the water, blossoms and then again subsides to ripen its seeds and throw out fresh runners, each tuft of leaves flowering but once. The leaves are a span long or more, acute, highly vascular, fringed with very sharp saw-like teeth. Flowers white, large and handsome, the stalk firm, stout, two-edged, much shorter than the leaves. (*Smith's Eng. Flor.* vol. iii. p. 34.)

WATER COWBANE. See COWBANE.

WATER-CRESS. See CRESS.

WATER DROPWORT. See DROPWORT.

WATER ELDER. See GUELDER ROSE.

WATER FARCY. See FARCY.

WATER HEMLOCK. See COWBANE.

WATER-LILY, THE FRINGED. See BUCKBEAN.

WATER-LILY, YELLOW. See LILY, WATER.

WATER-LILY, WHITE. See LILY, WATER.

WATER-MEADOW. See IRRIGATION.

WATER-MILL. See MILLS.

WATER-PARSNEP. (*Sium*, from the Celtic *siw*, water, the habitat of most of the species.) A genus of acrid and dangerous herbs, mostly aquatic and perennial. The succulent roots of *S. sisarum*, a native of China, were formerly much esteemed in cookery under the name of skirret. There are six indigenous species of water-parsnep, all perennial.

1. Broad-leaved water-parsnep (*S. latifolium*), growing in rivers, ditches, and fens. The root is fleshy, with numerous long fibres, creeping. Stems from two to six feet high, erect, angular and deeply furrowed, leafy, hollow, smooth, very little branched. Leaves from six to twelve inches in length, pinnate; leaflets oblong, lanceolate, equally serrated. Umbels terminal or axillary, of numerous snow-white small flowers. Fruit elliptic-ovate, small. The flavour of the seeds is aromatic, and less acrid than the rest of the plant, which, like all the tribe when growing in water, partakes of a poisonous quality. This herb is eaten by horses and swine, but is disliked by sheep.

2. Narrow-leaved water-parsnep (*S. angustifolium*). This species is not uncommon in ditches and rivulets. The root is extensively creeping. The whole plant is about half the size of the foregoing. The stem is round, striated, erect, much branched. Leaves simply pinnate, with leaflets unequally lobed and serrated. Umbels stalked, opposite to the leaves. Fruit roundish ovate, with three dorsal ribs and two lateral ones to each side.

3. Procumbent water-parsnep (*S. nodiflorum*). The stems of this species are procumbent, or floating, often creeping, various in length, branched, round, hollow, striated. Leaflets ovate, equally serrated. Footstalks with a broad membranous border. Umbels nearly sessile, opposite to the leaves. The flowers small, greenish white. The fruit like that of the last, but sharper in the ribs. The juice of this herb is recommended by Dr. Withering and others in cutaneous disorders. Three large spoonsful are given, mixed with milk, twice a day. But such general recommendations are not only indiscreet, but likely to be productive of much danger, as no two cutaneous disorders demand the same treatment, or depend on the same cause.

4. The creeping water-parsnep (*S. repens*) grows in boggy meadows or on watery commons. It is still smaller than the last described, with several slender quite prostrate creeping stems. Leaflets roundish, deeply toothed.

5. Least water-parsnep (*S. inundatum*). This species grows in ditches, pools, and wet ground overflowed in the winter. The stems are procumbent or floating, branched, round, leafy, throwing out fibrous radicles. Leaves on dilated clasping footstalks, alternate, oblong; those above water simply pinnate, with five or seven wedge-shaped, cut, somewhat succulent leaflets; the immersed ones in many compound capillary segments. Flower-stalks opposite to the leaves, and nearly as long, each bearing a pair of stalked distant umbels of five white flowers.

6. Whorled water-parsnep (*S. verticillatum*), growing in salt marshes. The roots are fleshy, spindle-shaped, aggregate. Stem solitary, twelve or eighteen inches high,

erect, round, striated, almost naked, slightly subdivided or corymbose at the top. Leaves chiefly radical, with short, sheathing footstalks, pinnate, with numerous pairs of sessile leaflets, each deeply cut into many narrow, linear, almost capillary segments, which spread so as to form a series of whorls. Flowers copious, white, with purplish anthers. The seeds are slightly but not agreeably aromatic. (*Smith's Eng. Flor.* vol. ii. p. 55.)

WATER-PLANTAIN. (*Alisma*, from the Celtic *alis*, water.) A genus of pretty little, aquatic, perennial, smooth plants, with simple, entire leaves, and numerous, stalked, white, yellowish or purplish, panicled or umbellate inodorous flowers. There are four native species.

1. The greater water-plantain, or thrumwort (*A. Plantago*), which is very common in pools, ditches, and about the margins of rivers. The root is fibrous. Leaves all radical, on long stalks, erect, ovate, acute, ribbed, in deep or running water lengthened out more or less. Flower-stalk rising two or three feet above the water, panicled, with innumerable whorled, compound, spreading, bracteated branches and subdivisions. Flowers terminal, solitary, small, of a delicate pale purple. Capsules ranged side by side in a circle, obtusely triangular. It has been recommended in hydrophobia; but, like many other wonder-working remedies, it is worthless.

2. Star-headed water-plantain (*A. Damasonium*), found in ditches and pools on a gravelly soil, but not common. The root consists of many long pale fibres. The leaves all radical, floating, bluntish or oblong, heart-shaped at the base. Footstalks very broad, with many ribs, and a membranous border, tapering upwards. Flower-stalks scarcely a span high, bearing one or two whorls of white flowers, yellow in the middle. Capsules six, spreading in the form of a star, half ovate.

3. Floating water-plantain (*A. natans*). In this species, which frequents the lakes of North Wales and Cumberland, the stems are floating, thread-shaped, varying in length from three to ten feet, according to the depth of the water, and throwing out radicles, as well as a few leaves and flowers, from every joint. The leaves are also floating, about an inch long, on still longer footstalks, with membranous, ovate, concave stipules. There are numerous radical, membranous, ribbed, tapering footstalks, three or four inches long, bearing no leaves. Flower-stalks one or two from each joint, erect, simple, single-flowered. Capsules from six to twelve, oblong, recurved, beaked, copiously striated.

4. Lesser water-plantain (*A. ranunculoides*). This grows in swamps and turfy bogs, but is not a very common species. The leaves are linear-lanceolate, on long, flattish, or semi-cylindrical highly vascular stalks. Flower-stalks erect, radical, from three to ten inches high, bearing one or two whorls of light purple flowers. Capsules angular, acute, numerous, in a globular head.

5. Creeping water-plantain (*A. repens*). This has only been found with us in the margins of some of the lakes in North Wales. It is like the last in general appearance, but differs essentially in having several procumbent leafy stems, throwing out radicles, with one or two leaves, and as many flowers here and there from the joints, in the manner of *A. natans*. Towards the end of the stems it appears that the flowers are not accompanied by leaves. The petals are pale purple. (*Smith's Eng. Flor.* vol. ii. p. 203.)

WATER SOLDIER. See Water-Aloe.

WATER-STARWORT. See Starwort, Water.

WATER VIOLET. See Featherfoil.

WATERWORT. (*Elatine*, from the Greek *elate*, signifying a fir; its leaves have been compared to those of the fir-tree.) A genus of curious little aquatic plants, of no beauty. One species is indigenous, the small waterwort (*E. tripetala*). It grows on the margins of ponds and ditches in a sandy soil. Roots annual, of many long white fibres. Leaves opposite, rough, with minute points. Flowers mostly three-cleft, reddish or pale flesh-coloured. (*Smith's Eng. Flor.* vol. ii. p. 243.)

WATSON, SIR WILLIAM, deserves our notice more as the friend of horticulture than as ranking among the authors of works on that art. He was born in 1715, and educated at Merchant Tailors' School, and was early distinguished for his love of botany. In 1741 the Royal Society elected him a Fellow. To its *Transactions* he contributed many papers in almost every branch of natural history. His death occurred May 10th, 1787. His chief writings relating to horticulture are:—

1. Critical Remarks on the Rev. Mr. Pickering's Paper concerning the Seeds of Mushrooms. This appeared in the Phil. Trans. vol. xlii. p. 599. vol. xliii. p. 51. 2. Account of the Remains of the Garden formerly belonging to the Tradescants at Lambeth. Phil. Trans. vol. xlvi. p. 160. 3. Account of the Garden at Fulham formerly belonging to Dr. Henry Compton, Bishop of London. Phil. Trans. vol. xlvii. p. 241. (*G. W. Johnson's Hist. of Gardening.*)

WAX. (Germ. *wachs.*) A solid concrete abounding in the vegetable kingdom, whence it is erroneously supposed that it is collected by bees. Bees' wax is a secretion in the body of the bee, and is accumulated in what are called the wax-pockets. Bees confined to a hive, and fed merely on sugar, form wax. It constitutes the partitions of the cells in which they store their honey. It it obtained by melting the comb. Wax, when pure, is of a whitish colour; it is destitute of taste, and has scarcely any smell. Bees' wax, indeed, has a pretty strong aromatic odour; but this seems chiefly owing to some substance with which it is mixed; for it disappears almost completely by exposing the wax, drawn out into thin ribands, for some time to the atmosphere to blanch, frequently changing the surface thus exposed, by remelting it, and reducing it again to thin flakes. By this process, which is called *bleaching*, the yellow colour of the wax disappears. White wax is principally used in making candles, and in white ointments, for the sake of its colour. Wax is insoluble in water; nor are its properties altered though kept under that liquid. When heat is applied to wax it becomes soft; and at the temperature of 142° if unbleached, or of 155° if bleached, it melts into a colourless transparent fluid, which concretes again, and resumes its former appearance, as the temperature diminishes. If the heat be still further increased, the wax boils and evaporates; and if a red heat be applied to the vapour, it takes fire and burns with a bright flame. It is this property which renders wax so useful for making candles. Wax combines readily with fixed oils when assisted by heat, and forms with them a substance of greater or less consistency, according to the quantity of oil. This composition, which is known by the name of cerate, is much employed by surgeons.

According to the experiments of Gay-Lussac and Thenard (*Rech. Physico-Chim.* vol. ii. p. 316.), 100 parts of wax are composed of —

	Parts.
Oxygen - -	5·54
Hydrogen - -	12.67
Carbon - -	81·78
	100

Wax is sometimes adulterated with the white oxide of lead to increase its weight, with white tallow, and with potato starch. The first is detected by melting the wax in hot water, when the oxide falls to the bottom undissolved; the presence of tallow is indicated by the wax being of a dull opaque white, and wanting the transparency which distinguishes pure wax; and starch may be detected by applying strong sulphuric acid to the suspected wax, as the acid carbonises the starch without acting on the wax.

Notwithstanding the large supply of wax produced at home, a considerable quantity is imported from abroad; but it is subject to the high duty of 1*l.* 10*s.* per cwt. The price varies, duty included, from 5*l.* to 10*l.* per cwt. (*Thomson's Chem.* vol. iv. p. 103.; *Thomson's Dispensatory; M'Culloch's Com. Dict.*)

WAX-WING. See BOHEMIAN WAX-WING.

WAY BENNET, or WALL BARLEY. See HORDEUM.

WAYFARING TREE. See GUELDER ROSE.

WAY-GOING CROP. That which is taken from the land the year the tenant leaves a farm.

WAY, PRIVATE RIGHT OF. This may arise either from grant or by prescription and usage from time immemorial, for this is in law supposed to arise from a grant. A right of way may be to a particular person to go over the grantor's land to church, to market, or to any particular close. Such a special permission is, however, to be construed strictly: the grantee cannot, under such a grant, justify going beyond the place specified in the grant; nor can he take any other person with him; neither can he assign over this right, — it dies with him. And a grant for agricultural purposes does not authorise the grantee to use the road for commercial or general purposes (*Jackson* v. *Stacey*, Holt, 455.); neither does a prescriptive right of way for all kind of carriages, prove a right of way for all manner of cattle. (*Ballard* v. *Dyson*, 1 Taunt. 279.) A rector cannot claim, unless by prescription or grant, a permanent right of way to carry off his tithe. (*James* v. *Dods*, 2 C. & M. 266.) But if the grantor convey a piece of ground in the middle of his own land, the law will presume that he also granted a way to it. (*Howton* v. *Frearson*, 8 T. R. 56.) "When," said Lord Kenyon, in this case, "they made the conveyance, it must be taken for granted that they intended to convey some beneficial interest; but he can derive no benefit whatever from the grant unless he has a right of way to the land." But if by purchasing other land, or new circumstances afterwards arise by which he can approach the public road, then the right of way ceases with the necessity. (*Holmes* v. *Goring*, 9 Moore, 166.) And if a private way is granted, that does not justify a person for going over the land by the side of it, even if the road is overflown with water from an adjoining river. (*Taylor* v. *Whitehead*, Doug. 716.; *Bullard* v. *Harrison*, 4 M. & S. 387.) Lord Ellenborough C. J. said, in this case, "It is a thing founded in grant, and the grantor of a private way does not grant a liberty to break out of it at random over the whole surface of his close."

By the 2 & 3 W. 4. c. 71. it is enacted, that in all claims for right of way by prescription, where it has been enjoyed for twenty years, such right shall only be defeated or destroyed by showing that such right was first expired at any time previous to such twenty years; and where it has been enjoyed for full forty years, the right shall be absolute and indefeasible, unless it shall appear that the same was enjoyed by some consent or agreement by deed or writing.

WEANING. The means employed to reconcile a young animal to the loss of its mother's milk, and habituate it to take common food. Under the head FOAL we have already given directions for their management during and after weaning. The process of weaning calves is variously managed by different farmers. When not let run with the cow, the most advisable mode, as it regards the calf, is to place it loose in a crib, and to suckle it by hand with the mother's new milk, of which it will consume for some time not more than about four quarts per day: the quantity, however, must then be gradually increased, as it will, in the course of a few weeks, require as much as three gallons. If the weather be fine, it should be, within a fortnight or three weeks, turned out daily in the orchard, or some well-sheltered enclosure of sweet herbage; and, as it will in the course of ten or twelve weeks have acquired some relish for the pasture, it may be regularly weaned by gradually diminishing the quantity of milk, and then substituting the skimmed for the new. Calves may, however, be reared with skimmed milk and meal, without any portion of new milk, except the first few days' biestings, and many persons give them nothing but water gruel and hay tea within a fortnight after they have been removed from the cow. Sago and linseed jelly are also very nutritious, and calves may be weaned on them without any other food. (*Brit. Husb.* vol. ii. p. 441.)

The time of weaning lambs differs materially, according to the locality of the farms and the quality of the pasture. Four months old is about the period usually selected.

The lambs should be turned into somewhat better pasture than that to which they had been accustomed, in order to compensate for the loss of the mother's milk. Many farmers are very fanciful as to the provision for the weaned lambs. The clover or the sainfoin, or the after-math, are selected by some; others put their smaller and more weakly lambs to weed the turnip crops; but there can be nothing more desirable than a fresh pasture, not too luxuriant, and yet sufficient to maintain and increase their condition. (*Youatt on Sheep*, p. 516.) For directions as to weaning pigs, see SWINE.

WEASEL. (*Felis vulgaris.*) A diminutive predatory animal, frequenting barns, granaries, and outhouses: its body seldom exceeds six or seven inches in length, and the legs are remarkably short. The female brings forth six or eight young at a birth, which are born blind, but soon acquire their sight. Like the ferret and the polecat, the weasel emits a very offensive odour. Although beneficial in some respects by keeping rats, mice, and moles within due bounds, weasels are very destructive to poultry, game, and rabbits, and also devour large numbers of eggs. They may be readily caught by the hutch or box trap, baited with an egg or small bird, and are also destroyed by sal ammoniac mixed and beat up with the white of an egg, wheat-flour, and honey, laid in small pieces in coppices, hedge-rows, or other places which they frequent.

WEASEL-SNOUT. (*Galeobdolon luteum.*) The weasel-snout, yellow archangel, or dead nettle, is a pretty indigenous perennial plant, found abundantly in most parts of England, in marshy, shady places. The root is somewhat tuberous, moderately creeping. The stems are eighteen inches high, simple, leafy, covered with close deflexed hairs. Leaves stalked, ovate, acute, serrated, slightly hairy, bright green, various in breadth. Whorls numerous, each composed of many large, handsome, inodorous yellow flowers, whose lower lip is spotted with red, the middle segment stained with orange-colour. The flowers afford to bees an abundant supply of honey. (*Smith's Eng. Flor.* vol. iii. p. 96.)

WEATHER. (Sax.) A term applied to denote the state or disposition of the atmosphere, with regard to heat and cold, drought and moisture, fog, fair or foul, wind, rain, hail, frost, snow, &c.

A knowledge of this is of vast importance to the farmer, as the securing of his produce in a perfect manner greatly depends upon it; and as it is in and by means of the atmosphere that plants are nourished, and animals live and breathe, any alteration in its density, heat, purity, &c. must, of course, necessarily be attended with proportionable effects on organisation.

The great but regular alterations a little change of weather makes in many parts of inanimate matter is fully shown in the common instances of barometers, thermometers, hygrometers, &c.; and it is owing partly to our inattention, and partly to other causes, that man, like other animals, does not feel as great and as regular ones in the tubes, chords, and fibres of his own body.

In order fully to establish a proper theory of the weather, it would be necessary to have registers carefully kept in different parts of the globe for a long series of years, whence we might be enabled to determine the directions, breadth, and bounds of the winds, and of the weather they bring with them; with the correspondence between the weather of divers places, and the difference between one sort and another at the same place; and thus, in time, learn to foretel many great emergencies; as extraordinary heats, rains, frosts, droughts, &c. But hitherto very few, and only partial, registers or accounts of the weather have been kept. The Meteorological Society of Great Britain, and the British Association for the Advancement of Science, have latterly done much towards increasing our stock of meteoric knowledge, and have collected an immense body of facts and registers, from which many useful inferences have been drawn, and some important theories deduced. The general conclusions that have been drawn from the experiments that have been made on this subject are—that barometers generally rise and fall together, even at very distant places, and a consequent conformity and similarity of weather; but this is the more uniformly so, as the places are nearer together, as might be expected;—that the variations of the barometer are greater as the places are nearer to the pole: thus, for instance, the mercury at London has a greater range by two or three lines than at Paris; and at Paris, a greater than at Zurich; and at some places near the equator there is scarcely any variation at all;—that the rain in Switzerland and Italy is much greater in quantity for the whole year than in Essex; and yet the rains are more frequent, or there are more rainy days, in Essex than at either of these places; — that cold contributes greatly to rain, apparently by condensing the suspended vapours, and so making them descend; thus, very cold months, or seasons, are commonly followed immediately by very rainy ones, and cold summers are always wet ones; — that high ridges or mountains, as the Alps, and the snows with which they are covered, not only affect the neighbouring places, but even distant countries, as England, often partake of their effects.

The science of meteorology, or the study of the changing phenomena of the atmosphere, &c. has from the earliest periods occupied a greater or less share of attention from the tiller of the soil, the gardener, and those engaged in the pasturage of animals. To no individual (the mariner, perhaps, excepted) is a foreknowledge of the probable future state of the weather of more consequence and importance than the agriculturist; for on this must mainly depend the progress and success of his field operations, his seedtime and his harvest, and the greater or less return afforded by his crops.

It may not comport with the dignity of the man of science, or the elevated learning of the erudite philosopher, to have his eyes and ears open to the plain and simple rules and guides which nature lays out before him. Perhaps he has little of leisure to note the every-day phenomena which the atmosphere and all animate and inanimate nature hold up to observation, as in a glass, where all who use their eyes may read as they run. The companions of his study are the more costly and elaborately-prepared philosophical instruments: how much, however, might their value be enhanced by a careful and comparative observation of the "skyey influences," as the poet terms them? But to these closet companions, the husbandman, the shepherd, the traveller, the fisherman, and the mariner have rarely access, while engaged in the busy out-of-door occupations of their several avocations. Those who till the land, or who go down to the sea in ships, of all others, are they who become, by habits of observation and reflection, most conversant with the signs and changes of the heavens; the sun, the moon, and the stars are to them monitors and instructors, whose warning voices meet a prompt and ready response. The ripple of the wave, the curl of the smoke, the passing shadow of the cloud, the budding of the tree, the arrival and departure of the migratory birds, the frolicsome gambols of animals, every leaf that quivers in the sunbeam, every plant that drinks the dew of heaven, the myriads of insects, and creeping things innumerable, that inhabit each leaf and opening flower, are all fraught with instruction and information to the experienced and watchful observer.

Around, above, beneath, all animate and inanimate creation, animals, vegetables, the elements, a thousand objects in a thousand directions, in every recurring season, furnish their quota of information towards our stock of meteoric knowledge, and foretel the approaching variations of atmospheric phenomema. The experienced fisherman and the watchful and wary mariner will predict the coming storm, by the tiny cloud and other unerring criteria which frequent and attentive observance of the sky has rendered familiar, long before its approach is visible to the ken of the ordinary and inattentive observer.

It has been well remarked, that "the shepherd, whose sole business it is to observe what has a reference to the flock under his care, who spends all his days and many of his nights in the open air, under the wide-spread canopy of heaven, is obliged to take particular notice of the alterations of the weather; and when he cares to take a pleasure in making such observations, it is amazing how much progress he makes in them, and to how great a certainty he arrives at last, by mere dint of comparing signs and events, and connecting one observation with another. Every thing in time becomes to him a weather-gauge: the sun, the moon, the stars, the clouds, the winds, the mists, the trees, the flowers, the herbs, and almost every insect, animal, and reptile with which he is acquainted — all these become, to such a person, instruments of real knowledge."

To the farmer, a careful study of the weather, and of the inferences to be drawn from precedent, and from natural and artificial data, come fraught with numerous and important considerations. Like the angler, the husbandman "must observe the wind, sun, and clouds by day; the moon, stars, and wanes of the air by night." Few are so entirely dependent on the caprice of the weather, for the commonest routine operations of the farm, as the agriculturist. And how soon may his fairest crops be blighted by adverse and unfavourable seasons, or by the baneful effects of scorching and arid winds, of severe frosts, of heavy rains. Some winds come fraught with disease and death; murrain, malaria, and epidemics, in hot dry seasons, commit fearful ravages among his live stock; and these are frequently to be attributed to some mysterious atmospheric agency: other winds bring swarms of noxious insects and predatory birds to our shores; the lightning and the whirlwind level his plantations or fire his ricks; the hail storm, and the frost, and excess of rain, damage and destroy his growing crop, or that to which he has looked for reward and profit for all his toil and outlay.

The various casualties and diseases to which his crops are liable are frequently attributable to, and certainly much aided by, the state of the weather and the condition of the atmosphere. This is confirmed by the opinions of the ancients, who were certainly careful observers of the weather and its results upon vegetation. Pliny considered that the mildew always occurred at the new or full moon, and during the absence of the sun. The farmers of the present day fancy that the mists which frequently prevail during mid-day, in the hottest periods of summer, are the cause of mildew. Duhamel believed that mildew was brought on by mild hazy or gloomy weather, being succeeded by a hot sun, when the wheat crops will become mildewed in a few days. He always observed wet springs very productive of this disease; but it rarely occurs in clear, dry, hot years. Heavy showers after a hot sun, and chilly wet seasons, or a succession of cold rains while the grain is forming, is very conducive to mildew; and although the researches of science have proved that the disease is the result of a parasitical fungus, yet there can be no doubt that the moist and unwholesome state of the atmosphere has considerable effect in extending its ravages. Blight often occurs in spring, when the bleak keen frosty winds nip and destroy the tender shoots of the plant, by stopping the current of juices. Blight from sultry and pestilential vapour occurs in summer, while the grain has nearly attained its full growth. Such was the blight that used to ravage the vineyards of ancient Italy, and which frequently damages extensively the hop plantations and wheat crops of Britain. The Romans observed that it generally happened after short but heavy showers occuring about noon, and followed by clear sunshine, at the season when the grapes were ripening, and that the middle of the vineyard suffered the most. This agrees pretty nearly with the manner in which the blight traverses the hop districts in the present day. See Fire Blast.

Although, in the limits afforded me in this article, it would be impossible to do any thing like full justice to the interesting subject under review, or to give even a bare sketch of the science of meteorology, yet, rejecting crude fancies, without omitting altogether some of the popular opinions which have passed into proverbs, I shall base my remarks principally upon popular facts, and endeavour to explain the various meteoric phenomena which are daily occurring, and thence pass on to deduce, and incidentally advert to, the various data by which the state of the weather may be foretold.

Much information on this important subject will be found already dispersed under the heads — Dew, Fogs, Frost, Hail, Hoar Frost, Rain, Snow, Lightning, &c.

The means of prognosticating the future state of the weather are usually deduced from three sources; from natural data, artificial data, and from precedent. A fourth help has lately been called into very extensive request, viz. planetary influence combined with electricity.

The *natural data* for this study are:—

1. The vegetable kingdom; many plants shutting or opening their flowers, contracting or expanding their parts, &c. on approaching changes in the humidity or temperature of the atmosphere.

2. The animal kingdom; most of those familiar to us exhibiting signs on approaching changes, of which those by cattle and sheep are more especially remarkable.

3. The animal kingdom; stones, earths, metals, salt, and water of particular kinds, often affording indications of approaching changes.

4. Appearances of the atmosphere, the moon, the general character of seasons, &c. The characters of clouds, the prevalence of particular winds, and other signs, are very commonly attended to.

The *artificial data* are the various meteorological instruments, as the barometer, hygrometer, pluviometer, and thermometer, &c., which are all extremely useful aids to the farmer.

How various are the climates of the earth, and yet how uniform is each climate in its temperature, notwithstanding the fact that we traverse annually a circle in space whose diameter extends over 190,000,000 of miles! In each particular climate we behold races of animals and plants, many of which would not prosper elsewhere. Though apparently rains and winds and frosts are very irregular, yet we find a remarkable constancy in the average weather and seasons of each place. Very hot summers, or very cold winters, have little effect in raising or depressing the mean annual temperature of any one climate above or below its general standard. We must be convinced, from observation, that the structure of plants and the nature of many animals are especially adapted to the climate in which they are located. A vegetable, for example, which flourishes where the mean temperature is fifty-five degrees, would perish where the average is only fifty. If our temperature were raised or lowered by five degrees, our vegetable world would be destroyed, until a new species suited to the altered climate should be substituted for that which we possess at present. An inhabitant of the equatorial regions, whose mean temperature is eighty, would hardly believe that vegetable life could exist in such a climate as ours. We have the same opinion of the arctic regions. Both are equally mistaken; the care of a presiding Providence is limited to no climate,—it

> "Lives through all space, extends through all extent,
> Spreads undivided, operates unspent."

At the equator we find the natives of the Spice Islands, the clove and nutmeg trees, pepper, and mace. Cinnamon bushes clothe the surface of Ceylon; the odoriferous sandal-wood, the ebony tree, the teak tree, the banyan, grow in the East Indies. In the same latitudes in Arabia the Happy, we find balm, frankincense, and myrrh, the coffee-tree and the tamarind. But in those countries, at least in the plains, the trees and shrubs which decorate our more northerly climes are wanting. And as we go northwards, at every step we change the vegetable group, both in addition and by subtraction. In the thickets to the west of the Caspian Sea we have apricot, citron, peach, walnut, &c. In the latitude of Spain, Sicily, and Italy, we find the dwarf plum, the cypress, the chestnut, the cork tree; the orange and lemon tree perfume the air with their blossoms; the myrtle and pomegranate grow wild among the rocks. We cross the Alps, and we find the vegetation which belongs to northern Europe, of which England is an instance. The oak, the beech, and the elm are natives of Great Britain; the elm tree seen in Scotland and the north of England is the wych elm. As we travel still farther to the north, the forests again change their character. In the northern provinces of the Russian empire are found forests of the various species of firs; the Scotch and spruce fir, and the larch. In the Orkney Islands no tree is found but hazel, which occurs again on the northern shores of the Baltic. As we proceed into colder regions we still find species which appear to have been made for these situations. The hoary or cold elder makes its appearance north of Stockholm; the sycamore and mountain ash accompany us to the head of the Gulf of Bothnia; and as we leave this, and traverse the Dophrian range, we pass in succession the boundary-lines of the spruce fir, the Scotch fir, and those minute shrubs which botanists distinguish as the dwarf birch and the dwarf willow. Here, near to or within the arctic circle, we yet find wild flowers of great beauty, the mezereum, the yellow and white water-lily, and the European globe-flower. And when these fail us, the reindeer moss still makes the country habitable for animals and man. (*The Vegetable Kingdom.*)

So also there are boundaries to the growth of corn, the vine, and the olive. Wheat extends over certain tracts from England to Thibet; it does not flourish in the polar regions nor within the tropics, except in situations considerably raised above the level of the sea. The temperature required for the successful cultivation of the vine must not be under fifty, nor much above sixty-three, degrees; though in the warm climates elevation of situation will correct the excess of heat. Maize and olives have their

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favourite regions in France, Italy, and Spain. We first meet with rice west of Milan; it extends over the northern provinces of Persia, and over all the southern districts of Asia where there are facilities for irrigation. Millet is one of the principal grains of Africa. Cotton is cultivated in the new world no higher than latitude forty degrees; in the old, it extends to latitude forty-six degrees, being found in Astrachan. Exceptions, indeed, occur with respect to the sugar cane, the indigo tree, the plantain, and the mulberry, all natives of India and China; for these productions have found a genial climate in the West Indies and South America. The genuine tea tree seems indisposed to flourish out of China, although the South American Indians have something like it. The cassava, yams, the bread-fruit tree, the sago palm, and the cabbage tree, are all apparently special provisions for the islands in which they are peculiarly found to flourish. It is impossible, we think, to reflect upon all this variety of natural wealth, and upon the adaptation of each species to the climate in which it is found, without perceiving that the distribution of those productions (no one climate yielding a perfect substitute, generally speaking, for that of another) was originally designed to prompt and to continue throughout human existence that commercial and friendly intercourse which has been long since established between the inhabitants of countries the most remote from each other. See TEMPERATURE.

The following passages from *Tacitus's Life of Agricola* (cap. 12.), written more than eighteen centuries ago, tend to prove that no very material alteration has taken place in the soil and climate of England:—

"The sky in this country is deformed by clouds and frequent rains; but the cold is never extremely rigorous. . . . . The soil, though improper for the olive, vine, and other productions of warmer climates, is fertile, and suitable for corn. Growth is quick, but maturation slow; both from the same cause, the great humidity of the ground and the atmosphere."

It is a very common error to predict the future state of the season from some *single* appearance in the commencement of it, as an early bee, an early bud or blossom, the premature appearance of a swallow; but this is both unphilosophical and fallacious, for these appearances are frequently the consequence of a mild winter, or fine weather in the preceding autumn. One swallow does not, indeed, make a summer; but a congeries of seasonal phenomena carefully noted by accurate observers will generally afford a very fair criterion of the mildness or severity and of the dryness or moisture of future seasons. A moist autumn, succeeded by a mild winter, is generally followed by a dry and cold spring, in consequence of which vegetation is greatly retarded. Should the summer be uncommonly wet, the succeeding winter will be severe; because the heat or warmth of the earth will be carried off by such unusual evaporation. Farther, wet summers are mostly attended with an increased quantity of fruit on the whitethorn (*Mespilus Oxyacantha*) and dog rose (*Rosa canina*); say, the uncommon fruitfulness of these shrubs is considered as the presage of an intensely cold winter.

A severe winter is supposed to be indicated by the appearance of birds of passage at an early period in autumn; because they never migrate southward till the cold season has commenced in northern regions. Great storms, rains, or other violent commotions of the clouds, produce a kind of crisis in the atmosphere; so that they are attended with a regular succession either of fine or of bad weather for some months. An unproductive year mostly succeeds a rainy winter, as a rough and cold autumn prognosticates a severe winter. Very cold months or seasons are commonly followed immediately by very rainy ones, and cold summers are always wet ones.

Plants. — The sensitive indications afforded us by many plants first claim attention, and will be found amply to repay the time that may be bestowed upon the singular properties inherent to them.

Very many of our most common plants are unerring guides for the foretelling rain and other atmospheric changes. The opening and shutting of some flowers depends not so much on the action of the stimulus of light as on the existing state of the atmosphere, and hence their expansion or contraction betokens change.

The common chickweed, or stitchwort (*Stellaria media*), may be considered a natural barometer; for if the small white upright flowers are closed, it is a certain sign of rain; while during dry weather they expand freely, and are regularly open from nine in the morning till noon. After rain they become pendent, but in the course of a few days they again rise.

The purple sandwort (*Arenaria rubra*) is another example of a true prophet prior to a coming shower. The beautiful pink flowers expand only during sunshine, and close at the approach of evening or before rain.

The pimpernel (*Anagallis arvensis*) has been very justly named "the poor man's weather-glass." This little plant blooms in June in our stubble fields and gardens, and continues in flower all the summer

ts tiny brilliant red flowers are
xpanded in the morning, we may
y expect a fine day; on the con-
is a certain sign of rain when its
petals are closed.

goat's-beard (*Tragopogon praten-*
not unclose its flowers in cloudy
. From its habit of closing its
at noon, this plant has received
mon name of "Go-to-bed-at-noon,"
many districts, the farmers' boys re-
heir dinner hour by the closing of
's-beard.

stated in *Keith's Botany*, that if the
sow-thistle shuts at night, the en-
y will be fine; and if it opens, it
cloudy and rainy.

the African marigold remains
fter seven o'clock in the morning
ing, rain may be expected. If the
nd the convolvulus contract their
thunder and heavy rain may be
d. Lord Bacon tells us, that the
f the trefoil swell and grow more
previous to rain.

dark and lovely gentianella opens
eyes to greet the mid-day sun, but
s petals against the shower.

germander speedwell (*Veronica*
drys), so universal a favourite in
hedgerow, closes its blue corolla
rain comes on, opening again when
s. The red campion (*Lychnis di-*
ncloses its flowers in the morning.
wers of the white campion (*Lychnis*
na) open and expand themselves to-
the approach of night. The wood
Oxalis acetosella, "la Petite Oseille,"
lle, of the French), an unobtrusive
little inhabitant of the moist, shaded
s soon as night approaches, as it is of
icate a structure to bear the storm,
p its curious triple leaves, hanging
ers towards the earth, thus preserv-
more tender parts from injury; but
as the morning sun arises, these ex-
nd regain their beauty. Most of the
iums, or hawk-weed tribe, also open
owers with the morning light, going
again in the afternoon. The clear,
and gay flowers of the succory (*Ci-*
Intybus) foretel the commencement
aylight. Another of the components
a's clock, which deserves a passing
s the common daisy (*Bellis perennis*),
at sunrise, and closing its flowers at
hence by Chaucer called the "Eie
." The great white ox-eye (*Chrysan-*
leucanthemum), foretelling the coming
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When rabbits come out to feed early in the evening, it is a sign of rain in the night in summer, and of either rain or snow in winter; and when it is likely to be a bad night, they will be apt to return to their burrows before it is dark.

Next, with respect to *birds*: there is an old saying that "when swans fly it is a sign of rough weather," and the correctness of this saying would appear to be proved. A late writer states that he had invariably found that when the swan flies any distance against the wind, however fine the weather may be at the time, so sure will a wind, almost amounting to a hurricane, arise within twenty-four, and generally twelve, hours after the bird has taken flight. The early appearance of woodcocks, snipes, fieldfares, and other birds of passage, &c., are prognostics of severe winters. When owls hoot and screech during bad weather, it is a sign of coming fine weather. The misseltoe thrush (*Turdus viscivorus*) frequently sings particularly long and loud before rain, and sometimes even during severe storms: hence it is termed the "storm cock." The blue macaw is said to be a true indicator of the changes of the weather. Dr. Thornton is stated to have had one some years ago, whose blue feathers assumed a greenish hue in rainy weather, or grey in clear weather, if likely to change for wet.

When cranes fly exceedingly high, in silence, and ranged in order, it is said to indicate fine weather; but if their flight is in disorder, and they speedily return with cries, it foretels wind. If fowls roll themselves in the sand more than usual, it denotes rain; also when the cocks crow in the evening, or at unusual hours. When peacocks cry at night, rain may shortly be expected. When peacocks roost on the tops of houses, when the raven sails round and round high up in the air, and when the song birds carol late in the evening, the weather will continue fair.

The croaking of crows is said to indicate fine weather. When ducks and geese fly backwards and forwards, and frequently plunge into the water, or send forth cries, or when pigeons return slowly to their houses, the probability is that the succeeding day will be rainy. It is a sign of rain or wind when sparrows chirp a great deal; if the redbreast be seen near houses; or swallows fly near the ground, or brush the surface of the water. When sea-fowl and other aquatic birds retire to the seashore, or more inland, it generally indicates a change of weather. If larks or kites soar high, and continue so for some time, it is generally a sign of fine weather. If the kingfisher disappear, expect fine weather. If the cuckoo be no longer heard, expect autumnal weather. If swallows and martins fly lower than usual, foul weather may be expected. The cause of this is, that they pursue flies, which delight in warm air; and these insects, escaping from the excess of moisture above, descend nearer to the surface of the earth, and are then pursued by these birds. When the corn-crake (*Rallus crex*) ventriloquises in the corn or grass, when the partridge calls in the evening to his mate, and when the snipe booms in the air in the evening, a continuation of fine weather may be expected.

When those rare birds the dotterel and golden plover are seen in the sheep-walks late in the autumn, an early and rigorous winter is certain. The migration of birds is also fraught with interest to the careful observer of the weather. The late roosting of crows (rooks) is a fair criterion of approaching rain. The cause is apparent: they feed upon larvæ and earthworms; and these, especially the latter, come most abroad in the evenings before rain.

Mr. Yarrell, in his *History of British Birds*, vol. iii. p. 117., records an instance of instinct, showing how useful an attention to the movements of animals, &c., might occasionally prove:—"I am indebted to the kindness of Lord Braybrooke for the following account of a female swan, on the small stream at Bishop's Stortford. This swan was eighteen or nineteen years old, had brought up many broods, and was highly valued by the neighbours. She exhibited, some eight or nine years past, one of the most remarkable instances of the power of instinct that was ever recorded. She was sitting on four or five eggs, and was observed to be very busy in collecting grass, weeds, &c., to raise her nest; a farming man was ordered to take down half a load of haulm straw, with which she most industriously raised her nest and the eggs two feet and a half; that very night there came down a tremendous fall of rain, which flooded all the malt shops, and did great damage. *Man* made no preparation; the *bird* did. Instinct prevailed over reason; her eggs were above, and only just above, the water."

The same author, in his account of the green woodpecker (*Picus viridis*), known in some localities as the "rain-bird," from being very vociferous when rain is impending, alludes to the probable means by which birds and some other animals become cognisant of approaching changes in the weather. The following is the rationale referred to:—

"It is highly probable that no change takes place in the weather without some previous alteration in the electrical condi-ion of the atmosphere, and we can easily nderstand that birds, entirely covered as hey are with feathers, which are known to e readily affected by electricity, should be usceptible of certain impressions, which re indicated by peculiar actions: thus, birds nd other animals, covered only with the roduction of their highly sensible skin, beome living barometers to good observers." Yarrell's Brit. Birds, vol. ii. p. 136.)

Insects, being very sensible of every change n the atmosphere, are good weather guides.

When gnats collect themselves before the etting sun, and form a sort of vortex in he shape of a column, it announces fine eather. If they play up and down in the pen air near sunset, they presage heat; if n the shade, mild and warm showers; but f they sting those passing them, cold weaher and much rain may be expected.

If garden spiders break off and destroy heir webs, and creep away, expect coninued rain and showery weather.

If spider webs (*gossamer*) fly in the auumn, with a south wind, expect an east ind and fine weather.

The following curious observations on he singular foreknowledge possessed by the pider are extracted from a little work enitled *The Pocket Barometer*. This despised nsect oftentimes indicates a coming change n the weather ten, twelve, or fourteen days revious to its taking place. The following directions will be a guide to the curious n their observations of this insect:—If the eather is likely to become rainy, or windy, piders fix the terminating filaments on hich the whole web is suspended unusually hort. If the terminating filaments, on the ontrary, are very long, the weather will e serene, and continue so for fourteen ays. If spiders be totally indolent, rain enerally ensues; though their activity uring rain is a certain proof of its short uration, and that it will be followed by ne and settled weather. Spiders usually ake some alteration in their webs every wenty-four hours. If this take place beween the hours of 6 and 7 P.M., it foreels a clear and serene night.

The weather is about to become cloudy and hange for wet, when flies sting and are more roublesome than usual. Most insects beome torpid when their temperature is much educed. When it approaches the freezing oint, they fall into a lethargic state, and equire no food. Ants present a remarkble exception to this rule; for they are ot benumbed till the thermometer is 27° of ahr., or 5° below freezing point. When ees do not range abroad as usual, but eep in or about their hives, it is a sign of ain.

In the summer season much information relative to the change of the weather may be gained from watching the movements of ants. The finer the day the more busily are they employed, as they never bring out their corn to dry but when the weather is clear and the sun very hot. A celebrated naturalist relates the following curious anecdote:—He one day observed these little creatures, after having brought out their corn at eleven in the forenoon, removing the same, contrary to their usual custom, before one in the afternoon. The sun being very hot, and the sky remarkably clear, he could perceive no reason for it; but half an hour after, his surprise ceased—the sky began to be overcast, and there fell a shower of rain, which caused all this bustle, no doubt, among these active little creatures: they evidently foresaw rain, and provided accordingly; and were we minutely to examine into the economy and management of these wonderful artificers, many other similar and equally curious facts might be gleaned relative to the weather.

The leech also possesses the peculiar property of indicating approaching changes of the weather in a most eminent degree. In fair and frosty weather it remains motionless and rolled up in a spiral form at the bottom of the vessel; previous, however, to rain or snow, it will creep to the top, where, should the rain be heavy, or of long continuance, it will remain for a considerable time,—if transient, it will descend. Should the rain or snow be accompanied with wind, it will dart about with great velocity, and seldom cease its evolutions until it blows hard. If a storm of thunder or lightning be approaching, it will be exceedingly agitated, and express its feelings in violent convulsive starts at the top of the glass. It is remarkable, that however fine and serene the weather may be, and to our senses no indication of a coming change, either from the sky, the barometer, or any other cause, yet, if the leech shifts its position, or moves about sluggishly, the coincident results will undoubtedly occur within twenty-six hours.

Signs of Rain.—Although we have incidentally glanced already at some of these indications, it may be well to sum them up in a body, as being more easy of reference.

A white mist in the evening over a meadow or a river will be drawn up by the sun next morning, and the day will be bright. Five or six fogs, successively drawn up, portend rain. Where there are high hills, and the mist which hang over the lower land draws toward the hills in the morning, and rolls up to the top, it will be fair; but if the mist hangs upon the hills, and drags along the woods, there will be rain soon. A general mist before the sun rises, near the time of full moon, is a sign of fair weather. When there are mists in the new moon, there will be rain in the old; and if there are mists in the old moon, there will be rain in the new.

Against much rain, the clouds grow bigger and increase very fast, especially before thunder. When the clouds are formed like fleeces, but dense in the middle, bright towards the edge, with the sky bright, they are signs of a frost, with hail, snow, or rain. If clouds breed high in the air, in the white train like locks of wool, they portend wind, and probably rain. When a general cloudiness covers the sky, and small black fragments of clouds fly underneath, they are sure signs of rain, and probably it will be lasting. Two currents of clouds always portend rain, and in summer thunder.

If the dew lies plentifully on the grass after a fair day, it is a sign of another fine day. If not, and there is no wind, rain will follow. A red evening portends fair weather; but if spread too far upward from the horizon in the evening, and especially morning, it foretels wind or rain, or both. When the sky in rainy weather is tinged with sea-green, the rain will increase; if deep blue, it will be showery.

If there be a haziness in the air, which fades the sun's light, and makes the orb appear whitish or ill-defined; or at night, if the moon and stars grow dim, and a ring encircles the former, rain must follow. If the sun appears white at setting, or goes down into a bank of clouds in the horizon, bad weather is expected. If the moon looks pale and dim, we expect rain; if red, wind; and if the natural colour, with a clear sky, fair weather. If the moon is rainy throughout, it will be clear at the change, and perhaps the rain return a few days after. If fair throughout, and rain at the change, the fair weather will probably return on the fourth or fifth day. If the setting sun appears yellow or gold colour, and particularly if accompanied with purple streaks, the following day will be fine.

If the wind veers about much, rain is pretty sure. If, in changing, it follows the course of the sun, it brings fair weather; the contrary, foul. Whistling or howling of the wind is a sure sign of rain.

The aurora borealis, after warm days, is generally succeeded by cooler air. Shooting stars are supposed to indicate wind.

Before rain, swallows fly low; dogs grow sleepy and eat grass; waterfowls dive much; fish will not bite; flies are more troublesome; toads crawl about; moles, ants, bees, and many insects, are very busy; birds fly low for insects; swine, sheep, and cattle are uneasy, and even the human body.

"The air, when dry, I believe, refracts more red or heat-making rays; and as dry air is not perfectly transparent, they are again reflected in the horizon. I have generally observed a coppery or yellow sunset to foretel rain; but, as an indication of wet weather approaching, nothing is more certain than a halo round the moon, which is produced by the precipitated water; and the larger the circle the nearer the clouds, and consequently the more ready to fall." (*Sir H. Davy.*)

To turn now to the atmosphere: the bulk of our most valuable meteorological observations are, of course, deducible from its electrical condition, and the precise kind of electricity present; from the power of evaporation exercised, from the state and direction of the wind, from a careful examination of the clouds; in fact, the phenomena of the atmosphere are well nigh endless. But, though endless in the variety of their forms and consequence, and for the most part uncertain in the time of their occurrence, yet they are successively the same in their nature to parts and properties, and are all the production of simple causes. The principal agents in producing these phenomena have already been noticed under the head METEOROLOGY. I need not enlarge further upon the advantages to science in general derivable from the accurate and careful investigation of meteorological researches, aided by the excellent instruments that are now attainable, and at a moderate expense. From the accumulation of a multitude of such facts can we alone hope at some future time to derive that accurate knowledge and insight into the secret springs that would appear to be the movers of these phenomena. This may not be too much to effect from the analogies of the seasons and the results of experience; and this, we may venture to predict, will be the crowning reward of meteorological research. (*Trans. of Met. Soc.* vol. i. 1839.)

Clouds.—The following definition of the descriptive terms now employed by meteorologists to define various clouds, may prove useful to those in the habit of consulting meteorological registers, which are occasionally published in newspapers and scientific journals. It is taken from *Ure's Chemical and Miner. Dict.*, article "Cloud," p. 338.

A cloud is a mass of vapour, more or less opaque, formed and sustained at considerable heights in the atmosphere, probably by the joint agencies of heat and electricity. The first successful attempt to arrange the diversified forms of clouds, under a few general modifications, was made by Luke Howard, Esq. We shall here give a brief account of his ingenious classification.

The *simple* modifications are thus named and defined—1. *Cirrus;* parallel, flexuous, or diverging fibres, extensible in any or in all directions. 2. *Cumulus;* convex or conical heaps, increasing upwards from a horizontal base. 3. *Stratus;* a widely extended continuous horizontal sheet, increasing from below.

The *intermediate* modifications which require to be noticed are—4. *Cirro-cumulus;* small well-defined roundish masses in close horizontal arrangement. 5. *Cirro-stratus;* horizontal or slightly inclined masses, attenuated towards a part or the whole of their circumference, bent downward, or undulated, separate or in groups, consisting of small clouds having these characters.

The *compound* modifications are—6. *Cumulo-stratus;* the cirro-stratus blended with the cumulus, and either appearing intermixed with the heaps of the latter, or superadding a wide spread structure to its base.

7. *Cumulo-cirro-stratus*, vel *Nimbus;* the rain cloud, a cloud or system of clouds from which rain is falling; it is a horizontal sheet, above which the cirrus spreads, while the cumulus enters it laterally and from beneath.

The *cirrus* appears to have the least density, the greater variety of extent and direction, and to appear earliest, in serene weather, being indicated by a few threads pencilled in the sky. Before storms they appear lower and denser, and usually in the quarter opposite to that from which the storm arises. Steady high winds are also preceded and attended by *cirrus* streaks running quite across the sky in the direction they blow in.

The *cumulus* has the densest structure, is formed in the lowest atmosphere, and moves along with the current next the earth; a small irregular spot first appears, and is as it were the nucleus on which they increase. The lower surface continues irregularly plain, while the upper rises into conical or hemispherical heaps, which may afterwards continue long nearly of the same bulk, or rapidly rise into mountains: they will begin in fair weather to form some hours after sunrise, arrive at their maximum in the hottest part of the afternoon, then go on diminishing, and totally disperse about sunset. Previous to rain the cumulus increases rapidly, appears lower in the atmosphere, and with its surface full of loose fleeces or protuberances. The formation of large cumuli to leeward in a strong wind indicates the approach of a calm with rain; when they do not disappear or subside about sunset, but continue to rise, thunder is to be expected in the night. The stratus has a mean degree of tensity, and is the lowest of clouds, its inferior surface commonly resting on the earth or water. This is properly the cloud of night, appearing about sunset. It comprehends all those creeping mists which in calm weather ascend in spreading sheets (like an inundation of water) from the bottom of valleys and the surfaces of lakes and rivers. On the return of the sun the level surface of this cloud begins to put on the appearance of *cumulus*, the whole at the same time separating from the ground. The continuity is next destroyed, and the cloud ascends and evaporates, or passes off with the appearance of nascent cumulus. This has long been experienced as a prognostic of fair weather.

The *cirrus* having continued for some time increasing or stationary, usually passes either to the *cirro-cumulus* or the *cirro-stratus*, at the same time descending to a lower station in the atmosphere. This modification forms a very beautiful sky, and is frequent in summer, as an attendant on warm and dry weather. The *cirro-stratus*, when seen in the distance, freqently gives the idea of shoals of fish (a mackerel sky). It precedes wind and rain; is seen in the intervals of storms, and sometimes alternately with the *cirro-cumulus* in the same cloud, when the different evolutions form a curious spectacle. A judgment may be formed of the weather likely to ensue, by observing which modification prevails at last. The solar and lunar *halos*, as well as the parhelion and paraseline (mock sun and mock moon), prognostics of foul weather, are occasioned by this cloud. The *cumulo-stratus* precedes, and the *nimbus* accompanies, rain.

When there are small round clouds, of a dapple grey colour, with a north wind, it may be concluded that there will be fair weather for two or three days, but that large clouds like rocks are a sign of great showers. And when small clouds increase it is a sign that there will be much rain, but if the large clouds are seen to lessen there will be fair weather.

In summer or harvest, when the wind has been south two or three days, and it grows very hot, and clouds are seen to rise with great white tops like towers, as if one were on the top of another, and joined together with black on the lower side, it may be considered a sign that there will be thunder and rain suddenly. When two such clouds rise, one on each hand, it is time to make haste to shelter.

When a cloud is seen to rise against the wind or side wind, it is a sure sign that when the cloud comes up near you, the wind will blow the way that the cloud came. It is the same with the motion of a clear place, when all the sky is thick except one edge.

At all times, when the clouds look black in the west it is sure to rain, or if raining it is sure to continue, whatever quarter the wind may be in; and, on the contrary, if it breaks in the west it is sure to be fair.

If clouds appear white, and drive to the north-west, it is a sign of several days' fine weather; and if the rising sun be encompassed with an iris, or circle of white clouds, and they disperse equally, it is a sign of fair weather.

It is often observed, on those clear sunny mornings which occur in summer and autumn, that it is very likely, if not certain, to rain before evening; and there is frequently much truth in the remark. The reason is, that when moisture accumulates in the air, before it begins to be precipitated, it imparts to it a higher refractive power; and it becomes, in consequence, more bright and transparent. (*British Almanac*, 1830.)

The gradual diminution of clouds, till they are no longer observable, is a sign also of fine weather. So, likewise, is the continuance or abundance of dew upon the grass, after a serene day.

During winter, fleecy clouds being thick and close in the middle, and very white at the edges, the surrounding sky being remarkably blue, indicate hail or snow, or cold chilling showers of rain.

Where the clouds appear moving in two opposite currents, and the lowest is wafted rapidly before the wind, it is a certain sign of rain; and if this occurs during summer, or generally in hot weather, it announces a thunder storm.

It may be a useful piece of information for agriculturists, or those concerned in getting in their crops, to describe the appearance of a small cloud, which, from its rapid formation and disappearance, is likely to escape the observation of most persons, but which, from my own experience, I have found a very faithful forewarner of foul weather. It appears mostly in the mild weather of spring, summer, and autumn, when its warning token becomes most acceptable. It is a small delicately soft, thin, white, curved cloud, formed suddenly upon the summit of those fine heaped clouds (termed cumuli) which often prevail in warm weather, and appear to tower up to a prodigious height. It is necessary to keep a watchful eye upon the summit of the cumulus. When this little film, which I term "the storm cap," appears, it lies closely over the rounded summit, like a white silken web; in a very few seconds it will disappear, sinking, I suppose, into the cumulus; but in a little time, and when heavy foul weather threatens, the film again appears, disappearing as shortly as before. (*Mag. Nat. Hist.* vol. iv. p. 444.)

The following indications have been recorded, as shown by the predominance of certain of the prismatic colours of the rainbow, but they are too fastidious and fanciful to be deserving of much credence. — 1. red; if this colour be very predominant, wind, or wind and rain, may be expected. 2. orange; when the orange colour appears strong and very full, it generally indicates approaching rain. 3. yellow; when yellow is more conspicuous than the other colours, it foretells dry weather. 4. green; approaching rain may be expected when the green is very predominant. 5. blue; fine weather may be expected when the blue is particularly full. 6. purple; if the purple be a very full colour, wind and rain may be expected. 7. violet; the violet, when very clear, generally indicates approaching fine weather. See Rainbow.

The Wind. — The earth is surrounded to the extent of sixty miles with an atmosphere, on which all nature mutually depends for life. This aerial ocean revolves with our earth round the sun, is very susceptible of motion, and some parts of it is constantly in restless commotion. These commotions are called winds, and are principally caused by heat from the rays of the sun, which rarifying the air, causes it to ascend; and the vacuum thus formed is filled up with a colder air from the north and south.

Wind has been explained in the following manner: — Heated air has a tendency to rise, and cold air rushes in to supply its place. Thus the heated air of the equatorial regions rises and gives place to a current sent from the polar regions, which is a process that serves to equalise the temperature of the world. But the polar countries lying near to the axis of the sphere, the air from those regions has not received so much motion as that about the equator, or greatest distance from the axis; wherefore it arrives at the equator, where the motion of the earth is greater. If it had no motion before, an east wind would be the consequence, and the force of that wind would be as the difference between the motion of the earth where the air came from and that where it arrived: but then it has a motion to the south; for it is rushing into a vacuum left by the air which rises; so that the wind will not be from the east, but north-east; and the number of degrees north of

from which it will blow will depend
e comparative force of the current
from the north to the difference
the earth's motion at the equator
the polar region, whence the air
As there must be a corresponding
om the equator higher up, according
theory the wind should every where
-east or south-west, but it blows in
ferent directions at different times
ces; and this probably depends on
iations in temperature at different
nd places. (*Foster's Researches on*
heric Phenomena.)

winds are the grand disturbers of
ther, and to them we may proxi-
ascribe the occurrence of clear
gs, clouds, rain, &c.

observing the wind, a fair idea of
ing weather may oftentimes be
and yet, as Solomon observes, " he
siders the wind shall never sow;"
he that busies himself too much
he wind will become superstitious.
nention a few of the many rules that
en deduced from actual experience.
wind be north-north-west or east,
er to the north-east, and remain
vo or three days without rain, and
n change quickly, though perhaps
le rain, to the north-east, and re-
ere, such fine weather may occa-
last for two months.

re be, within four, five, or six days,
hree changes of the wind from the
rough the west to the south without
in and wind, and then again through
to the north with rain and wind, ex-
tinued rainy and showery weather.

north-west or north wind during
four more days blow with rain and
snow in the winter, and then pass
the west to the south, expect con-
ain and showers.

following remarks further illustrate
ges in the weather, as resulting from
tion of the wind. When the north
st clears the air, expect a fine day.
the wind turns to the north-east,
rain for two days, and does not
o the south with rain, it is likely to
eight or nine days. If the north
rn out of the south to the north-
h rain, and continue there two days
rain, expect fair weather for two
months. If the wind be north-
ing the former part of summer, the
will probably continue dry. When
with an east wind, it will probably
twenty-four hours. Heavy rains ge-
egin when the wind is blowing east,
dually veering round to the south;
nor does the rain cease till the wind has got west, or a little to the north-west. It thunders more when the wind blows from the south, and less when it blows from the east, in hot weather. If it rain from the south with a high wind for two or three hours, and the wind then fall, continuing still to rain, it will not abate for twelve hours. When the wind is south-west during summer or autumn, and the air cold for the season, much rain may be expected. When the wind turns from the south to south-west, after having been variable for some time, it will continue in that quarter very likely several weeks. The wind being north-north-west, indicates a change of weather, and frequently produces a " weather dog," which is a sign of much rain. The strongest winds turn from south to north and by west, and mostly bring fair weather.

The south-east, if it blows fresh in hot weather, always brings a tempest; and the wind going out or to southward, in the case of a westerly wind prevailing, indicates rain. The late Dr. Kirwan states, as the result of his observations, that when there has been no particular storm about the time of the spring equinox, March 21., if a storm arise from the east on or before that day, or if a storm from any point of the compass arise near a week after the equinox, then, in either of these cases, the succeeding summer is generally dry, four times in five. But if a storm arise from the south-west or west-south-west, on or just before the equinox, then the summer following is generally wet, five times in six.

In all countries particular winds are noted for being accompanied with either wet or dry weather. Thus the south and south-west winds bring much moisture into Britain; while those from the north and north-east are cold, dry, and penetrating. Hence the old proverb —

" When the wind 's in the south,
It 's in the rain's mouth."

Not only does this arise from the immense surface of ocean over which these winds sweep south of the equator, the evaporation from which must be prodigious; but from these southerly winds being of a higher temperature, whereby they hold a greater quantity of vapour in suspension or solution, the condensation of which must be proportionally greater on arriving in this colder climate. Accordingly, it has been observed that the wind will turn from the north to the south quietly and without rain; but on returning from the south to the north, will blow hard and bring much rain. Again, if it begin to rain from the south with a high wind for two or three hours, the wind falls; but if the rain continues, it is likely to rain for twelve hours or more, and does usually rain until a strong north wind clears the air. For the same reason, winds from the west and south-west are considered to bring with them wet weather. (*Chambers' Information for the People*, No. 58. New Series.)

A change in the warmth of the weather is often followed by a change in the wind. Thus, the northerly and southerly winds, though commonly accounted the causes of cold and warm weather, are really the *effects* of the cold or warmth of the atmosphere; of which Dr. Derham assures us he had so many confirmations that he makes no doubt of the fact. Thus, it is common to see a warm southerly wind suddenly changed to the north by the fall of snow or hail; or to see the wind in a cold frosty morning north, when the sun has well warmed the air wheel towards the south; and again turn northerly or easterly in the cold evening.

Mr. Towers (*Quart. Jour. of Agr.* vol. ix. p. 39.) relates the case of a person in Somersetshire who had been haymaking nearly forty years, and had hardly, in one instance, failed to carry in good condition. He had observed that in the month of June, earlier or later, there are three or more days wherein the wind blows from the north-east, and that period is invariably dry. When that wind first occurred, he seized the opportunity of cutting his grass and carrying the crop before the wind veered to the south. This theory holds good as respects the south-western counties, where the wind from any quarter between north and east is the sure concomitant of dry weather.

The following predictions of the weather are met with in the Holy Scriptures; and, applying with equal correctness in the present day as at the time they were written, I subjoin them: — A south wind, or great heat in summer, portends a whirlwind. (*Job*, xxxvii. 9.) Cold or fair weather is indicated by the north wind, which drives away rain. (*Ibid.* xxxvii. 9. 22.) A red sky in the evening foretels fair weather; in the morning, foul. "When it is evening ye say, It will be fair weather, for the sky is red. And in the morning, It will be foul weather to-day, for the sky is red and lowering." (*Matthew*, xvi. 2, 3.) "When ye see a cloud rise out of the west, straightway ye say, There cometh a shower; and so it is. And when ye see the south wind blow, ye say, There will be heat; and it cometh to pass." (*Luke*, xii. 54, 55.)

It results from observations made by M. Schouw, that in the north of Europe the western winds are more frequent than the eastern. This rule is without exception; but the western winds diminish more and more as we approach the centre of the Continent, being more frequent in England, Holland, and France than in Denmark and the greater part of Germany; and more frequent in these latter countries than in Russia and Sweden. At London, the east wind is to the west as 1· to 1·7; at Amsterdam, as 1 to 1·6; at Copenhagen, as 1 to 1·5; at Stockholm, as 1 to 1·4; at Petersburg, as 1 to 1·3. The west winds seem to incline the more to the south according to the propinquity of the Atlantic sea; towards the interior of the Continent they incline more to the north-west. The north winds appear to increase towards the east. Amongst the winds which come from the west, that of the south-west predominates in England, Holland, and France; that of direct west in Denmark and the greater part of Germany; at Moscow the north-west predominates; at Petersburg and Stockholm the north wind is much more frequent than in the western parts of Europe. In the western and middle districts of northern Europe, such as England, France, Denmark, Germany, and Norway, the west winds are much more frequent during the summer than during the winter or spring. This does not appear to be the case in Sweden and Russia. During the winter the west winds are more southerly; during the summer more direct and more northerly. (*Jahrb. der Phys. und Chem.* 1828.)

A correspondent of the *Magazine of Natural History* (vol. i. p. 180.) states, that, having paid particular attention to the weather for twenty-two years, he always observed that the wind blew from the eastward at the beginning of May. Those who are concerned in the progress of vegetation during the vernal months, must often have had to witness the withering effects of the east wind on the tender plants, flowers, and shoots of the season: its parching effects on the garden, and its hurtful consequences to the young barley in the fields, are frequent complaints. These easterly winds are generally attended by a blue mist, haze, or fuliginous vapour, which is considered to have a blighting effect. At least, the sun's heat being then intense, the aphides and other predatory insects are drawn forth from their hiding places, and the pregnant females commence their nidification, and countless generations are brought forth.

The moon has long been supposed to excise considerable general influence on the eather, and the subjoined table has been nstructed to show the probabilities of a change of weather after, or in coincidence with, the situations occupied by the moon during every revolution in her orbit:—

Situation of the Moon.	Situation explained.	Chances that the Weather will change.
New moon - -	When she exerts her influence in conjunction with the sun - - - - - -	6 to 1
First quarter - -	When she is 90° distant from the sun - -	5 — 2
Full - - -	When she exerts her influence in opposition to the sun - - - - - -	5 — 2
Third quarter -	When she is in the middle point of her orbit, being equidistant from the points of conjunction and opposition - - - - -	5 — 4
Perigee - -	When she is at the least distance from the earth -	7 — 1
Apogee - -	When she is at the greatest distance from the earth	4 — 1
The ascending equinox	When she is crossing the equator towards the north	13 — 4
The descending equinox - -	When she is crossing the equator to the south -	11 — 4
The northern, or boreal lunistice - -	When she approaches nearest to our zenith during the period which intervenes between one new moon and another - - - -	11 — 4
The southern, or austral lunistice -	When she is at the greatest distance from our zenith	3 — 1

The following table, which appears in most every almanac, has been very com-only, but erroneously, attributed to Sir illiam Herschell. It is a fair approximation to correctness, but there are many influencing causes which will derange the ensuing weather, and upset any predictions.

New and Full Moon.	Summer.	Winter.
If it be a new or a full moon, or the moon entering into the first or last quarter at noon, or between 12 and 2	Very rainy - -	Snow and rain.
2 and 4 afternoon -	Changeable - -	Fair and mild.
4 — 6 evening -	Fair - - -	Fair.
6 — 8 evening -	Fair, if wind at N.W.; rainy, if wind at S. or S.W. -	Fair and frosty, if wind at N. or N.E. Rain or snow, if S. or S.W.
8 — 10 evening -	Ditto - - -	Ditto.
10 — 12 night - -	Fair - - -	Fair and frosty.
12 — 2 morning -	Ditto - - -	Hard frost, unless wind S. or S.W.
2 — 4 morning -	Cold, with frequent showers	Snow and stormy.
4 — 6 morning -	Rain - - -	Ditto.
6 — 8 morning -	Wind and rain - -	Stormy weather.
8 — 10 morning -	Changeable - -	Cold rain, if wind be W.; snow, if E.
10 — 12 noon - -	Frequent showers -	Cold, with high wind.

The barometer (says Dr. Lardner) has en called a weather-glass. Rules are atnpted to be established by which, from e height of the mercury, the coming state the weather may be predicted; and we cordingly find the words "rain," "changele," "fair," "frost," &c., engraved on the le attached to common domestic baroters, as if, when the mercury stands at height marked by these words, the ather is always subject to the vicissitudes pressed by *them*. These marks are, however, entitled to no attention; and it is only surprising to find their use continued in the present times, when knowledge is so widely diffused. They are, in fact, to be ranked scarcely above the *Vox Stellarum*, or astrological almanac. Two barometers, one near the level of the river Thames, and the other on the heights of Hampstead, will differ by half an inch, the latter being always half an inch lower than the former. If the words, therefore, engraved upon the plates are to be relied on, similar changes of weather could never happen at these two situations. But, what is even more absurd, such a scale would inform us that the weather at the foot of a high building, such as St. Paul's, must always be different from the weather at the top of it. It is observed that changes of weather are indicated, not by the actual height of the mercury, but by its change of height. One of the most general, though not absolutely invariable, rules is, that where the mercury is very low, and therefore the atmosphere very light, high winds and storms may be expected. The following rules, given by Mr. C. Mackenzie, may generally be relied upon, at least to a certain extent:—

1. The rising of the mercury presages, in general, fair weather; and its falling shows the approach of foul weather, as rain, snow, high winds, and storms.

2. In very hot or sultry weather, especially if the wind be south, the falling of the mercury foretels thunder.

3. In winter the rising presages frost; and in frosty weather, if it falls three or four divisions, there will follow a thaw; but if it rises in a continued frost, snow may be expected.

4. Whatever change of weather suddenly follows a change in the barometer, may be expected to last but for a short time. Thus, if foul weather happens soon after the falling of the mercury, expect but little of it; and infer the same, if fair weather succeeds shortly after the rise.

5. When the mercury continues to rise for several days before the foul weather is over, expect a continuance of fair weather to follow.

6. In fair weather, when the mercury falls much and low, and continues so for two or three days before the rain comes, then expect a long continuance of foul weather will possibly ensue, with much wet, and probably high winds.

7. The mercury generally rises very fast after great storms of wind, when before it was very low. Dr. Halley mentions that he once observed it to rise an inch and a half in six hours, after a long continued storm of south-west wind.

8. A fluctuating and unsettled state of the mercurial column indicates uncertain or changeable weather.

The words on the plate of a barometer are not strictly to be adhered to, though they will in general agree; for, the height of the mercury does not so much indicate the weather, as its motion up and down: to know, therefore, whether the mercury is actually rising or falling, observe,—

1st. If the surface of the mercury is convex (or stands high in the middle), it is then rising.

2d. If the surface is concave (standing low in the middle), it is then falling.

3d. If the surface is plain, or a little convex, it may be considered as stationary.

4th. A small shake of the tube will sometimes bring the mercury to its approaching height.

The foregoing rules are chiefly to be depended on; but the following are not unworthy of regard:—

1st. The greatest heights of the mercury are on easterly and north-easterly winds; and its lowest station on southerly or westerly winds.

2d. A continuance of fair weather, the wind being in the north, and the mercury high or rising, is never succeeded by foul till the wind changes southerly.

3d. A continuance of rain from the south is scarcely ever succeeded by settled fair weather before the wind changes either to the west, or to some point of the north.

4th. If the mercury falls when the wind is full south, it scarcely ever fails to be a sign of rain.

5th. If the weather is about to be cold, frosty, or foggy, it rises pretty high; but if going to be windy or tempestuous, it will then sink very low, and, as soon as the first storm is over, it will rise again apace.

The domestic barometer would become a much more useful instrument if, instead of the words usually engraved on the plate, a short list of the best established rules, such as the above, accompanied it, which might be either engraved on the plate or printed on a card. It would be right, however, to express the rules only with that degree of probability which observation of past phenomena has justified. There is no rule respecting these effects which will invariably hold good.

The barometer never fails to show the true cause of the alterations of the weather, and we are thereby prepared to expect them; but it may sometimes happen that the column of mercury will not alter its altitude agreeably to the foregoing rules; for, when the atmosphere is charged with more aqueous matter than it can well dissolve, or hold in a state of suspension, the surplus will form clouds; and those will produce showers of rain when the mercury stands very high; and, for the contrary reason, there may be sometimes no rain when the mercury is very low. Hence it follows, that we are generally satisfied by a glance at the barometer, as to the weather we may at all times expect, though sometimes the contrary may happen. A general monitor, therefore (to any wise man), is better than none at all. (*Farmer's Magazine.*) See BAROMETER.

*es calculated from Atmospherical Ob-
rvations, made in the Parish of Cobham,
urrey, during the Eight Years from* 1833
1840.

THERMOMETER.

nth.	Utmost Range.		Mean.	Mean Highest.	Mean Lowest.	Difference, or Solar Variation.
uary	60	10	38·38	52·6	14·6	38·0
ruary	60	14	39·84	54·7	20·6	34·1
ch	66	16	42·02	60·1	20·5	39·6
il	85	17	46·25	71·3	23·0	48·3
	86	23	55·25	79·8	30·3	49·5
e	93	33	61·31	88·5	37·8	50·7
	98	33	63·00	89·2	39·2	50·0
ust	94	32	61·83	85·8	36·7	49·1
t.	82	27	56·32	76·0	32·3	43·7
ober	79	21	49·87	68·4	25·8	42·6
.	66	16	43·64	58·8	21·8	37·0
.	63	4	38·98	57·5	18·8	38·7

BAROMETER.

onth.	Utmost Range.		Mean.	Mean Highest.	Mean Lowest.	Difference.
uary	30·83	28·97	29·986	[30·59	29·17	1·42
ruary	30·62	28·62	29·819	30·44	29·04	1·40
rch	30·68	28·70	29·915	30·47	29·24	1·23
il	30·53	29·02	29·999	30·41	29·34	1·07
	30·62	29·42	29·960	30·42	29·54	0·88
e	30·42	29·29	30·008	30·35	29·55	0·80
	30·47	29·37	30·039	30·36	29·57	0·79
ust	30·48	29·11	30·023	30·35	29·42	0·93
t.	30·58	28·99	31·182	30·34	29·26	1·08
.	30·71	28·98	29·997	30·50	29·24	1·26
.	30·48	28·67	29·822	30·38	29·00	1·38
.	30·66	29·04	30·038	30·50	29·28	1·22

he mean temperature, mean highest, and
n lowest, have been calculated from
rvations made on registering thermo-
rs, hung on a post two feet eight inches
the grass, facing the north, and in no
sheltered. The barometer is in a ves-
le. No corrections of any kind have been
e in registering the barometer. (*Johnson
Shaw's Farmer's Almanac*, vol. i. p. 157.)
hall conclude this article with a register
e state of the weather in the summers
e last quarter of a century which ap-
s in the *Farmer's Almanac*.

he Summers from 1816 *to* 1840.—1816.
emely cold and wet throughout; one
e worst harvests ever known.—1817.
y cold and wet in July and August, but
emely fine in September, which favoured
harvest.—1818. Intensely hot and dry;
thermometer twice at 89°, and often
e 80°.—1819. A very fine hot summer;
month of August intensely warm;
ely any thunder.—1820. A fine summer
he whole, and very productive.—1821.
e very hot days occasionally, but for
most part cold and showery. Immense
during harvest, which did great da-
e.—1822. A splendid year; hot and dry
he most part, but heavy rain at times,
much thunder. A very abundant har-
—1823. A cold showery summer. In
it rained every day except the 24th;
little thunder.—*1824. Very fine and
u throughout, but never intensely hot.* The thermometer stood highest September 1st, and was at 79°.—1825. Very hot almost throughout. July 18th, the thermometer stood at 90°, which is the highest observation in the course of all these summers.—1826. The hottest and driest summer ever known; it began early and continued late. The thermometer was twice at 88° and often at 84°.—1827. Hot and dry, but not to such extremity as in the preceding summer; much thunder.—1828. Immense rains, which began July 9th, and continued almost without cessation. Large floods July 16th and 30th. Heavy thunderstorms; bad harvest.—1829. A very cold stormy summer. In September the rains were extremely heavy.—1830. Very cold and wet, especially in June; much thunder.—1831. Warm, gleamy, showery, and electrical. A sickly summer; great number of insects, especially house-flies.—1832. Moderate for the most part, without much inclination either one way or the other.—1833. Very fine, the early part especially. An abundant harvest.—1834. A fine genial summer, but heavy rains in the end of July. An early and productive harvest.—1835. Hot and dry, with some showery exceptions. Another abundant harvest.—1836. Very variable in different parts of the kingdom. In the midland counties, dry weather predominated. Remarkable for the almost entire destruction of the turnip crop by the fly. Harvest not amiss.—1837. A fair average of hot weather, but preceded by a very severe spring. Harvest deficient.—1838. A cold wet summer, and a late unproductive harvest.—1839. Very heavy rains, almost without cessation. A large flood August 2., and smaller ones frequent. The harvest not unproductive, but much damaged.—1840. A fine warm summer, with intense heat in August; fine harvest weather, but seed deficient from the want of rain.—1841. Fine and warm in May and June; wet and cold in July and the beginning of August; fine harvest weather at the end and in September. (*The Weather Guide*, by P. L. Simmonds; *Quart. Journ. of Meteor. Soc.* vol. i. p. 5—74.)

WEEDS. The clearing of all kinds of crops, and keeping them free from weeds, is an essential part of cultivation: if this be omitted, neglected, or but partially performed, a portion of the crop will be lost, in proportion to the prevalence of such weeds, from defective preparation or partial extirpation. The nourishment drawn from the ground by the roots of all vegetables being somewhat similar, where that nourishment is suffered to be drawn by weeds it is lost to the intended crop, which will therefore be reduced in produce in proportion as it has been deprived of nutriment from the soil, and prevented from occupying its whole extent of ground. The same observation will apply to pastures, to hedges and plantations, and to all parts of the earth's surface reclaimed, occupied, and cultivated for the use of man; for therein the growth of noxious or useless plants will be injurious to the success of the useful ones, and in proportion as the former abound, the latter must prove defective.

The clearing of crops from weeds must be effected in two ways: 1. In the preparation; and, 2. During the growth of the crop. In the preparation, attention must be given to distinguish root weeds from seedlings, as their destruction must be effected upon different principles. In the spring of the year particularly, attention should be paid to hoeing and weeding.

And old Tusser's advice may be followed with advantage: —

"In May get a weed-hook, a crotch, and a glove,
And weed out such weeds as the corn doth not love;
For weeding of winter corn, now it is best,
But June is the better for weeding the rest.

"The May-weed doth burn, and the thistle doth fret,
The fitches pull downward, both rye and the wheat,
The brake and the cockle be noisome too much,
Yet like unto boodle no weed there is such.

"Slack never thy weeding, for dearth nor for cheap,
The corn shall reward it, ere ever ye reap;
And 'specially where ye do trust for to seed,
Let that be well used, the better to speed."

The plants we term weeds, considered as respecting mankind, are not totally useless; many of them have valuable medical qualities, and some of them may be applied to useful purposes, so as to pay something towards the expense of clearing them from the ground. Thus, sow-thistles (*Sonchus*) afford food for rabbits or hogs; the hog-weed, or cow-parsnip (*Heracleum sphondylium*), is good for either swine or cattle; horses and asses are fond of young thistles when partially dried, and the seed may be prevented from spreading by gathering the down, which makes good pillows; however, there is some danger of trusting them to this stage of growth, as a high wind would, and frequently does, disperse them over a whole country. Charlock, when drawn, may be given to cows, who are very fond of it, particularly of the smooth kind; and, in the *Oxford Report*, it is stated that it can be converted into good hay. Nettles, fern, and the more bulky hedge-weeds, are, in Staffordshire, collected annually about midsummer and burnt; their ashes being afterwards formed into balls, which are of considerable value, being used in composing a ley for scouring and cleaning linen and other clothes.

It is said that pigeons are of use in picking up the seeds of many weeds that would otherwise vegetate; and I have no doubt but that a prodigious quantity of the seeds of weeds are eaten by small birds, particularly of most of the snake-weeds (*Polygonums*), of the spurrey (*Spergula*), and, in severe weather, of the different sorts of charlock (*Sinapis*, *Brassica*, and *Raphanus*), and of many other kinds. It has been observed that bees have not thriven so well in this island since the extirpation of weeds has been more attended to. In China and Japan, it is said not a weed is to be seen, and that they only make use of night-soil as a manure, partly with a view of preventing any rise of weeds.

Weeds, like all other vegetables, may be distinguished into annuals, biennials, and perennials, according to their term of duration.

Annuals are those which continue only one year, the plants dying after perfecting their seeds: these are generally very prolific in seed. Biennials are those which continue two years, and die after perfecting their seed: these also produce an abundance of seed. Perennials are those which continue many years: some of these perfect their seeds every year, and others being very tenacious of growth by their roots, and having the faculty of reproducing themselves in this way, are less prolific in seeds; but many of them increase both by seeds and roots.

The weeds of agriculture are very numerous, but by far the greater part are underlings, and are little noticed; these are comparatively innocent, and a very great portion of them have no local or common names. Mr. William Pitt, in his essay *On the Extirpation of Weeds* (*Com. to Board of Agr.* vol. v. p. 233.), enumerates fifty-five weeds, and the list might have been greatly extended; but few farmers, whose knowledge is bounded by the soils they respectively cultivate, would think themselves troubled with more than a dozen to twenty; that is, four or five which trouble them in their fallows; four or five, the seeds of which infest their samples of corn; and a few besides, which are locally prevailing and obtrusive, but (as seems to have been too generally considered) not *very hurtful*.

The fact was, that, before the improved agriculture became so generally known, those weeds which did not hurt the samples the farmers cared little about; not considering how much they hurt the crops: and hence it has been, that on the different soils corn poppy, charlock, blue-bottles, corn marigold, May-weed, &c. have been suffered to abound.

The weeds of agriculture may be divided.

), 1. Those which infest samples of n; 2. Rooted or fallow weeds, and h others as are hard to destroy; 3. ose which are principally objection- e as they encumber the soil; 4. Under- ; weeds, such as never rise with the p nor come into the sickle. Under ir respective heads, in alphabetical er, we have already treated of the de- iorating qualities and mode of destruc- 1 of each weed; but, following the above angement, we shall classify them, and l such further remarks as may be re- red.

. *Weeds which infest Samples of Corn.*— e weeds of this description do not exceed in number, and it very rarely happens t more than two sorts are found asso- ted in one sample of wheat. They vary to soil so much, that some of the worst eds in fens and marshes are not known at on clay, cold soils, and are but very le seen on any sort of dry turnip land. ht loams, and deep loose soils, gene- y have most weeds by nature. The eds which infest the sample are, darnel *romus secalinus* and *mollis*), cockle *rostemma Githago*), tares (*Ervum te- permum* and *hirsutum*), melilot (*Meli- s officinalis*), wild oats (*Avena fatua*), iff (*Galium Aparine*), crow-needles, or pherd's needle (*Scandix pecten Veneris*), ck bindweed (*Polygonum Convolvulus*), ual snake-weed (*Polygonum lapathifo- n*), and charlock seeds in barley some- es.

)f these ten weeds whose seeds infest ples of corn, five are principally inju- us to wheat; the others are partial, and re common in barley and oats.

. *On Fallow Weeds.*—The objects of a ow are, and always were, first, to era- ate root weeds, and cleanse and open the to the fibres of future crops; second, to verise and break down the texture of y soils, and mix them with manure, in ler to bring the land periodically into a d and fertile condition. Seedling weeds destroyed incidentally; and good fal- s, with good seasons, kill a great many, ugh it be not the object of fallowing.

The fallow weeds are principally the fol- ing: couch, including *Triticum repens*, *rostis repens*, *Holcus mollis*, and *Poa tensis*, rest-harrow (*Ononis arvensis*), -wort, the common way-thistle, or pas- e thistle (*Carduus arvensis*), curled dock *umex crispus*), tall oat-like soft-grass *olcus avenaceus*), colt's-foot (*Tussilago rfara*), corn bindweed (*Convolvulus ar- sis*), corn mint (*Mentha arvensis*), sur- e-twitch (*Agrostis stolonifera angusti- a*), black foxtail-grass (*Alopecurus agrestis*), common knot-grass (*Polygonum aviculare*), wild carrot (*Daucus Carota*), hedge parsley, or dill (*Torilis infesta*), common fool's parsley (*Æthusa Cynapium*), spingel or fennel (*Meum Fœniculum*.)

3. *Weeds which are principally objectionable as they encumber the Soil, or whose Roots are annual, and whose Seeds pass the Corn-sieve.*—Of this class of weeds the following deserve particular notice: charlock (several species), corn poppy (*Papaver Rhœas*), blue-bottle (*Centaurea Cyanus*), stinking May-weed (*Anthemis cotula*), corn marigold (*Chrysanthemum segetum*).

To extirpate these weeds, clean corn-seed must be used, not a single plant of these weeds must be suffered to perfect seed in the hedgerows, and a judicious rotation of crops adopted, so as to admit of the unsparing use of the horse-hoe, as well as of the hand in weeding; by which means these noxious and disgraceful pests of corn-fields will be overcome, and banished from the soil.

The corn poppy particularly accumulates upon gravelly soils of low quality, also on dry sandy soils, and generally on all dry and shallow lands which are over-cropped and neglected. But much better soils, as loamy gravel, &c., are infested with it; only here the crops are generally good enough to keep it under, and being less abundant, it is much easier subdued by weeding. But the corn poppy is never so triumphant as in a hot and dry season, in which case many fields which should have been corn are wholly covered with it. One of three things must be done by way of remedy: 1st, the soil must be clayed or marled; 2d, or it must be fed with much larger quantities of farm-yard dung or compost; 3d, if neither of these be easily practicable, the rotation must be changed.

4. *Of the Weeds called Underlings, or such as never rise in the Crop, nor come into the Sickle.*—These are groundsel or Simson (*Senecio vulgaris*), annual meadow-grass (*Poa annua*), chickweed (*Stellaria media*), shepherd's purse (*Thlapsi bursa pastoris*), spurry (*Spergula arvensis*), camomile feverfew (*Matricaria Chamomilla*), fat hen or wild spinach (*Chenopodium album*), corn salad, or lamb's lettuce (*Fedia olitoria*), flixweed (*Sisymbrium Sophia*), common fumitory (*Fumaria officinalis*), and sand mustard (*Sinapis muralis*).

Land may be rendered inert or unfertile from an excess of manure, as well as from the want of it; severe and avaricious cropping, long persevered in, being understood in both cases. Over-stimulus, as in the first instance, wears out, or renders inert, the principle of fertility in the land; and, in the latter instance, the want of stimulus produces the same effect. The underling weeds above mentioned flourish and prosper under this state of the land, brought on by either cause. The remedy is therefore obvious, viz. rest, or a clear-out summer fallow; and if in the first mentioned case (which is to be met with in deep fen land and in old garden mould), apply a dressing of lime, and sow down with the superior pasture-grasses and clovers, to remain for not less than five years. In the latter case, or when the fertility of the soil is worn out by injudicious cropping, and a niggardly supply of manure, joined to the naturally thin and poor staple of the soil, then a full application of manure, or marl and manure, the latter consisting as much as possible of cow-dung, should be given, and the land sown down with the superior permanent pasture-grasses suited to the soil, with a due admixture of clover.

5. *Pasture Weeds.* — Some farmers seem to suppose that if they keep the weeds subdued in the growing crops, they have performed wonders (and too many have reason to congratulate themselves if they do this), while all kinds of nuisances in the shape of weeds disfigure and overrun their pastures. But thistles, milkweed, everlasting John's-wort, sweet elder, &c., flourish undisturbed, and fill the earth with seeds or roots in readiness to spread and grow whenever the earth is moved for their reception. Any plant not wanted on a farm, or not required in course of cultivation, should never be allowed to perfect its seeds on any part of it; if they are, the farmer will find, to his sorrow, that he has suffered an enemy to steal a march upon him, one which it may require much time and labour to subdue. Allow, then, nothing to go to seed on your farm you do not mean to cultivate; dig them up root and branch, or, if this is not practicable, take your scythe and cut them at once.

The following weeds are more frequently found to infest dry, sandy pastures, and calcareous soils, than loamy or damp grass lands. Dwarf-thistle (*Carduus acaulis*), common camomile (*Anthemis nobilis*), ox-eye daisy (*Chrysanthemum leucanthemum*), great fleabane, or ploughman's spikenard (*Conyza squarrosa*), cheese refining, or yellow ladies' bedstraw (*Galium verum*), long-rooted hawk-weed, wild thyme (*Thymus serpyllum*), sheep's sorrel (*Rumex Acetosella*), knot-grass, or snake-weed (*Polygonum aviculare*), yellow rattle (*Rhinanthus crista-galli*), common Carline thistle (*Carlina vulgaris*).

Where these are found to prevail to a great extent, there is no remedy like breaking up the land and taking a course of crops; for palliative remedies are of little avail. The thistles, sheep's sorrel, and knot-grass, are the most formidable. Hand weeding, when the weeds are confined to local spots, and are only just beginning to spread generally over the soil, will be found effectual: but when once the pasture becomes generally infected with the seeds and roots of these plants, no time should be lost in using the plough, harrow, and horse-hoe, and a judicious course of cleansing crops before returning the land again to permanent pasture.

The pasture weeds which generally prevail in loamy soils, and such also as are prevalent in clayey and damp soils, are principally as follows: — yellow goat's beard (*Tragopogon pratensis*), marsh, or red thistle (*Carduus palustris*), melancholy plume-thistle (*Cnicus heterophyllus*), meadow plume-thistle (*Carduus pratensis*), common butter-bur (*Tussilago Petasites*), ragwort (*Senecio Jacobæa*), common daisy (*Bellis perennis*), black knap-weed, or matfellow (*Centaurea nigra*), broad-leaved dock (*Rumex obtusifolius*); several species of orchis, common cow parsnip, or hog-weed (*Heracleum Sphondylium*), and sedge (*Carex*).

The means to be adopted for the extirpation of these noxious weeds in pastures must be regulated by the nature of the soil and the comparative prevalence of the weeds. In good pasture land, where, from accident or neglect, these weeds, in part or wholly, have insinuated themselves, hand-weeding may most advantageously be had recourse to; and particularly for the larger weeds, such as thistles, rag-weed, docks and knapweed, it will be found the best temporary remedy. Should the coarseness of the pasture have been occasioned by too frequent haying, then depasturing closely for two or three years, with a good top-dressing of dung compost applied in the early part of the spring or late in the autumn, with strict attention to hand-weeding, will be found effectual to recover the pasture and extirpate the weeds. Frequent top-dressings are of the greatest use in effecting the above improvements on deteriorated thin pasture lands, as regards the destruction of weeds, as well as of improving the quality of the pasture. When the sedges, marsh-thistle, pestilent wort, &c. prevail in meadows, then recourse must be had to other means than that of hand-weeding, viz. draining, paring and burning, liming, and a judicious rotation of crops under the horse-hoe husbandry, until every vestige of the seeds and roots of these noxious weeds disappear. The ground may then be laid down to permanent pasture.

with the seeds of the most valuable species adapted to the soil, and where water can be commanded, converted to water meadow, by which the value of the land will be considerably increased. (*Holdich's Weeds; Pitt's Essays on Weeds.*)

WEIGH. A weight of cheese, wool, &c., containing 256 lb. avoirdupois. Of corn, the weigh contains forty bushels; of barley or malt, six quarters. A weigh of cheese or butter in Suffolk is 256 lbs., and in Essex 336 lbs.

WEIGHTS AND MEASURES. The proportions or quantities by which various sorts of agricultural or other produce are disposed of. They vary greatly in different districts of the kingdom, and even in different places of the same district or county.

In a general sense the term measure is applied to that by which any thing is compared in respect of quantity. Thus we have measures of extension, of weight, time, force, resistance, temperature, &c.; in short, of every thing of which greater or less can be predicated; and it frequently happens that the unit or measure is not taken in the thing or property which is the immediate subject of consideration, but in something else which depends on it, or is proportional to it. Angular space, for example, is measured by an arc of a circle; time, by the rotation of the earth upon its axis, or its revolution around the sun; force, by the quantity of motion it impresses on a body; degrees of heat, by the expansion of metals or other substances; muscular strength, by the resistance of a spring. See DYNAMOMETER, STRENGTH, THERMOMETER, &c.

By measure, in an absolute sense, is understood the unit, or standard, by which we measure extension. We have, therefore, measures of length, of superficies, and of volume or capacity; but as the two latter may be deduced in all cases from the former, it is only necessary to establish a unit, or standard of length. The choice of such a standard, and the different multiples and parts of it taken for the uses of society, form a metrical system, or system of metrology.

As no precise notion can be formed of the magnitude of a line in any other way than by comparing it with another line of a known length, the necessity of having recourse, for the interchange of ideas, to measures not entirely arbitrary, but fixed by nature and intelligible alike to all mankind, seem to have been perceived in the earliest ages. Hence originated the foot, the cubit, or length of the arm from the elbow to the tip of the middle finger; the *ulna*, arm, or yard; the span; the digit, or finger; the palm; the fathom, or space from the extremity of one hand to that of the other, when they are both extended in opposite directions; the pace, the barley corn, the hair's breadth, and other denominations of measure taken from parts of the human body, or from natural objects, which, though not of an absolute and invariable length, have a certain mean value sufficiently definite to answer all the purposes required in a rude state of society. But as civilisation advanced, the necessity of adopting more precise standards would be felt, and the inadequacy of such measures as the foot, the cubit, &c. (referred only to the human body) to convey accurate notions, would be rendered most apparent in their application to itinerary measures, or the estimation of great distances.

English System of Lineal Measures. — The unit of lineal measure in this country is the yard, all other denominations being either multiples, or aliquot parts of the yard. The yard is divided into 3 feet, and the foot subdivided into 12 inches. The multiples of the yard are the pole or perch, the furlong and the mile; 5½ yards being a pole, 40 poles a furlong, and 8 furlongs a mile. But the pole and furlong are now scarcely ever used, itinerary distances being reckoned in miles and yards.

The relations of these different denominations are exhibited in the following table: —

Inches.	Feet.	Yards.	Poles.	Furlongs.	Miles.
1	0·083	0·028	0·00505	0·00012626	0·0000157828
12	1	0·333	0·06060	0·00151515	0·00018939
36	3	1	0·1818	0·004545	0·00056818
198	16·5	5·5	1	0·025	0·003125
7920	660	220	40	1	0·125
63360	5280	1760	320	8	1

Of the different measures of length used n European countries, the foot is the most universally prevalent. We subjoin the reation between the foot of different counries and the *English foot.*

	English foot.
Russian foot -	- 1·
Paris foot - -	- 1·065765
Prussian and Danish foot	- 1·029722
Bavarian foot -	- 0·957561
Hanoverian foot -	- 0·958333

	English Foot.
Saxon foot - -	- 0·929118
Austrian foot -	- 1·037128

See Foot, League, Mile, &c.

Measures of Superficies. — In square measure the yard is subdivided, as in general measure, into feet and inches; 144 square inches being equal to a square foot, and 9 square feet to a square yard. For land measure the multiples of the yard the pole, the rood, and the acre; 30¼ (square of 5½) square yards being a 40 poles a rood, and 4 roods an acre. Acre.) Very large surfaces, as of countries, are expressed in square mi

The following are the relations of sq measure: —

Square Feet.	Square Yards.	Poles.	Roods.	Acres.
1	0·1111	0·00367309	0·000091827	0·0000229
9	1	0·03305798	0·000826448	0·0002066
272·25	30.25	1	0·025	0·00625
10890	1210	40	1	0·25
43560	4840	160	4	1

Land is usually measured by a chain of 4 poles or 22 yards, which is divided into 100 links. Three chains in length and one in breadth make an acre, which equals 160 square perches, or 4840 square yards.

Land Measure.

Countries.	Land Measure.	English Square Yards.	No. equal to 10 English Acres.
England -	Acre -	4840	10000
Scotland -	—	6150	7860
Ireland -	—	7840	6173
France -	Hectare	11960	4046
Prussia -	Morgen	3053	15853
Hamburgh	—	11545	4192
Amsterdam	—	9722	4978
Dantzic -	—	6650	7278

Measures of Volume. — Solids are measured by cubic yards, feet, and inches; 1728 cubic inches making a cubic foot, and 27 cubic feet a cubic yard. For all sorts of liquids, corn, and other dry goods, the standard measure is declared by the act of 1824 to be the imperial gallon, the capacity of which is determined immediately by weight, and remotely by the standard of length. See Gallon.

The parts of the gallon are quarts and pints, 2 pints being a quart, and 4 quarts a gallon. Its multiples are the peck, the bushel, and the quarter; the peck being 2 gallons, the bushel 4 pecks, and the quarter 8 bushels. The following are the rotations: —

Pints.	Quarts.	Galls.	Pecks.	Bushels.	Quarters.
1	0·5	0·125	0·0621	0·015625	0·001953125
2	1	0·25	0·125	0·03125	0·00390625
8	5	1	0·5	0·125	0·015625
16	8	2	1	0·25	0·03125
64	32	8	4	1	0·125
1512	256	46	32	8	1

Cubic or Solid Measure.

1728 cubic inches make - 1 cubic
27 cubic feet - - 1 cubic
40 feet of rough timber }
50 feet of hewn timber } 1 load.

This comprehends length, breadth, thickness

And 108 solid feet, that is, 12 fe length, 3 feet in breadth, and 3 feet or commonly 14 feet long, 3 feet 1 broad, and 3 feet 1 inch deep, are a sta wood.

And 128 solid feet, that is, 8 feet 4 feet broad, and 4 feet deep, are a c wood.

Grain Measures.

Countries.	Bushels.	No. of equal to English Quarters.	Name Meas
England -	1000	8800	
Scotland -	1022	7827	
France -	4427	1807	Setier.
Holland -	3157	2534	Mudd
Prussia -	1479	5409	Schef
Spain -	1599	5003	Faneg
Poland -	1451	5513	Korz

(*Loudon's Encyclo. of Agr.* p. 20.)

English Corn Measures.

4 gills = 1 pint = 34 cubic
2 pints = 1 quart = 69
4 quarts = 1 gallon = 277
2 gallons = 1 peck = 544
8 gallons = 1 bushel = 2218
8 bushels = 1 quarter = 10 cubic
5 quarters = 1 load = 51

See Bushel, Peck, Quarter.

able of Winchester Quarters from 1 *to* 100, *with their Equivalents in Imperial Quarters.*

inchester Quarters.	Equivalents in Imperial Quarters.	Winchester Quarters.	Equivalents in Imperial Quarters.
1	0·96945	51	49·44180
2	1·93889	52	50·41124
3	2·90834	53	51·38069
4	3·87779	54	52·35014
5	4·84724	55	53·31959
6	5·81668	56	54·28903
7	6·78613	57	55·25848
8	7·75558	58	56·22793
9	8·72502	59	57·19737
10	9.69447	60	58·16682
11	10·66392	61	59·13627
12	11·63336	62	60·10571
13	12·60281	63	61·07516
14	13·57226	64	62·04461
15	14·54171	65	63·01406
16	15·51115	66	63·98350
17	16·48060	67	64·95295
18	17·45005	68	65·92240
19	18·41949	69	66·89184
20	19·38894	70	67·86129
21	20·35839	71	68·83074
22	21·32783	72	69·80018
23	22·29728	73	70·76963
24	23·26673	74	71·73908
25	24·23618	75	72·70853
26	25·20562	76	73·67797
27	26·17507	77	74·64742
28	27·14452	78	75·61687
29	28·11396	79	76·58631
30	29·08341	80	77·55576
31	30·05286	81	78·52521
32	31·02230	82	79·49465
33	31·99175	83	80·46410
34	32·96120	84	81·43355
35	33·93035	85	82·40300
36	34·90009	86	83·37244
37	35·86954	87	84·34189
38	36·83899	88	85·31134
39	37·80843	89	86·28078
40	38·77788	90	87·25023
41	39·74733	91	88·21968
42	40·71677	92	89·18912
43	41·68622	93	90·15857
44	42·65567	94	91·12802
45	43·62512	95	92·09747
46	44·79456	96	93·06691
47	45·56401	97	94·03637
48	46·53346	98	95·00581
49	47·50290	99	95·97525
50	48·47235	100	96·94470

Weights are used to ascertain the gravity bodies, a quality depending partly on eir magnitude and partly on their den- ty. The determination of the gravity or eight of different bodies, supposes the in- ntion of the balance. Nothing is known the steps which led to its introduction; it it was used in the *remotest antiquity.* *eights have frequently* been derived from grains of corn. Hence in this, and in some other European countries, the lowest denomination of weight is a *grain;* and 32 of these grains are directed by the ancient statute, called *Compositio Mensurarum,* to compose a pennyweight, whereof 20 make an ounce, 12 ounces a pound, and so upwards.

Tables of Weights and Measures according to the Imperial Standard.

Avoirdupois Weight.			French grammes.
	1 drachm	=	1·771
16 drachms	1 ounce	=	28·346
16 ounces	1 pound	=	453·544
28 pounds	1 quarter	=	12·699 kilogram.
4 quarters	1 cwt.	=	50·796
20 cwt.	1 ton	=	1015·920

The stone is generally 14 lbs. avoirdupois weight, but for butchers' meat or fish it is 8 lbs. Hence the cwt. equals 8 stone of 14 lbs., or 14 stone of 8 lbs.

Hay and straw are sold by the load of 36 trusses. See Hay and Truss.

The custom of allowing more than 16 ounces to the pound of butter used to be very general in several parts of the country.

Wool weight. Like all other bulky articles, wool is weighed by avoirdupois weight, but the divisions differ thus,

7 pounds = 1 clove.
2 cloves = 1 stone.
2 stone = 1 tod.
6½ tods = 1 wey.
2 weys = 1 sack.
12 sacks = 1 last.

Cheese and butter:

8 pounds = 1 clove.
32 cloves = 1 wey in Essex.
42 cloves = 1 wey in Suffolk.
56 pounds = 1 firkin of butter.

Of wood-fuel, English measure. — Wood-fuel is assized into shids, billets, faggots, fall-wood and cord-wood. A shid is to be 4 feet long, and according as they are marked and notched, their proportion must be in the girth; viz. if they have but 1 notch they must be 16 inches in the girth, if 2 notches 23 inches, if 3 notches 28 inches, if 4 notches 33 inches, and if 5 notches 38 inches about. Billets are to be 3 feet long, of which there should be three sorts, viz., a single cask, and a cask of 2; the first is 7 inches the second 10 inches, and the third 14 inches, about: they are sold by the 100 of 5 score. Faggots are to be 3 feet long, and at the band 24 inches about, besides the knot of such faggots; 50 go to the load. Bavins and spray wood are sold by the 100, which are accounted a load. Cord wood is the bigger sort of fire wood, and it is measured by a cord or line, whereof there are 2 measures; that of 14 feet in length, 3 feet in breadth, and 3 feet in height. The other is 8 feet in length, 4 feet in height, and 4 feet in breadth.

Measures of Wood.

1000 billets of wood = 1 cord.
10 cwt. of wood = 1 cord.
1 cord of wood = ¼ chaldron of coals.
100 lbs. of wood = 1 quintal of wood.

Method of ascertaining the weight of cattle while living. This is of the utmost utility for all those who are not experienced judges by the eye, and, by the following directions, the weight can be ascertained within a mere trifle. Under the head CATTLE we have already given a useful table on this subject; but the annexed rules will be found of service. Take a string, put it round the beast, standing square, just behind the shoulder blade, measure on a foot-rule the feet and inches the animal is in circumference, this is called the girth; then with the string measure from the bone of the tail, which plumbs the line with the hinder part of the buttock; direct the line along the back to the fore part of the shoulder-blade; take the dimensions of the foot-rule, as before, which is the length, and work the figures in the following manner:—Girth of the bullock, 6 feet 4 inches; length, 5 feet 3 inches; which, multiplied together, make 31 square superficial feet; that again, multiplied by 23 (the number of pounds allowed to each superficial foot of all cattle measuring less than 7 and more than 5 feet in girth), makes 713 lbs.; and allowing 14 lbs. to the stone, is 50 stone 13 lbs.; and where the animal measures less than 9 and more than 7 feet in girth, 31 is the number of pounds to each foot. Again, supposing a pig or any small beast should measure 2 feet in girth, and 2 feet along the back, which, multiplied together, make 4 square feet, that multiplied by 11, the number of pounds allowed for each square foot of cattle measuring less than 3 in girth, makes 44 lbs.; which, divided by 14, to bring it to stones, is 3 stones 2 lbs. Again, suppose a calf, sheep, &c. should measure 4 feet 6 inches in girth, and 3 feet 9 inches in length, which multiplied together, makes 16½ square feet; that multiplied by 16, the number of pounds allowed to all cattle measuring less than 5 feet and more than 3 in girth, makes 264 lbs; which, divided by 14, to bring it to stones, is 18 stones 12 lbs. The dimensions of the girth and length of black cattle, sheep, calves, or hogs, may be as exactly taken this way as it is at all necessary for any computation or valuation of stock, and will answer exactly to the four quarters, sinking the offal, and which every man who can get even a bit of chalk may easily perform. A deduction must be made for a half-fatted beast of 1 stone in 20 from that of a fat one, and for a cow that has had calves, 1 stone must be allowed, and another for not being properly fat.

The last act of the legislature on the subject of weights and measures, is the 5 & 6 W. 4. c. 63., which contains some important provisions. It abolishes all local or customary measures under a penalty of 40s. for every sale made by them; it prohibits the mischievous practice of selling by heaped measure; it enacts that coals shall in all cases be sold by weight; that with the exception of the precious metals, jewels, and drugs, all other articles sold by weight shall be sold by avoirdupois weight only; and that a stone shall in all cases consist of 14 lbs. avoirdupois; a hundred weight of eight such stones, &c. Lead and pewter weights are not to be stamped.

The act sets out with repealing the 4 & 5 W. 4. c. 49., and the provisions in the acts 5 G. 4. c. 74. and 6 G. 4. c. 12., which require that all weights and measures shall be exact models or copies in shape or form of the standards deposited in the exchequer; and those allowing the use of weights and measures, not in conformity with the Imperial standard, established by said acts; or that allow goods or merchandise to be bought or sold by weights or measures established by local custom, or founded on special agreement. It then goes on to enact as follows:

Local and customary measures abolished. —From and after the passing of this act, the Winchester bushel, the Scotch ell, and all *local or customary* measures shall be abolished; and every person who shall sell by any measure other than one of the Imperial measures, or some multiple or aliquot part thereof, shall be liable to a penalty not exceeding 40*s*. for every such sale: but nothing herein shall prevent the sale of any articles in any vessel, where such vessel is not represented as containing any amount of Imperial measure, or of any fixed, local or customary measure heretofore in use. —§ 6.

Heaped measure abolished.—From and after the passing of this act, so much of the said acts as relates to heaped measure is hereby repealed, and the use of heaped measure shall be abolished, and all bargains, sales, and contracts made after the passing of this act, by heaped measure, shall be null and void; and every person who shall sell any articles by heaped measure shall be liable to a penalty not exceeding 40s. for every such sale.—§ 7.

Articles sold by heaped measure, how to

be sold. — Whereas some articles heretofore sold by heaped measure are incapable of being stricken, and may not be conveniently sold by weight; it is enacted, that all such articles may henceforth be sold by a bushel measure, corresponding in shape with the bushel prescribed by the 5 G. 4. c. 74. for the sale of heaped measure, or by any multiple or aliquot part thereof, filled in all parts as nearly to the level of the brim as the size and shape of the articles will admit; but nothing herein shall prevent the sale by weight of any article heretofore sold by heaped measure. — § 8.

Coals to be sold by weight. — From and after the 1st of January, 1836, all coals, slack, culm, and cannel of every description shall be sold by weight, and not by measure, under a penalty of 40*s.* for every sale. — § 9.

All articles to be sold by avoirdupois, except, &c. — From and after the passing of this act, all articles sold by weight shall be sold by avoirdupois weight, except gold, silver, platina, diamonds, or other precious stones, which may be sold by troy weight; and drugs, which, *when sold by retail*, may be sold by apothecaries' weight. — § 10.

The stone, hundred weight, &c. — From and after the passing of this act, the weight denominated a stone shall, in all cases, consist of fourteen standard pounds avoirdupois, the hundred weight of eight such stones, and the ton of twenty such hundred weights; but nothing herein shall prevent any bargain, sale, or contract being made by any multiple or aliquot part of the pound weight. — § 11.

Fiar prices. — In Scotland, from and after the passing of this act, the fiar prices of all grain in every county shall be struck by the Imperial quarter, and all other returns of the prices of grain shall be set forth by the same, without any reference to any other measure whatsoever; and any sheriff clerk, clerk of a market, or other person offending against this provision shall forfeit not exceeding 5*l.* — § 16.

Penalty on price lists, &c. — From and after the 1st of January, 1836, any person printing, or clerk of any market or other person making any return, price list, price current, or any journal or other paper containing price list or price current, in which the weights and measures quoted or referred to denote or imply a greater or less weight or measure than is denoted or implied by the same denomination of Imperial weights and measures under the provisions of this act, shall forfeit and pay not exceeding 10*s.* for *every copy* of every such return, price list, *price current*, journal, or other paper which they publish. — § 31. (*Brande's Dict. of Science; M'Culloch's Com. Dict.*)

WELD. (*Reseda luteola.*) The dyer's yellow rocket, or yellow weed, is an indigenous annual plant, growing in waste ground, especially on a chalky soil, as well as in fallow fields, and on walls. The root is tapering. The stem wand-like, striated, leafy, somewhat branched, smooth, like the rest of the herb; two or three feet high. The leaves are sessile, of a darkish green, linear-lanceolate, obtuse, entire, single-ribbed. The flowers are in terminal clusters, erect, many-flowered, dense, pointed. The flowers themselves, which blow in July, are small, greenish white, without much scent. Weld is cultivated for the sake of its stalks, flowers, and leaves, which are employed for dyeing wool and other substances yellow, or mixed with indigo, green. The whole plant is fetid when bruised. When it has attained maturity, which is about the time of flowering, it is pulled, and made into bundles and dried, in which state it is used as a dye stuff. Weld is preferred to all other substances for giving the lively green lemon-yellow: but to render the yellow permanent, the wool must be previously prepared with a mordaunt of alum and tartar. Being an exhausting crop, and liable to failure from many causes, the cultivation of the dyer's rocket is only partially carried on in Essex, and a few other places. (*Smith's Eng. Flor.* vol. ii. p. 347.; *Bancroft on Colours*, vol. ii. p. 95.)

WELL. (Sax.) A term sometimes applied to a chimney or vent hole left in a rick or mow of hay or other similar materials, to prevent its overheating.

WESTON, RICHARD, was a literary man, but agriculture and gardening "had been his principal study and amusement for many years." He resided at Kensington-Gore, near London. He was author of the following works: —

1. Tracts on Practical Agriculture and Gardening, in which the Advantage of imitating the Garden Culture in the Field is fully proved by a Seven Years Course of Experiments. To which is added a complete Chronological Catalogue of English Authors on Agriculture, Gardening, &c. London. 1769. 8vo. Anonymous. An enlarged edition appeared in 1773 with the author's name. 2. The Universal Botanist and Nurseryman, containing Descriptions of the Species and Varieties of all the Trees, Shrubs, Herbs, Flowers, and Fruits, Natives and Exotics, at present cultivated in the European Nurseries, Greenhouses, and Stoves, as described by modern Botanists; arranged according to the Linnæan System, and their Names in English. To which are added a copious Botanical Glossary, several useful Catalogues and Indexes. Plates. London. 1770-74. 4 vols. 8vo. 3. The Gardener and Planter's Calendar; containing the Method of raising Timber Trees, Fruit Trees, and Quick for Hedges; with Directions for forming and managing a Garden every Month in the Year. Also many new Improvements in the Art of Gardening. London. 1773. 8vo. 4. A Catalogue of Greenhouse and Stove Plants, on five sheets. 1775. 5. Tracts on Alabaster or Gypsum,

describing its powerful effects as a very cheap Manure, &c. London. 1791. 8vo. 6. A Catalogue of Trees, Shrubs, Plants, and Fruits. 1775., and a Supplement in 1780. 8vo. (*G. W. Johnson's Hist. of Eng. Gardening.*)

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WHEAT. (*Triticum.*) This is undoubtedly the most important genus of the order *Gramineæ*; for wheat is that species of grain which is more generally cultivated than any other, and from the universal demand and high price it obtains, best repays the European farmer's toil and outlay.

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Its grains are, for the most part, small, and the produce of the straw is less than that of some other species, when cultivated under the same circumstances. Professor Low says, that "the trials which have been made with it in this country have shown it to be inferior in productiveness and quality to the better kinds of winter wheat. The advantage which it possesses is the earlier period of its ripening, on which account it may be sown so late, even in this climate, as the beginning of May." The Board of Agriculture being desirous of bringing spring wheat into general cultivation, in 1805 offered large premiums to those who should, in the spring of that year, sow the greatest quantity of land with spring wheat. In one of the communications made to the Board, Sir Joseph Banks states that "in the countries best acquainted with its culture, spring wheat is preferred to all other corn for raising a crop of seeds. This is owing to the small quantity of leaf it bears, less, perhaps, than any other corn, and to the short duration of the leaf, which fades and falls down almost as soon as it has attained its full size.

"In cases where red wheat has been damaged by the wire-worm, a mischief which seems of late years to have increased in this island, spring wheat appears to hold out an easy and simple remedy. In the first week of May the ravages of the worm have somewhat abated; if then the seed of spring wheat is at that time dibbled, or only raked with a garden rake, into the naked spots left by the worm, though it will not attain the growth at which the worm begins to prey upon it till he has changed his state for that of a winged beetle, it will certainly be ripe as soon as the winter wheat, and may be thrashed out and sold with it; or, if it is preferred, may be reaped separately, as the appearance of the ears, which, in the Lincolnshire sort, have longer beards or awns than the rivet or cone wheat, will point it out to the reapers in such a manner that no great error can happen in separating it from the Lammas." (*Com. to Board of Agr.* vol. v. p. 181.) To the miller this mixture of grain can be of no consequence; but it would be scarcely safe to employ the produce as seed.

From the analysis of Sir H. Davy it may be inferred that bread made of the flour of spring wheat is more nutritious than that made of winter wheat, because the former contains a larger proportion of gluten or half animalised matter. He found that

	Gluten.	Starch.	Insoluble Matter.
100 parts of best Sicilian wheat contained - -	21	75	4
100 parts of spring wheat of 1804 - - - -	24	70	6
100 parts of good English wheat of 1803 - -	19	77	4
100 parts of blighted wheat of 1804 - - - -	13	52	[illegible]

2. Winter, or lammas wheat (*T. Hyburnum*), is distinguished from the last by its appearance, being much more vigorous in the stem, more erect and thick in the ear, by having no awns upon the calyx, and only short awns upon the corolla, near the summit of the spike. But the awns not being a good botanical character, many botanists have conceived the species to be the same. The characters, however, of either kind being permanent and remaining under given circumstances unchanged for an unknown period, they may be regarded as species. The winter wheat has usually five or six florets, of which two are barren.

Winter wheat is that which is the most important with relation to its cultivation in Northern Europe. It is in this country generally sown in autumn, or previously to the winter months, and ripens its seed in the following summer; but it is an annual plant, and may be sown in spring.

"Slight varieties of this species are exceedingly common in different localities and are probably attributable to some peculiarities in the mode of culture. The common varieties of winter wheat are distinguished from each other according to the colour of the tunic enveloping the grain, and the difference observable in their chaff. The colours are usually divided into white and red, the latter of these, including many different shades of brown. Red wheat is commonly said to be more hardy than white; it is therefore thought better suited for cultivation in bleak and upland districts

The plant is, however, not so productive as the white, and the flour which it yields is seldom of so desirable a quality." (*Baxter's Lib. of Agr.* p. 640.)

3. Compact wheat (*T. compactum*) is allied to the two last named species, and may be merely a variety of them. In it the internodii of the rachis are very short. It is partially produced in different parts of Europe. "I have received specimens of it," says Professor Low, "from France and Sweden, and have cultivated them without observing any change of characters. Whether, however, the characters which distinguish it are sufficiently permanent to entitle it to be regarded as a species, has not been determined. In the meantime, following the authority of Host (*Icones et Des. Gram. Aust.*), I have placed it amongst the species.

4. Egyptian, or many spiked wheat (*T. compositum*), is distinguished from the others by its branched or compound spike, which no other species tends under any circumstance, to produce. Its seeds are numerous, and the produce abundant. It requires a good climate and a fertile soil, for in unfavourable situations the branches of the spike are not evolved, and then it assumes the appearance of ordinary wheat. It is cultivated in Egypt and the east, as it is in the south of Europe and different parts of Italy. It was known in Germany about 240 years ago, and in France it is said to have been cultivated for about eighty years, having been brought from the east under the name of wheat of Smyrna. In England it has been partially cultivated as the subject of experiment. It is uncommonly fruitful, and the straw is very strong and tough, whence it has received the name of reed wheat.

The grains, however, do not yield so large a proportion of flour or meal as any of the other species and their varieties, and the flour is scarcely superior to that obtained from the finest barley. Egyptian wheat will bear great degrees of heat and drought without harm, so that it is found to yield abundantly in situations where other kinds would be greatly injured if not destroyed; a circumstance which points it out as admirably adapted to the arid lands whereon it is chiefly cultivated. It would be more cultivated in England if its form did not cause it to hold the wet at harvest time, and hence it is very liable to be laid.

5. Turgid wheat. (*T. turgidum*). In this species the corolla is awned but not the calyx; the spikes are covered with soft hairs, and in some varieties change to a dark colour, and the awns drop off as the seeds become ripe, in which respect it differs from summer wheat. It is known in different localities under the several names of grey wheat, duck's bill wheat, grey pollard, rivet, pole rivet, cone, pendulum, &c. This species grows very tall, with a thick and rigid stem. The spikes are large and heavy, and nod to one side as the grain increases in weight. The kinds or minor varieties are distinguished by the farmer from their qualities of earlier or later ripening, and greater or less productiveness. One of the most esteemed of these is cone wheat, so named from the conical form of its spike. The turgid wheats are productive in corn and straw, but the grain is coarse and hard, and the flour much browner and of an inferior quality. They are chiefly suited to the inferior clays, upon which in England they are extensively cultivated. They are valued under such circumstances for their productiveness in grain and their large growth of straw; but being inferior to the winter wheats in the quality of their produce, the cultivation of them is not likely to be extended in this country.

6. Dark-spiked wheat (*T. atratum*), is allied to the last species, if it is not rather to be regarded as a variety of it. It has merely been made the subject of experiment, but not of extended cultivation. It is not superior in productiveness to the turgid wheats in common use.

7. Barley-like wheat (*T. hordieiforme*), so named from its peculiar form, resembling that of barley, seems, like that last described, to be derived from Africa. The florets are awned, and the calyx and corolla become dark as the seeds ripen. But it resembles the class to be next referred to, termed spelt-wheat.

8. Far (*T. Zea*), is one of the class of spelt-wheats. It is distinguished by the distance of its spikelets from one another. The straw is rigid; the calyx and corolla adhere closely to the seed, and the spikelets again so closely to the rachis, that they cannot be separated from the rachis without breaking it. This wheat is cultivated in some parts of Europe on inferior soils.

9. Spelt-wheat (*T. Spelta*), is distinguished like the last by its spikelets being firmly attached to the rachis, and by its rigid calyx and corolla closely enveloping the seed. Spelt is much cultivated in the south of Europe. It is grown extensively in the southern provinces of France, in Switzerland, Italy, in several parts of Germany, and in Arragon, Catalonia, and other parts of Spain, as well as in the north of Africa, and at the Cape of Good Hope. Spelt could be raised in this country with facility, and it is probable on soils low in the scale of fertility. It has been cultivated in Scotland, 600 feet above the level of the sea.

It is said that spelt-wheat is better adapted than any of the more delicate kinds for culture in Australia, and probably it will be found the more preferable sort in all the more southern wheat-growing countries.

There are two distinct varieties of spelt, distinguished as the awned and the awnless; the latter is perhaps the most naked of all the cerealia. The grains of this are large, but the ear contains only a small number of them, as a portion of the flowers prove barren. It is generally, if not always, a spring sown crop; grows strongly, and its stalks are nearly solid. Bread made of its flour is said to be of a dry quality. It is well known in commerce that the incomparable Nuremberg and Frankfort starch and flour are solely obtained from spelt-wheat. The grain cannot be divested of its husks by thrashing, and therefore requires to be passed through a mill. It should however be sown or drilled with the husks on.

10. One-grained wheat, or St. Peter's corn (*T. monoccocum*), is readily distinguished from all the other wheats by its general appearance, in which it resembles barley. Its spikelet consists of three or four florets, one of which only is for the most part fertile, and hence its name of one-grained wheat. The fertile floret has a long awn. The stem of this species of wheat is slender and rigid; and, from being both hard and fine, the straw is excellent for thatching. It is allied to the spelts, with which it was classed by some of the older botanical writers. This species is principally cultivated in the mountains of Switzerland and other elevated regions of Europe, and in barren soils. In consequence of its containing less gluten than common sorts, it answers better for being boiled into gruel than for being baked into bread. The four-sided form of the ripe ear is so regular, that it has the appearance of being carved in ivory. It has never formed an object of cultivation in this country, and does not appear to possess properties to entitle it to be introduced.

11. Polish wheat (*T. polonicum.*) This species has long awns, and is distinguished from all the others by its long and leafy calyx and corolla. It is cultivated in Germany, in Poland, and in Spain. It was brought into notice, and partially cultivated, in some of the counties of England, in the latter part of the seventeenth century; and it is said to have been valued on account of its productiveness of flour. But, although it may be possessed of this quality, its florets are often infertile, and it does not merit a more extended culture in this country. Unless sown sparingly, it is apt to lodge, in consequence of which the quality of the corn is impaired.

Varieties.—The minor varieties of any species of wheat are not permanent in their character, though, under given conditions, they will remain unchanged for an indefinite period. Under other circumstances, however, they degenerate; and hence particular kinds that were once valued have now ceased to be so. The best advice that can be given, therefore, in the choice of varieties and sub-varieties, is to select those which the practice and experience of the principal farmers of the neighbourhood have stamped as the best. Colonel Le Couteur, one of the best authorities on the culture of wheat, has given us the result of his experiments and great experience, upon four of the best pure and improved varieties of wheat lately introduced into England. (*Journ. Roy. Eng. Agr. Soc.* vol. i. p. 113.)

1. White downy. This excellent variety is believed to be the same that is so well described by Boys in his *General View of the Agriculture of Kent*, as the "Hoary White," or "Velvet-eared," said by him to have been much prized by the millers, but then entirely lost. The seed after being washed and steeped was sown in drills seven inches apart, at the rate of two bushels or a little more to the acre. The wheat was carefully hand-hoed in the month of May, which caused it to tiller freely. The preceding crop was potatoes. This wheat will withstand the most severe weather. The season 1837 to 1838 was a very trying one, both as to wetness and severity of cold, the thermometer having fallen to 18° below freezing; but the crops of this wheat raised by my neighbours were perfectly insensible to it, and of great produce. This wheat is not remarkable for its early maturity, though it cannot be called a tardy variety. It is not subject to degenerate, and if attention is paid to sowing the seed pure, and annually, or even occasionally, varying the manure intended for it, it is possible that it may never degenerate. The only objection to it is the huskiness or velvety ear, which in damp weather is retentive of moisture; and in snatchy seasons the grain is more apt to sprout than the smooth-chaffed varieties. It is not much affected with dust-brand; and when pickled and limed, has never been found with smut-balls. It is little liable to shed, even when over-ripe, and will resist very heavy gales without being laid or broken.

2. *Jersey Dantzic.*—The seed is described as having been raised from a single ear, originating from seed procured from Dantzic, selected from the finest "high mixed." It is, however, suspected to be

identical with some excellent sorts, called in Sussex, Kent, and some parts of Surrey, the "Chittums;" in other parts "Pegglesham;" in Berkshire, "Trump;" in Essex, "Hardcastle;" in some counties, "Old Suffolk;" in Scotland, "Hunter's White;" and assuming several other names. This wheat is not quite so hardy as the "hoary;" it is, nevertheless, considered sufficiently so to succeed throughout the kingdom, excepting the northern parts of Scotland. In rich soils it tillers amazingly, and produces a longer straw than the hoary, nor is it so liable to sprout in a moist climate from being smooth-chaffed: in very severe, moist, and stormy weather, it will be laid sooner than the hoary.

It ripens a week earlier at least than the variety last described, and should be reaped while the grain can be marked by pressure from the thumb-nail, as it is rather liable to shed if over-ripe, a disadvantage which the hoary is peculiarly free from, as it is tenacious to the ear. In a dry season this wheat will afford a beautiful, clean, white straw, fit for bonnet-making, or any purpose of thatching: it is firm and tenacious. In wet seasons it is rather subject to rust, which, under such circumstances, almost all wheat suffers from.

3. *Whittington Wheat.* — The seed was obtained from Mr. Whittington himself, and was a very fine pure sample. The grain is large, full, and plump, rather of a whitish-red cast, and a little thick-skinned. The seed was washed, pickled, drained, and limed, then sown in drills seven inches apart, about three bushels to the acre. When the seed is large, it is considered prudent to add half a bushel or more to the acre. I consider this to be a very hardy wheat, affording much herbage and straw, very fit for being eaten down by sheep in the spring when sown early in the fall. The Whittington is rather a late wheat, ripening a week or ten days later than the Jersey Dantzic before described, though it was in bloom on the same day. From the purity of the seed, and the uniform appearance of the crop, it does not appear likely to degenerate, nor does it seem more liable to disease than other wheats. The straw is brittle, and many ears break off. I am of opinion from what I have witnessed, that the value of this description of wheat is much over-rated: the millers dislike it, and in certain situations it is apt to blight.

4. *Bellevue Talavera.* — This admirable variety is invaluable where it is adapted to the soil and climate. The seed being large, a greater quantity of it should be allowed than usual. This wheat has succeeded in the north of Scotland, and is sufficiently hardy to withstand the winter in its grassy state, but it is otherwise more valuable as a spring crop: without doubt it may be sown as late as the first week in February in all the milder parts of England, with a prospect of reaping quite as good an average crop from it as from any other wheat, but with a certainty of obtaining more flour than from most. There is no tendency to degenerate observable in this wheat, as far as the experience of five or six years goes; nor, from its early habits, is it at all likely to become intermixed by fecundation from other varieties, though sown about the same period, as it will, in such cases, flower a fortnight or three weeks before them. It is not more liable to disease than ordinary white wheats, and affords a very fine clear white straw: it is, indeed, one of the Italian bonnet-making varieties. There is, however, one disadvantage in it, which is, that the ear is so heavy that it is apt to break down, though not break off, when swept by a gale about the period of ripening; but it has a countervailing good quality, of ripening the grain equally well though bent down; as is the case with spring wheats, which ripen their seed well though quite laid, which with winter wheats is doubtful. Another peculiarity is the tenacity of the chaff to the ear, more remaining on it after passing through the thrashing-machine than any other variety I am acquainted with.

The following sorts I have also grown experimentally, but not having raised them in quantities sufficient to warrant a positive opinion, which probably might only tend to mislead, they are merely named.

The "golden drop" is one of the best red wheats, affording great produce in corn and straw, and a larger quantity of flour than some white wheats.

"Hickling's prolific red" is a productive variety, but rather coarse. The properties of this wheat are, straw long, stout at the bottom, and tapering at the head; head short, thick, close, and heavy; kernels four in the row across the ear, and red in colour, with the chaff white; in sample the wheat is short, plump, thin-skinned, and looks as if it would flour well: colour dark orange-red.

Brown's "ten-rowed chevalier," or prolific, is well named, where it suits the soil and climate: it is, when pure, a very fine variety.

"Gale's Hampshire" is a very enormously productive sort of bearded wheat. "Essex red" a very good variety. "The duck's-bill" wheat is very productive, but shedding greatly, and not very farinaceous. (Journ. of *Roy. Eng.* Agr. Soc. vol. i. p. 113.)

In order to present the particular points of comparison between the four principal varieties above-described, the results are appended in a tabular form:—

Varieties.	Soil.	Manure.	Quantity of Seed per Acre.	Time of Sowing.	Harvested.	Produce per Acre.				Produce per Acre in			
						Grain.	Straw.	Chaff.	Weight of Bushel.	Finest Flour.	Flour, &c. (Pollard and Bran.)	Produce of Bread from 14 lbs. of Flour.	Net Profit.
						bush.	lbs.	lbs.	lbs.	lbs.	lbs.	lbs.	£. s. d.
White Downy.	Argillaceous Schist, light and rich.	Kelp Ashes, 9 qrs.	2 bushels.	Jan. 29.	Aug. 16.	48	4557	315	62	2402	542	25	7 4 [illegible]
Jersey Dantzic	Ditto.	Ditto.	Ditto.	Ditto.	Aug. 12.	45½	4681	430	63	2161	606	25½	[illegible]
Whittington.	Do. on a red clay bottom.	2 hhds. of lime. 6 qrs. lime ashes. 5 qrs. kelp ashes.	3 bushels.	Jan. 8.	Aug. 24.	33	7786	483	61	1454	824	23¾	[illegible] 7 4
Bellevue Talavera.	Ditto.	Ditto.	3 bushels.	Feb. 3.	Aug. 17.	52	5480	282	61	2485	626	25	[illegible] 11 [illegible]

N.B, In the estimate of profit in the last column the calculation is not made with relation to the respective values of the wheats as to their productiveness in flour, which it might be, but according to the ordinary marketable value of good wheat; the straw is valued as intended for manure.

The following is an excellent account of an experiment on the relative values of several varieties of wheat by Mr. John Morton, which I have extracted from the first volume of the *Journ. of the Eng. Agr. Soc.*, p. 39. It is from practical and carefully carried out experiments, such as these, that we shall be able to arrive at the proportionate value of different species and new varieties of wheat, and from which we may be enabled to select the good and reject the bad kinds.

The profits of farming, whether the land be pasture or arable, and the tenant be a feeder of stock or a tiller of the ground, may be increased in two ways. The stock-farmer knows very well that the return he obtains from his cattle depends, not only on the kind of food given to them, and the manner in which it is supplied, but also on the feeding qualities of the breed to which they belong; and he increases his chance of profit as much when, on purchasing from the breeder, he selects with judgment, as when he adopts an improved mode of feeding. The intelligent farmer of arable land, again, expects a greater crop, the more he has been able to improve the texture of the soil, and the better the nature and state of the manure which it contains. He expects it, because he knows that it depends on the nature of the food given to the plants, and the manner in which they are provided with a constant supply of it. The crop does not, however, depend only on this: for as two beasts fed in exactly the same manner may not be equally profitable, owing to a difference between them regarding the quantity and quality of the meat they afford, so two different kinds of wheat, though sown on land precisely similar, and in equally good condition, may give unequal returns, owing to a difference between them regarding the quantity and quality of the flour they afford. Hence the importance, too often overlooked by farmers, not only of preparing the land for the crop in a good and sufficient manner, but also of selecting that kind of seed which experience has pointed out as being most valuable and productive. It was with a view, not only of ascertaining the relative value, hardiness, and other properties of several of the most commonly-planted wheats, but also of effecting an improvement in the best of them, that the following experiment was commenced on the 1st of November, 1837. To insure accuracy in the results, it was necessary that the seeds of each variety should be planted so as to have them all at equal distances. To effect this, two boards were used, each six inches wide, nine feet long, and half an inch thick. Along the centre of each board was a row of holes, three inches apart and one inch in diameter. A dibble was made to fit into the holes, having a shoulder at the distance of 2½ inches from the point.

When the board was placed on the ground, and the dibble put through each hole in succession, a series of holes was thus made, two inches deep, and three inches apart from centre to centre.

After this had been done through the first board, the second, which was touching it, and parallel to it, was served in the same way; and then the first was taken up, and placed on the other side of the second

By proceeding thus, the whole ground was finished, and then one grain of wheat was dropped into each hole. The rows were thus exactly six inches apart, and the grains in the rows were three inches from one another. The regularity with which the planting was performed was thus mathematically accurate. The ground planted lies on the lower edge of the great oolite formation, and the soil is a stone brash, about ten inches in thickness. Crops of potatoes had been taken off it for a succession of eight years; and it had been manured every alternate year, with a compost of equal bulks of stable-dung and earth, at the rate of about twenty cubic yards per acre. It was sixty-seven feet in length; and three rows of each variety of wheat were planted, except the first and last numbers, of which there were four rows. The outer row of each of these, however, was not taken into account, because their roots had a much greater extent of ground for their growth than the others, whose roots touched one another all round. The end plants of each row were also rejected for the same reason. Sixty-six feet in length of ground were thus taken up, and three rows of each variety occupied in width 1½ foot: the ground occupied by each variety was thus ninety-nine square feet, the 440th part of an acre.

When planted.	No.	Name of Wheat.	Whence obtained.	No. of Seeds planted.	Loss of Seeds from Birds, Frost, &c.	Produce of 99 sq. Feet. Plants or Roots.	Produce of 99 sq. Feet. Heads of Grain.	No. of Ears in One square Feet.	Average No. of Heads per Root.	Weight of Grain produced from 99 square Feet.	Weight of Wheat per Acre.	No. of Bushels per Acre, at 64 lbs. per Bushel.	Length of Straw.	Weight of Straw produced from 99 square Feet.	Weight of Straw per Acre.	Weight of Roots with 2 in. of Stem.	Weight of Roots per Acre.
										lbs.	Tons. cwt. qrs. lbs.		ft. in.	lbs.	Tons. cwt. qrs. lbs.	lbs.	Tons. cwt. qrs. lbs.
ov. 15	1	Old red Lammas.	Pusey, Berks.	792	387	405	2463	25	6	6	1 3 2 8	41¾	5 8	16½	3 5 2 24	5	0 19 2 6
- -	2	Golden drop	- -	792	291	501	2542	25	5	6¾	1 6 2 8	46¾	5 6	15¼	3 0 0 3	5½	1 0 2 14
- -	3	Ten-rowed prolific.	Hareby, Lincolnshire.	792	391	401	1935	19	3½	4½	0 16 2 16	27	5 5	12¼	2 10 0 10	5	0 19 2 6
- -	4	Hunter's.	Leek, Lincolnshire.	792	273	519	2028	20	4¼	4½	0 16 2 16	27	5 6	12¾	2 12 0 10	5	0 19 2 6
- -	5	Thick-set Suffolk.	Lyford, Berks	792	120	672	3039	30	4½	10½	2 1 1 0	72¼	5 8	19½	3 5 2 14	7½	1 9 1 24
- -	6	Hickley's prolific.	Old Buckingham, Norfolk.	792	132	657	2886	29	4½	10¼	1 19 3 3	69½	5 7	16½	3 5 2 24	6¾	1 6 2 8
16	7	White Taunton.	Wallingford, Berks.	792	305	487	2695	27	5¼	6	1 3 1 20	41½	5 6	15¼	3 0 0 0	5½	1 1 2 12
- -	8	Silver drop.	Lyford, Berks	792	218	574	2582	26	4½	8	1 11 1 20	55	5 6	18½	3 12 2 12	6	1 3 2 8
- -	9	Scotch white.	- -	792	379	413	2386	24	5¾	6½	1 4 2 6	43	5 9	16½	3 5 2 24	5½	1 1 2 12
- -	10	Talavera.	Taunton.	792	434	358	1985	20	5½	5¼	1 0 2 14	36	5 8	14½	2 16 3 14	5¾	1 1 2 12
21	11	Smithers' Hereford white.	Cirencester (Smith).	792	319	473	2529	25	5¼	9½	1 17 1 8	65½	5 6	17½	3 8 3 20	5	0 19 2 0
- -	12	A red wheat.	- -	792	252	540	3453	33	6½	12	2 5 1 12	82½	5 0	22	4 7 0 2	9	1 15 2 6
- -	13	Egyptian cone.	- -	792	528	264	711	7	2¼	3¼	0 13 0 24	23	6 0	8¼	1 11 2 2	3	0 11 3 4
- -	14	Red straw Lammas.	- -	792	510	282	2096	21	7½	4½	0 16 2 16	27	5 8	14½	2 16 3 4	5	0 19 2 6
- -	15	Blue cone.	- -	792	264	528	1626	16	5	6	1 3 1 28	41½	6 0	9¾	1 16 1 16	6	1 3 2 8
- -	16	Red cone.	- -	792	456	336	2446	24	7	10	1 19 1 4	68¾	5 3	12½	2 9 0 0	4¾	0 18 2 10
	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18

NOTE. — Specimens, in the straw, of each of the varieties mentioned in the Table were laid before the Society.

Although the tabular form in which this experiment is detailed explains itself by the headings of each column, yet it is considered necessary to give a somewhat fuller account of it. The seed from which the first ten varieties were raised was carefully selected from specimens of each obtained in the ear. The others were from samples, and here, also, the greatest care was taken that the seed from which each was raised should be the best and plumpest that could be obtained.

The first five columns need no explanation beyond what is given at the head of each: the sixth shows the number of grains lost from casualties. If the frost had been the only agent in the destruction of so many of the seeds, this column might have been considered as a very accurate index of the relative *hardiness of each* variety. This, however, is not the case, for the havoc which the birds made must also be taken into account. It was thought, at the time, that more injury was sustained, from the latter cause, by those varieties planted on the 21st, than by any of the others; but this does not appear to have been the case, for, if the great loss sustained by these had been wholly owing to the havoc committed by the birds, it is evident that the varieties marked Nos. 12. and 15. would not have been so slightly injured, while Nos. 11., 13, 14. and 16. suffered so severely. The figures in this column may, therefore, be said to indicate with tolerable accuracy the relative ability of each variety to withstand the effects of a severe and changeable winter, such as that during which the experiment was made.

The number of plants of each variety

which came to perfection, is placed opposite the name of each in the seventh column. This was ascertained by pulling each as they respectively ripened, and counting the plants of each before proceeding to the others. In this way, by a simple subtraction, the numbers contained in the sixth column also were ascertained.

When all the plants of any variety had been pulled, the number of ears also belonging to them was counted, and the results are placed in the eighth column.

By dividing these by ninety-nine, the number of square feet which each variety occupied, we obtain the number of ears in each square foot; and this is placed opposite the name of each wheat, in the ninth column.

The average number of ears to each root, ascertained by dividing the number of ears by that of the roots, is placed in the tenth column. This column shows the degree in which each species possesses the important property of spreading and shooting out stems, or, as it is technically termed, of *tillering;* and it will be seen that they vary in this respect greatly.

After having been pulled and dried, the wheat was carefully rubbed out; and after the light and imperfect grains had been separated, the weight of the remainder was taken, and placed opposite each sort, in the eleventh column.

The thirteenth column contains the number of bushels per acre raised from each variety. As the quantity produced was so small, there was some difficulty in obtaining the particulars which this column contains.

The mode adopted was this. The average weight of several of the varieties was ascertained by weighing eight pints of each, to be at the rate of sixty-four pounds per bushel, some being rather more, and others less. The number of bushels were then obtained from the weight of wheat per acre, by dividing it by sixty-four.

The weight of straw, which is placed in the fifteenth and sixteenth columns, was ascertained after the roots had been cut off, and after it had remained out sufficiently long to dry it perfectly.

After the earth had been removed from the roots, which had been cut off with about two inches of the stem, they were weighed, and the result placed in the seventeenth and eighteenth columns. The object of this was to ascertain the amount of vegetable matter left in the soil after the wheat crop has been removed, and the result greatly exceeds any conception of it that had been previously entertained.

The inferences which, it is presumed, may be drawn from the above details, are the following:—

1st. With regard to the hardiness of the varieties, which, as we have already said, may, to a certain extent, be deduced from the particulars contained in the sixth column, that they may be placed in three classes. Nos. 5, 6. 8. 12. 15. 4. and 2. being the hardiest; Nos. 13, 14. 16. and 10. being the most delicate; and Nos. 1. 3. 7. 9. and 11. occupying an average station.

2d. With regard to the property of *tillering*, of which we have already spoken, that Nos. 12. 14. 16. and 1. possess it in the greatest degree; that Nos. 3. 13. 4, 5, 6. 15. 8. and 2. possess it in the least; and that Nos. 7. 9, 10, and 11. hold a medium rank.

3d. That with respect to the relative value of each variety mentioned in the table, No. 12. is undoubtedly the best of any, in productiveness, and in being sufficiently hardy; that No. 13. is as undoubtedly the worst of any, as will be seen by a reference to any of the columns; and that the others vary greatly, some possessing nearly three times the productiveness of others.

These sixteen different sorts of wheat, with the exception of Nos. 13. 15, 16. which are bearded, are merely varieties of one species of the genus *Triticum;* and the circumstance of differences existing among them, some possessing three times the value of others, shows that any variety is capable of improvement. This, indeed, is shown by many other plants besides the wheat. The originals of the potato, the carrot, and the turnip, were comparatively insignificant and useless in their application as food, and it was only by careful and repeated cultivation that they were at length brought to their present condition, and made to hold such an important rank among the many nutritive plants cultivated for the food of man and beast. It is supposed then, and where it has been tried experience shows it to be a fact, that, by first ascertaining the best of many varieties of wheat, and planting the finest and plumpest seeds selected from the best sample that could be obtained of it, the last of a succession of crops, the first of which was raised in this manner, and all the others from seeds selected out of the produce of the preceding harvests, would at length, afford a wheat of a more productive and valuable kind than has hitherto been used by the farmer. The experiment here detailed is, then, merely the *first step* in the process; it merely points out the best of the varieties which were tried. The improvement of these by repeated cultivation still remains to be effected.

During the growth of the wheat, a journal was kept, an extract from which is given here, as it refers to an insect which was observed after the blossoming of the plants and to which the destruction of many of the seeds was owing.

Observations of this kind might be easily and generally made, and they would be useful as information regarding the nature and habits of the insects which attack wheat; and answers to the how? when? and where? on the subject, which would thus be obtained, afford the only guide to the invention of means for their destruction.

1838. *Extract from Journal.*

July 5th. — All the wheat is in blossom, except Nos. 13. and 15.

14th. — Very rainy and windy weather. Whether will this be found to injure or improve the quality of the grain?

16th. — Since the rain of the 14th, an orange-coloured substance, like rust, has been observed in the seed-vessels of some of the ears, as if the rain had got in and rotted the pollen. A very small fly has been observed about the ears in the evening. Many of the ears are filling rapidly, some are already full, and others are only in blossom.

19th. — In the ears of wheat, which were before-mentioned as having abortive grains, owing, as was thought, to the pollen having been rotted by the rain, I now find small orange-coloured grubs, about the tenth of an inch long, doubtless the offspring of the small fly observed about a week ago.

Aug. 4th. — All these grubs have disappeared.

27th. — Nos. 4. 10. and 11. are ripe and pulled.

28th. — Nos. 3. 5. and 6. are ripe and pulled.

29th. — Nos. 7. 8. and 9. are ripe and pulled.

30th. — Nos. 2. 12. and 16. are ripe and pulled.

Sept. 1st. — Nos. 1. and 14. are ripe and pulled.

2d. — Nos. 13. and 15. are ripe and pulled.

The account of this experiment is thus finished, and there now remains but to state what will have already occurred to the reader, especially if he be a practical man, that it is not one nor many experiments, if conducted on a small scale, which will accurately determine the point this tends to ascertain.

Soil.—Although wheat can be cultivated on any soil, yet heavy loams, strong clays, and marls are considered to be the best wheat soils, and the longer the proportion of alumin in the soil, the heavier will be the grain, and the more productive the crop.

Sandy soils (says a modern writer) are unfavourable to the growth of wheat, for they are deficient in that degree of firmness which is necessary to support the roots of the plants. It is therefore a crop which should never be sown on such land; or if grown, it should only be upon one ploughing of a clover ley, and then afterwards folded by a flock of sheep. (*Brit. Husb.* vol. ii. p. 140.)

Very fine descriptions of wheat are grown on gravelly, chalky, and flinty soils, which have a dry subsoil.

The cultivation of wheat varies in different districts, and according to the nature of the soil. Upon heavy clays, the course of cropping is commonly a twelvemonth's fallow, with from four to six ploughings, &c., and a dressing of manure or lime, or both. On this description of land, wheat also very commonly follows beans, which have been carefully cleaned; and, thirdly, is sown extensively upon clover leys. On lighter soils, a crop of turnips or rape sown in May, and fed off by sheep early in the autumn, is frequently substituted with advantage instead of a year's naked fallow. And, again, a practice, but which I strongly condemn, is still followed in several parts of England, of sowing dressed or folded ryegrass leys with wheat. (See ROTATION OF CROPS.) On soils adopted for turnips, and where the drill and horse hoe are employed, a course I much approve from the ley's return, from a small expenditure, consists of: 1st, turnips; 2d, oats or barley; 3d, clover; 4th, beans or peas; and then, 5th, wheat.

The quantity of seed varies considerably; and, although I have witnessed large crops grown from one bushel of seed drilled per acre, the rows at foot intervals, yet the general practice may be taken at from two to three bushels per acre. The time of sowing is from September to March; the winter varieties should be in the ground by the end of November, and the spring varieties as early as the season will admit. For the diseases of wheat, see MILDEW, RUST, and FLY IN WHEAT. And I may observe that, although subject to several diseases, yet upon the whole it is the hardiest of the cereal grasses, and flourishes under a greater variety of seasons and climate. See TEMPERATURE.

Sowing.—Wheat is either sown broadcast, or by the drill or dibble. Drilling is the most preferable mode. When it is sown in drills the usual distance between the rows is from nine to twelve inches; but it is conceived that the larger intervals are the better, and that they may in most cases be even more than twelve inches. The best period of sowing, it has been said, is from about the middle to the end of September. The early part of October, however, is well suited to the sowing of wheat, and it may be continued till the middle of November.

The proportion of seed that is necessary must depend upon and be regulated by a variety of different circumstances, but in general from two to three bushels, according to the state of the soil, the nature of the climate, and the period in which it is put into the ground may be the most suitable proportion for soils of a medium state of fertility, under the broadcast method of husbandry; but where the drill or dibble system of culture is practised, a considerably less quantity may be sufficient for the purpose. See SEED.

In the case of summer fallow the quantity of seed need not exceed two bushels to the acre. When the sowing takes place in spring, the quantity may be extended to three bushels, rather less than more.

The cultivation of wheat is very rapid by either of the following methods: 1. By selecting the grains of superior ears and dibbling them in a seedling bed, four inches apart every way. 2. By dividing and transplanting the roots.

The same weight of Rostock and Dantzic flour from wheat grown in the Baltic, made only twenty-three pounds of bread, very light and good, but not so white by many shades or well flavoured, as that made from the two first varieties of home growth.

These experiments having been made in my own presence, may be relied on. The dough was worked in the French mode, not pushed down, turned and worked with closed hands, but drawn up into long strings, and repeatedly lifted, in order to expose it to the action of the air as much as possible, which tends greatly to improve the bread, by rendering it more light and easy of digestion. See BREAD.

The superiority of the hoary variety of wheat which furnished three pounds more bread on a baking of eighteen pounds of flour, or an increase of one sixth, over the Dantzic and Rostock, which was also a very fine sample of flour, is thus clearly established. (*Le Couteur on Wheat*, p. 44.)

Securing the crop. — I have already briefly adverted under the head REAPING to the advantages to be derived from harvesting the grain before it is fully ripe, but have reserved to this place some further experiments and details corroborative of the benefit and profit resulting therefrom, by Mr. John Hannam of North Deighton, near Wetherby. This gentleman remarks,—

"Having selected a field of '*old square-headed red wheat*' for the experiments, on August 4. 1840, I cut a sheaf. At this time it was quite green, *i.e.* both straw and ears were in full vigour, and full of sap. Though the grain appeared perfectly formed, the chaff still adhered so firmly to it that it was scarcely possible to separate them by friction in the hands. When separated it was large and plump, but so full of milk, that the slightest pressure reduced the whole to a juicy consistency or pulp.

"This sheaf stood in the field for a fortnight, when it was housed. On the same day, August 18, I cut another. The wheat was, of course, yet 'green,' speaking positively, or 'not ripe,' if we speak negatively,—being what farmers commonly term '*raw*.' That is, the straw, though appearing at a distance green, when examined closely, was of a hue fast approximating to yellow; while, for about a foot upwards from the ground, it was quite yellow. The ears, too, were more open, the chaff tinged with various shades of yellow and green, and the grain itself, when separated, soft and pulpy, but not near so full of fluid as before. The judgment of the farmer will, however, best tell him the conditions of the wheat, both at this and at the preceding cutting, when I say, that in another fortnight the whole field was ripe. At the end of this fortnight (September 1.), I housed the sheaf cut on August 18, and which had remained exposed to the weather in the interval, and cut a third. This I have said was 'ripe;' but by the term I don't mean that degree of ripeness when the straw breaks, the ears curl, and the grain shakes out; but that condition in which it is customary to commence reaping it,—when the straw, from the roots to the ear, is uniformly yellow, and has lost all symptoms of vivid health.

"On the 14th of September the third sheaf was taken from the field and carefully preserved, along with the other two, till the 1st of November, when, out of each sheaf, I selected 100 ears, and put each parcel into a separate bag. The straw from each of these parcels of ears was preserved carefully.

"The ears in one bag (No. 1, or that cut very green) were now thrashed, the chaff carefully separated, and the gross weight of the corn yielded ascertained by an extremely accurate balance. The weights of a fixed measure of a certain number of grains were next found. *To avoid error, this was repeated several times.*

"No. 2. (cut raw) and No. 3 (ripe) underwent the same process: for the results of which see the following table:—

Comparative Weights of Wheat reaped at different periods.

Time of reaping and Condition.	Gross Produce.	Equal Measure.	Equal Number of Grains.
No. 1. August 4. (very green) -	576	568	19¾
No. 2., Aug. 18. (raw) - -	736	580	23¼
No. 3., Sept. 1. (ripe) - -	650	570	22¾

"As this table is merely comparative (the weights used being in parts, and decimal parts of the same, for the convenience of minute experiments), it may not be unnecessary to give the following table of the absolute weights of each sample in ounces, drachms, scruples, and grains Troy: —

	Gross Produce.				Equal Measures.				Equal Number of Grains.			
	℥	ʒ	℈	gr.	℥	ʒ	℈	gr.	℥	ʒ	℈	gr.
No. 1.	4	0	0	0	3	7	1	13	0	1	0	5¾
No. 2.	5	0	2	13	4	0	0	13	0	1	0	17½
No. 3.	4	4	0	6	3	7	2	0	0	1	0	15¾

"The straw belonging to each sample was now weighed (all the parcels having previously been made of the same length, commencing from the bottom of the ear), when the following was the result; —

Comparative Weights of 100 *Straws, of an equal length, belonging to the samples Nos.* 1, 2, 3.

No. 1. (green) = 550.
No. 2. (raw) = 475.
No. 3. (ripe) = 450.

"The next thing to be ascertained was the quality of the produce, or the comparative worth of each description. Believing in the old saying, that,

> 'The proper value of a thing
> Is just as much as it will bring,'

on the 5th of November I attended market, and asked the opinion of an extensive corn-grower as to the values of the respective samples, according to the prices of the day. His opinion was,

No. 1. - - 61*s.* per quarter.
No. 2. - - 64*s.* ditto.
No. 3. - - 62*s.* ditto.

Putting the same samples into the hands of an extensive corn-factor and miller, his opinion of its value, *and what he would give to buy*, was for

No. 1. - - 61*s.* per quarter.
No. 2. - - 63*s.* ditto.
No. 3. - - 61*s.* ditto.

Adding these values respectively together, and taking the mean price of each (by which we shall obtain as near an approximation to the truth as possible), we have

No. 1. = 61*s.* 0*d.* per quarter.
No. 2. = 63*s.* 6*d.* ditto.
No. 3. = 61*s.* 6*d.* ditto.

"The loss or gain on these samples, by reaping at different periods, will be best seen from the following

Table of the relative Weights and Value of Wheat cut August 4, *August* 18, *and September* 1; *that cut last* (*or ripe*) *being taken as the standard, and unity assumed as its value in each column.*

	Weight of Gross Produce.	Weight of equal Measures.	Weight of an equal Number of Grains.	Value.	Weight of the Straw.
No. 3. Sept. 1. (ripe) -	1	1	1	1	1
No. 2. Aug. (raw) -	1 43/323	1 1/57	1 2/91	1 4/123	1 1/18
No. 1. Aug. (green) -	284/323	284/285	79/91	122/123	1 2/9

"According to this table, it is evident that the wheat reaped *a fortnight* before it was ripe has the advantage of the ripe in every point:

1st. In weight of gross produce 43/323, or 13⅓ per cent.

2d. In weight of equal measures 1/57, or nearly ½ per cent.

3d. In weight of equal number of grains 2/91, or nearly 2⅕ per cent.

4th. In quality and value 4/123, or above 3¼ per cent.

5th. In weight of straw 1/18, or above 5 per cent.

On the other hand, that reaped *a month* before it was ripe, has an advantage of 22 per cent. in weight of straw, compared with the ripe, but in every other point has the disadvantage: thus,

1st. In weight of gross produce 37/323, or 11 6/13 per cent.

2d. In weight of equal measures 1/285, or rather more than ⅓ per cent.

3d. In weight of equal number of grains 12/91, or better than 13⅕ per cent.

4th. In quality and value 1/123, rather more than ⅘ per cent.

"It may be here necessary to mention that the sample No. 3 (ripe) was very bold, but *rather coarse*, feeling rough in the hand; while No. 2 (raw) was quite as bold, but *very fine and thin in the skin.* No. 3 (green) was also a good and clear sample, *but much smaller than either of the other.* This will account for the apparently anomalous fact of there being scarcely any difference in the marketable value of the *green* compared with the *ripe*, while there is a difference of 13 per cent. in favour of the ripe in weight of equal numbers of grains; for the sample being dry and good, the *buyer* lost little by this inferiority in the size of grain, as the weights of equal measures were the same, — the difference of $\frac{1}{288}$ scarcely making $\frac{1}{2}$ lb. in the sack.

"Before venturing to draw any deductions from these experiments, let us put their results in a still more practical point of view.

"Suppose we have three acres of wheat, one of which, reaped when ripe, yields us 30 bushels of corn and one ton of straw; what will be the gross value of the same? And what the value of the other two acres, according to the data furnished by the foregoing experiments, supposing each acre to be exactly equal in crop, and the one reaped *a fortnight* and the other *a month* before the ripe.)

"Before answering this, we must fix a value for the straw — say 2*d.* per stone, which, taking into account that used by the farmer himself — and many cannot sell any — is as much as it is actually worth. Whence we have, for the acre of ripe,

	£	*s.*	*d.*
30 bushels of wheat, at 61*s.* 6*d.* per quarter (the price of sample No. 3.) - - - -	11	10	7½
1 ton of straw, at 2*d.* per stone -	1	6	8
Gross produce -	£12	17	3½

"Let us next take the acre cut '*raw*.' Before we can come to its value, we must first resolve the question, How much, in measure, will the acre produce us, supposing it to produce 30 bushels, if cut when ripe?

"In solving this, as we must assume each crop to be exactly equal if cut at the same time, it is obvious that, if we would determine the difference caused by reaping at an earlier period, we cannot found our calculations upon the *gross weight* of the two samples (Nos. 2 and 3); for, although there is no doubt but that this weight was materially affected by the condition of the wheat at the time of reaping (indeed, the difference in the weight of equal numbers of grains proves the fact), it is possible that, in selecting the 100 ears from the sheaf, I might take out of one sheaf ears with a greater number of grains in them than those taken out of the other. This then, would affect the total or gross weight; and, therefore, it cannot be taken into account in the present case, where *both acres are supposed to have an equal number of grains.*

"To the weights of equal measures, and of equal numbers of grains, both the result of many careful trials, this objection cannot be urged; and they are amply sufficient to enable us to tell the produce of an acre of 'raw,' when that of the 'ripe' is 30 bushels. Thus, in the first table, we have,

-	Weight of equal Measures.	Weight of equal Numbers of Grains.
No. 2. (raw) -	- 580 -	- 23·25
No. 3. (ripe) -	- 570 -	- 22·75

Now put $m =$ this measure, and $n =$ the number of grains weighed of each sort; then

$n : 22{\cdot}75 :: 1 : \frac{22{\cdot}75}{n} =$ the weight of one grain of No. 3., whence

$\frac{22{\cdot}75}{n} : 1 :: 570 : \frac{570n}{22{\cdot}75} =$ the number of grains of No. 3. in the measure m.

Again, similarly, $n : 23{\cdot}25 :: 1 : \frac{23{\cdot}25}{n}$, weight of one grain of No. 2., and

$\frac{23{\cdot}25}{n} : 1 :: 580 : \frac{580n}{23{\cdot}25} =$ the number of grains of No. 2. in the measure m.

And $m \div \frac{570n}{22{\cdot}75} = \frac{22{\cdot}75m}{570n} =$ the space occupied by one grain of No. 3. (ripe); and

$m \div \frac{580n}{23{\cdot}25} = \frac{23{\cdot}25m}{580n} =$ the space occupied by one grain of No. 2. (raw).

Now, as there are the same number of grains upon each acre, and as the acre of ripe yields 30 bushels, we have

$\frac{22{\cdot}75m}{570n} : \frac{23{\cdot}25m}{580n} :: 30$ bushels : 30·130713 bushels, the produce of one acre cut a fortnight before the ripe.

Again, by reference to page 27, in the second table, we have 1 and $1\frac{1}{18}$ as the relative weights of the straw No. 3. and No. 2.; whence, as No. 3. is supposed to produce one ton,

$1 : 1\frac{1}{18} :: 160$ stones : $168\frac{8}{9}$ stones, the weight upon the acre reaped when raw. And for the whole produce of the acre, we have

	£	*s.*	*d.*
30·1307 bushels of wheat, at 63*s.* 6*d.* per quarter - - -	11	19	1½
168 stones of straw, at 2*d.* per stone - - - - -	1	8	1¾
	£13	7	3¼

Adopting the same course for the produce of the acre cut first, *i. e.* a month before the ripe, and which corresponds with sample No. 1., we get

$\frac{568n}{19{\cdot}75} =$ the number of grains of the green in the measure m; whence $\frac{19{\cdot}75m}{568n} =$ the space occupied by one grain of green.

But (*vide* above), $\frac{22\cdot75m}{570n}$ = space by one grain of the ripe; whence $\frac{22\cdot75m}{570n} : \frac{19\cdot75}{568n} :: 30$ bushels : 26·1356 bushels, the produce of the acre cut *a month* before the ripe. And (*vide* "Table of relative weights," &c., page 27.)

1 : 1⅜ :: 160 stones : 195⅝ stones of straw, the produce of the same; whence we have

	£	s.	d.
26·1356 bushels of wheat, at 61*s.* per quarter - - - -	9	19	3¼
195⅝ stones of straw, at 2*d.* per stone - - - - -	1	12	7
	£11	11	10¼

The total products of the three acres stand thus: —

	£	s.	d.
No. 3. Reaped when ripe - -	12	17	3½
No. 2. Reaped a fortnight earlier -	13	7	3½
No. 1. Reaped a month before the ripe - - - - - -	11	11	10¼

Showing a *loss* of 1*l.* 5*s.* 5*d.*, or about 10 per cent., by cutting very green; and *a gain of* 10*s. per acre*, or nearly 4 per cent., by reaping in a raw state, or a fortnight before it was ripe.

"From the above details, it would appear that it is the farmer's interest to cut his wheat before it becomes thoroughly ripe. Many, no doubt, will be disposed to doubt deductions of such importance, drawn from such limited experiments. This objection the writer anticipates, because it is a natural one, which he felt himself, when he considered the most important conclusions which resulted; when, however, he retraced, *step by step, his investigations, without any variation in that result,* he could no longer refuse to believe it true till he proved it untrue. He is aware that there are other points of consideration in this subject — that there are peculiarities in the nature of land, of seed, or of season, and that there is, as in all man's investigations, a *possibility* of error; any of which circumstances might materially affect the result of experiments upon so limited a scale as the present one; and for this reason he will, if all be well, give the subject a trial in the ensuing harvest, on a much more comprehensive scale. That the results of *these* experiments will be corroborative in the main points, he has no doubt, and for this cause he feels no hesitation in laying the preceding 'details' before the agricultural world; moreover, as he has in no case given a deduction without the grounds upon which it rested, the degree of 'acceptation' which the reader may give it rests with himself. The most sceptical he, however, flatters himself will think it 'worthy' of *being tested*, if of nothing more.

"In testing, however, the conclusion which the foregoing experiments warrant, there are some other advantages which strengthen that conclusion, which must not be forgotten. That they have not been considered in the preceding pages, is not because they are of no import, but, on the contrary, because they are of such consequence, that the writer could not assign them *an adequate momentary value.* And had he attempted to do so, he would have at once made the details of his experiments valueless by mixing the real results of *practice* with the imaginary ones of opinion. Before the subject, however, can be thoroughly sifted, they must be considered. The circumstances are these: — independently of the 4 per cent. gain (according to the foregoing experiments) by reaping our wheat a fortnight before it is ripe, we have,

"1st, Straw of a better quality.

"2d, A better chance of securing the crop; and,

"3d, A saving in securing it.

"1st, 'Straw of a better quality.' This is easily demonstrated, both for the purpose of food and manure.

"As an article of food, the value of any vegetable depends upon the gross quantity, or upon the combination of certain substances termed soluble, from their entering into union with water. This rule applies particularly to the grasses which are used for the purpose of feeding stock. The substances generally found in these grasses are saccharine matter or sugar, mucilage or starch, and gluten or albumen, and bitter extract and saline matters. Of these the sugar is, no doubt, the most, and the extractive matter the least, nutritive; the latter having been found, by experiment, to come away in the dung of the animal consuming it, while the other matters were absorbed by the body.

"Now, wheat is a species of grass, and the value of the straw, as an article of food, depends upon the quantity of nutritive matter contained in it. 'This nutritive matter must be very small in straw, as now generally used,' the practical farmer will say, 'for straw *per se* is but poor food, and scarcely able to sustain life.' This is true; 'from 400 grains of *dry* barley straw,' says Sir H. Davy, 'I obtained 8 grains of matter soluble in water, which had a brown colour, and tasted like mucilage. From 400 grains of wheaten straw, I obtained 5 grains of a similar substance.' With this paucity of nutritive matter in the *straw* before us, how can we account for the fact that, in the sap of wheat, the straw, and in all succulent plants, there is *naturally a great proportion of mucilaginous and saccharine matter?* The answer is this: in all grasses and succulent plants, the greatest proportion of this is present before the flower is dead ripe. So in wheat, when we allow the straw to remain till thoroughly ripe, a portion of the sugar is converted, by the action of light, heat, &c., into mucilage, and a great proportion of the nutritive powers of the grass absorbed by the atmosphere, or lost in some manner; for, as Mr. Sinclair observes in his *Report of Experiments on Grasses*, ' there is a great difference between straws or leaves that have been dried after they were cut in a succulent state, and those which are dried (if I may so express it) by Nature while growing. The former *retain all their nutritive powers*, but the latter, *if completely dry*, *very little, if any*.'

" As a manure, too, the straw cut " *raw* " is equally superior to the ripe; for, as it is an agricultural axiom, that the better the food of an animal is, the better the manure from it; the manure from a stock consuming this straw, *containing a fair proportion of nutritive matter*, must be more valuable than that from stock consuming the ripe with *scarcely any in it*.

" But a great proportion of the farmer's straw is converted into manure without undergoing the process of mastication and digestion. For this purpose the unripe straw is equally preferable, as all *unripe vegetables are manures without preparation*; the soluble and nutritive extracts which they contain, being the principal agents in forming vegetable manure; as they not only combine to render the process of decomposition the more rapid, by breaking down the woody fibres, &c. in the manure heap, but are also, in their pure and separate states, stimulants to vegetation.

" It may be urged, that the increased value of the straw is more in favour of that cut very green (No. 1.) than that cut a fortnight later (No. 2). This is true; but to produce this increase of value, if we cut our wheat so early as No. 1, we have a *desiccation of the grain to such an extent as to diminish the measured produce above* 12 *per cent.*; while, by reaping with No. 2, we are, so far from injuring either sample or measure, actually improving both, and at the same time *gaining* above 5 per cent. in the weight, and at least as much in the quality of the straw. For the increase of weight in the latter is not produced by a greater produce, but by the presence of a greater portion of those soluble substances which are alike necessary to animal and vegetable life — are alike the nutritive part of food and the quickening principle of manure.

" 2d, We come now to the second advantage, the ' *better chance of securing* the crop.'

" This is self-evident. We gain a fortnight at the commencement of harvest. If the weather be good, we can secure a great portion of our wheat before we should scarcely have begun upon the old system. If not, we can wait; so, under any circumstances, our chances of securing the grain must be greater. Moreover, if we take a retrospect of the harvests for a number of years, we shall find that nearly all the early harvests have been what we term ' good' ones, *i. e.* good as regards weather, and the condition in which the grain was secured. When the peculiarities of our climate, its general fickleness, and its still greater liability to change as the autumn advances, are considered, this will require no explanation.

" If we look, too, at the later harvests, we shall, I venture to say, find, that in nine cases out of ten, the grain which was first cut was secured in the best condition. As an example of this, the crop of 1839 will suffice. The crops were late, the beginning of reaping the same, and the result was, that in the North of England *full 75 per cent. of the whole wheat crop was damaged.* And full 75 per cent. of that which was *uninjured*, I will also venture to say, was that which was cut the first. In Yorkshire this was especially seen; for the *earliest wheat* was, with the greatest difficulty, secured. In this village (North Deighton) not a sheaf was in stack till the day before, and on some farms, the *very day* on which the rainy weather set in.

" The frequent recurrence of such years as this, will teach the value of even a fortnight, better than any thing that can be said here. And that they will recur is beyond a doubt. What has happened once may happen again, but what has frequently happened (as this sort of harvest has), with the same causes in operation, we are warranted in saying *will* happen again, and *often*.

" 3d, The *saving in securing* the crop is a double one. In the first place, there is less waste in moving or reaping, and no danger of ' shaking' or ' necking ' in strong winds. In the second place, there is an absolute economy in the expense of reaping the crop, which may be thus illustrated.

" The busy period of harvest with the farmer generally extends over four or five weeks. In this month a certain portion of his work is done by his own hands, i. e. by the regular labourers and servants of the farm; therefore, by beginning a fortnight sooner, and extending the season of harvest over six weeks instead of four, it is evident that these regular servants would cut a much greater proportion of his crop — in fact *one-half more*. By this he is rendered less dependent on those extraneous '*helps*' or '*takers*' who in the seasons of hurry and anxiety, fix their own terms.

"To assign a value for these advantages is, as has been said before, for *the farmer himself*; and it will not be an insignificant one. For if beginning harvest a fortnight earlier enables him to save a crop from spoiling once in a lifetime, — if the improved quality of his straw as food for his stock, allows him to plough out an acre more, or to pasture another acre of clover with feeding stock, instead of mowing it for his lean stock, every *grain saved, every extra bushel of corn produced, and every extra head of stock fed*, is a benefit to the whole community as well as to himself, — is so much added to the gross produce and wealth of the country: there being, in fact, an *increased return without an increased outlay*." (*Quart. Journ. of Agr.* vol. xii. p. 24.)

In a recent obliging communication, with reference to this important subject, made to me (March, 1842) by Mr. John Hannam, he observes in reference to the experiments above detailed, "At the time I wrote you last I stated that the bulk of the wheat reaped by me during the present harvest was unthrashed. I could therefore only give you an idea of the quality of the *raw* and the *ripe* by public opinion from a sample sheaf. Since then the various cuttings (for I made several) have been thrashed and ground. The result of which was, 3½ bushels of the ripe gave 10 st. 11 lb. of good flour, 1 st. 9 lb. of seconds (technically termed 'sharps'), and 2 st. 5 lb. of bran, 3½ bushels of *raw* gave 12 st. 6 lb. of flour, 12 lbs. of sharps, and 2 st. 1 lb. of bran. From which it appears that the *raw cut* wheat gave 6⁴⁄₇ lbs. of flour to the bushel more than the ripe gave, while the latter gave 3¹⁄₇ lbs. more sharps and 1⅛ lb. more bran than the former per bushel.

"Your question as to the effect of early reaping upon the vegetative powers of the seed I have not answered, because I can give no answer but what depends more upon opinion than fact. I have never seen a practical trial made of wheat, as seed, in the various conditions necessary to warrant a final and definite conclusion. An American writer, commenting upon my experiments, while he coincides with my conclusions as incontrovertible, says that it is '*equally indisputable*' that the ripe wheat is preferable for seed. For all this, I am not disposed to assent blindly to any such doctrine, because I have seen early cut wheat used with *perfect success* as seed many times."

Produce. — The fair produce of wheat (as is well observed by the author of *British Husbandry*) varies so much upon different kinds of land, and is so much governed by climate and mode of cultivation, that it is difficult to form any acreable estimate of the amount or soils of average quality in ordinary seasons and under the common course of management; it may, however, be fairly calculated at 3 quarters, or, perhaps, 28 bushels per imperial acre. To produce the latter quantity, circumstances must, however, be favourable, and anything beyond that may be considered large, though on some land four to five quarters are not unusual. The weight may average 60 lbs. per bushel. The straw is generally reckoned to be about double the weight of the grain; an acre producing three quarters of wheat of the ordinary quality may therefore be presumed to yield about 26 cwt.

The use to which the grain is applied is almost exclusively that of food in its various preparations, and chiefly in that of bread, though a considerable quantity — but generally of an inferior or damaged kind — is employed in the manufacture of starch. This preference is due, not only to the superiority of its nutritive properties, but also to their peculiar nature; for "more water is consolidated in bread made from barley, and still more in that from oats; but the gluten in wheat being in a much larger quantity than in any other grain, seems to form a combination with the starch and water which renders it more digestible than any other." (*Lects. on Agr. Chem.*, p. 121.) See FLOUR, BREAD, and GLUTEN.

STATEMENT of the DECENNIAL FLUCTUATIONS in the Price of WHEAT, from 1646 to 1815; from 1816 to 1828; and from 1829 to 1841; exhibiting the Highest and Lowest Annual Average in each Decennial Period, and the Per-centage Amount of Difference.

PERIODS.		Annual Average Price.				Per-centage Difference.
		Highest.		Lowest.		
		s.	d.	s.	d.	
1st Period -	1646 to 1655	77	10	23	9	227·
	1656 „ 1665	67	9	37	1	82·
	1666 „ 1675	62	10	33	0	90·
	1676 „ 1685	55	0	34	9	58·
	1686 „ 1695	61	11	23	0	169·
	1696 „ 1705	65	0	26	11	141·
	1706 „ 1715	71	11	23	9	202·
	1716 „ 1725	44	5	31	9	40·
	1726 „ 1735	49	11	24	4	105·
	1736 „ 1745	46	5	22	9	104·
	1746 „ 1755	40	10	29	8	37·
	1756 „ 1765	55	0	27	7	99·
	1766 „ 1775	59	1	41	10	41·
	1776 „ 1785	54	3	34	8	56·
	1786 „ 1795	75	2	40	0	87·
	1796 „ 1805	119	6	51	10	130·
	1806 „ 1815	126	6	65	7	92·
2d Period - -	1816 „ 1828	96	11	44	7	117·
3d Period - -	1829 „ 1841	70	8	39	4	79·

Parliamentary Papers relating to Wheat and other Grain.

Statement of the Quantities of each Kind of Grain imported, from 1828 to 1841.

	Quantities imported.			Quantities entered for Home Consumption.			Quantities remaining in Warehouse at the End of each Year.		
	Foreign.	Colonial.	Total.	Foreign.	Colonial.	Total.	Foreign.	Colonial.	Total.
WHEAT and WHEAT FLOUR.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
1828 (from 15th July)	570,799	20,130	590,929	740,458	20,021	760,479	32,005	[illegible]	[illegible]
1829 - - -	1,715,442	10,339	1,725,781	1,434,096	8,605	1,442,701	246,092	[illegible]	[illegible]
1830 - - -	1,592,768	70,515	1,663,283	1,667,228	60,559	1,727,847	143,131	[illegible]	[illegible]
1831 - - -	2,083,812	226,158	2,309,970	1,369,044	135,696	1,506,740	801,527	[illegible]	[illegible]
1832 - - -	345,386	124,516	469,902	182,770	193,985	376,755	673,673	[illegible]	[illegible]
1833 - - -	183,229	114,336	297,565	1,330	82,706	84,036	764,984	[illegible]	[illegible]
1834 - - -	109,734	66,587	176,321	290	64,684	64,974	715,132	[illegible]	[illegible]
1835 - - -	43,801	23,104	66,905	124	28,430	28,554	627,180	[illegible]	[illegible]
1836 - - -	234,503	7,240	241,743	1,045	29,062	30,107	599,463	[illegible]	[illegible]
1837 - - -	544,150	15,792	559,942	210,897	33,375	244,272	630,310	[illegible]	[illegible]
1838 - - -	1,355,314	16,643	1,371,957	1,818,828	29,647	1,848,475	24,229	1,500	[illegible]
1839 - - -	2,862,833	12,772	2,875,605	2,698,981	12,742	2,711,723	174,188	[illegible]	[illegible]
1840 - - -	2,284,289	148,476	2,432,765	2,287,637	113,799	2,401,436	102,845	[illegible]	[illegible]
1841* - - -	2,524,443	259,159	2,783,602	2,388,072	259,736	2,647,808			
Total - -	16,450,503	1,115,767	17,566,270	14,800,860	1,075,047	15,875,907			
BARLEY.									
1828 (from 15th July)	125,490	-	125,490	195,075	-	195,075	699	-	[illegible]
1829 - - -	305,798	-	305,798	209,799	-	229,799	64,979	-	[illegible]
1830 - - -	132,210	-	132,210	48,505	-	48,505	147,025	-	[illegible]
1831 - - -	368,809	223	369,032	514,395	215	514,610	1,889	-	[illegible]
1832 - - -	101,713	97	101,810	77,891	97	77,988	17,504	-	[illegible]
1833 - - -	85,221	-	85,221	1,226	-	1,226	98,341	-	[illegible]
1834 - - -	88,562	-	88,562	11,071	-	11,071	165,717	-	[illegible]
1835 - - -	67,796	-	67,796	136,853	-	136,853	51,762	-	[illegible]
1836 - - -	83,483	-	83,483	110,021	-	110,021	7,078	-	[illegible]
1837 - - -	87,791	-	87,791	47,475	-	47,475	37,053	-	[illegible]
1838 - - -	2,203	-	2,203	8,192	-	8,192	11,409	-	[illegible]
1839 - - -	579,405	-	579,405	594,301	-	594,301	1,121	-	[illegible]
1840 - - -	625,437	-	625,437	619,801	-	619,801	9,110	-	[illegible]
1841* - - -	264,460	525	264,985	222,312	525	222,837			
Total - -	2,918,378	845	2,919,223	2,816,917	837	2,817,754			
OATS and OAT-MEAL.									
1828 (from 15th July)	147,251	580	147,831	11,790	580	12,370	143,606	-	[illegible]
1829 - - -	548,588	61	548,649	189,815	61	189,876	443,451	-	[illegible]
1830 - - -	511,936	1,555	513,491	902,917	1,555	904,472	35,726	-	[illegible]
1831 - - -	615,117	7,099	622,216	348,666	6,826	355,492	282,251	[illegible]	[illegible]
1832 - - -	31,138	709	31,847	2,150	932	3,082	229,173	-	[illegible]
1833 - - -	23,334	-	23,334	975	-	975	226,384	-	[illegible]
1834 - - -	175,026	-	175,026	55,620	-	55,620	331,521	-	[illegible]
1835 - - -	113,188	-	113,188	176,142	-	176,142	229,688	-	[illegible]
1836 - - -	131,466	-	131,466	97,197	-	97,197	216,660	-	[illegible]
1837 - - -	418,885	-	418,885	334,024	-	334,024	253,854	-	[illegible]
1838 - - -	55,539	4	55,543	11,068	4	11,072	242,199	-	[illegible]
1839 - - -	670,453	60	670,513	862,729	60	862,789	15,845	-	[illegible]
1840 - - -	541,400	4,863	546,263	513,338	3,714	517,052	15,011	[illegible]	[illegible]
1841* - - -	123,006	8,019	131,025	20,769	7,149	27,918			
Total - -	4,106,327	22,950	4,129,277	3,527,200	20,881	3,548,081			

* *Note.*— The Returns for 1841 will be liable to alteration (although not to any considerable extent) when the Accounts of that year shall have been finally adjusted.

	QUANTITIES IMPORTED.			QUANTITIES ENTERED FOR HOME CONSUMPTION.			QUANTITIES REMAINING IN WAREHOUSE AT THE END OF EACH YEAR.		
	Foreign.	Colonial.	Total.	Foreign.	Colonial.	Total.	Foreign.	Colonial.	Total.
RYE, from 15 July—	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
1828 - -	28,172	- -	28,172	144	- -	144	31,609	- -	31,609
1829 - -	67,392	- -	67,392	64,963	- -	64,963	26,435	- -	26,435
1830 - -	44,784	- -	44,784	19,189	- -	19,189	17,604	- -	17,604
1831 - -	93,006	- -	93,006	56,203	- -	56,203	20,703	- -	20,703
1832 - -	4,646	- -	4,646	60	- -	60	4,054	- -	4,054
1833 - -	3,370	- -	3,370	1	- -	1	5,720	- -	5,720
1834 - -	10	- -	10	22	- -	22	5,108	- -	5,108
1835 - -	- -	- -	- -	3	- -	3	3,450	- -	3,450
1836 - -	6,626	- -	6,626	18	- -	18	6,805	- -	6,805
1837 - -	30,711	- -	30,711	19,576	- -	19,576	12,047	- -	12,047
1838 - -	1,781	- -	1,781	2,517	- -	2,517	5,079	- -	5,079
1839 - -	153,673	- -	153,673	152,582	- -	152,582	3,036	- -	3,036
1840 - -	3,332	- -	3,332	1,857	- -	1,857	3,326	- -	3,326
1841 * - -	15,600	- -	15,600	518	- -	518			
Total -	453,103	- -	453,103	317,653	- -	317,653			
PEAS, from 15 July—									
1828 - -	41,295	1,499	42,794	42,269	1,499	43,768	8,338	- -	8,338
1829 - -	39,272	1,140	40,412	35,271	1,140	36,411	10,207	- -	10,207
1830 - -	32,667	1,905	34,572	42,598	1,909	44,507	192	- -	192
1831 - -	58,925	582	59,507	57,365	612	57,977	699	- -	699
1832 - -	20,190	8	20,198	16,587	8	16,595	3,088	- -	3,088
1833 - -	15,879	11	15,890	18,081	11	18,092	315	- -	315
1834 - -	67,595	285	67,880	57,417	285	57,702	9,935	- -	9,935
1835 - -	23,566	650	24,216	24,525	659	25,184	7,705	- -	7,705
1836 - -	78,289	10	78,299	80,918	10	80,928	3,154	- -	3,154
1837 - -	111,254	7	111,261	87,608	7	87,615	22,929	- -	22,929
1838 - -	29,753	95	29,848	11,525	93	11,618	35,120	1	35,121
1839 - -	139,734	278	140,012	169,991	279	170,270	3,867	- -	3,867
1840 - -	154,270	4,216	158,486	155,202	4,255	159,457	2,904	- -	2,904
1841 * - -	132,769	16,728	149,497	118,113	14,744	132,857			
Total -	945,458	27,414	972,872	917,470	25,511	942,981			
BEANS, from 15 July—									
1828 - -	37,230	- -	37,230	72,863	- -	72,863	17,951	- -	17,951
1829 - -	46,487	- -	46,487	61,406	- -	61,406	2,557	- -	2,557
1830 - -	16,909	- -	16,909	18,697	- -	18,697	808	- -	808
1831 - -	22,345	- -	22,345	17,678	- -	17,678	5,305	- -	5,305
1832 - -	27,914	- -	27,914	7,439	- -	7,439	20,962	- -	20,962
1833 - -	22,859	- -	22,859	6,028	- -	6,028	37,223	- -	37,223
1834 - -	47,756	- -	47,756	44,566	- -	44,566	38,557	- -	38,557
1835 - -	34,380	- -	34,380	69,824	- -	69,824	2,306	- -	2,306
1836 - -	93,056	- -	93,056	87,796	- -	87,796	7,374	- -	7,374
1837 - -	105,607	- -	105,607	109,076	- -	109,076	4,519	- -	4,519
1838 - -	64,358	- -	64,358	54,240	- -	54,240	14,314	- -	14,314
1839 - -	109,810	- -	109,810	123,597	- -	123,597	701	- -	701
1840 - -	129,361	57	129,418	129,460	57	129,517	760	- -	760
1841 * - -	294,532	- -	294,532	267,697	- -	267,697			
Total -	1,052,604	57	1,052,661	1,070,367	57	1,070,424			

Previously to 1833, the monthly returns of the importation and consumption of foreign and colonial corn were collected together, in annual periods, commencing on 1st January, and terminating on 31st December. From 1833, downwards, they have been made up, like the other accounts of this department, in periods commencing on 6th January in each year, and terminating on 5th January in the year succeeding. This circumstance is necessary to be noted, inasmuch as it explains why the aggregate imports and consumption of the several years, from 1828 to 1832 inclusive, as exhibited in the present statement, will be found to differ to a small extent from the quantities shown in other accounts, which have been compiled, not, as in this case, from special monthly returns of the corn trade, but from the ordinary records of the general commerce of the country.

* *Note.* — The returns for 1841 will be liable to alteration (although not to any considerable extent) when the accounts of that year shall have been finally adjusted.

Statement of the Septennial Prices of each kind of Grain, as prepared for the Purposes of the Tithe Commission, in each Year, from 1835 to 1841.

Periods of Seven Years ending Christmas.	Average Prices per Imperial Bushel.											
	Wheat.		Barley.		Oats.		Rye.		Beans.		Peas.	
	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
1835 - - -	7	0¼	3	11½	2	9	4	3½	4	6¼	4	9
1836 - - -	6	8½	3	11¾	2	9	4	3½	4	6¾	4	9¼
1837 - - -	6	6¾	3	11¼	2	8¾	4	4¼	4	10	4	8¼
1838 - - -	6	6¼	3	9¾	2	8	4	2	4	6¾	4	8
1839 - - -	6	9	3	11½	2	9¼	4	3½	4	8	4	9
1840 - - -	6	11½	4	1	2	10¾	4	0¾	4	10	4	10½
1841 - - -	7	3¾	4	2	2	11¼	4	5¼	4	11	4	10¾

WHEAT.

Statement of the Quantities of Wheat returned as sold in England and Wales, by the Corn Inspectors, in each Week and each Year, from 11th July, 1828, to 31st December, 1841 (omitting the Years 1829 and 1831).

Weeks.	1828. First Week ending 11 July.	1830. First Week ending 1 Jan.	1832. First Week ending 6 Jan.	1833. First Week ending 4 Jan.	1834. First Week ending 3 Jan.	1835. First Week ending 2 Jan.	1836. First Week ending 1 Jan.	1837. First Week ending 6 Jan.	1838. First Week ending 5 Jan.	1839. First Week ending 4 Jan.	1840. First Week ending 3 Jan.	1841. First Week ending 1 Jan.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
1	- -	67,704	63,715	69,846	64,959	76,915	77,034	76,407	69,137	67,867	68,287	[illegible]
2	- -	60,067	67,243	68,018	65,116	67,120	72,870	75,940	71,853	58,975	73,156	[illegible]
3	- -	70,652	67,419	72,107	73,542	80,115	91,446	80,026	73,903	50,354	75,559	[illegible]
4	- -	65,434	67,541	70,774	68,681	73,974	93,075	76,591	76,748	43,702	73,461	[illegible]
5	- -	56,770	62,343	68,966	72,085	88,626	92,987	54,306	71,774	43,665	70,333	[illegible]
6	- -	69,904	66,117	66,171	70,192	82,333	79,560	63,618	68,246	40,713	71,665	[illegible]
7	- -	72,652	60,000	61,031	69,969	78,720	81,110	62,865	66,922	39,409	75,218	[illegible]
8	- -	70,506	57,323	62,429	67,093	76,351	98,979	66,356	78,499	44,253	75,607	[illegible]
9	- -	75,304	55,436	61,235	65,503	71,757	90,240	78,007	74,737	48,466	79,067	[illegible]
10	- -	78,742	58,097	56,534	60,942	67,056	77,348	74,127	76,026	51,074	84,764	[illegible]
11	- -	67,126	62,517	59,243	58,324	70,252	71,800	78,290	86,911	46,331	76,624	[illegible]
12	- -	72,045	60,951	60,736	53,661	71,598	68,623	71,200	86,842	40,308	80,796	[illegible]
13	- -	78,795	56,790	67,203	57,329	72,318	81,056	71,826	75,665	37,018	68,502	[illegible]
14	- -	71,613	57,247	64,678	59,345	70,204	72,071	69,646	72,740	33,183	67,073	[illegible]
15	- -	66,372	57,958	60,061	65,573	62,953	76,787	66,539	64,521	44,226	68,696	[illegible]
16	- -	67,683	62,476	53,759	69,260	67,982	87,282	73,865	67,734	44,444	76,475	[illegible]
17	- -	63,276	64,481	56,178	73,131	63,696	81,864	79,901	71,990	48,219	59,836	[illegible]
18	- -	62,643	65,065	59,041	74,762	64,939	65,042	85,398	87,121	48,889	61,962	[illegible]
19	- -	54,592	68,144	56,474	72,067	79,829	69,484	70,383	90,371	46,605	71,363	[illegible]
20	- -	51,308	65,096	62,507	59,847	75,861	83,115	68,503	85,996	57,242	70,337	[illegible]
21	- -	57,383	59,513	55,633	65,459	75,631	80,607	74,851	87,996	57,698	69,596	[illegible]
22	- -	52,926	65,481	55,404	62,855	68,744	69,559	82,080	95,631	50,215	69,867	[illegible]
23	- -	55,343	66,481	56,335	68,301	78,628	70,244	85,248	100,234	52,518	75,384	[illegible]
24	- -	55,495	68,784	61,776	69,553	77,632	83,696	86,103	98,469	55,096	66,156	[illegible]
25	- -	59,417	70,717	69,624	73,313	66,547	82,564	84,738	87,514	58,301	63,869	[illegible]
26	- -	62,452	62,138	71,637	65,626	56,419	72,415	73,501	97,189	52,100	68,976	[illegible]
27	- -	54,775	56,263	70,287	67,223	58,720	69,221	62,375	80,672	55,066	70,423	[illegible]
28	42,607	51,806	45,660	69,072	60,370	59,597	61,413	53,976	72,480	54,977	74,826	[illegible]
29	42,624	53,824	49,876	84,874	60,224	65,981	56,695	61,108	75,477	54,154	84,122	[illegible]
30	57,476	53,130	47,735	78,806	64,071	73,261	52,123	71,153	72,234	54,576	83,367	[illegible]
31	69,067	46,329	52,817	84,532	70,941	74,255	66,465	71,877	85,988	60,131	100,444	[illegible]
32	76,526	39,160	53,867	68,528	73,500	64,772	80,204	78,815	91,371	69,433	107,179	[illegible]
33	69,945	31,458	47,695	56,498	76,592	62,701	82,098	84,312	108,378	61,610	84,697	[illegible]
34	66,064	32,748	40,761	54,972	69,949	51,216	56,344	67,830	92,139	65,369	86,195	[illegible]
35	57,846	28,019	45,966	71,039	71,507	53,472	48,997	50,090	62,566	62,703	88,463	[illegible]
36	60,511	31,867	63,247	74,984	77,797	61,046	56,584	61,192	48,906	72,156	56,723	[illegible]
37	51,726	43,266	70,920	90,768	86,086	79,385	69,913	69,678	49,941	71,538	59,140	[illegible]
38	68,305	55,356	78,667	86,717	95,153	86,234	96,296	83,216	66,697	81,621	77,267	[illegible]
39	77,211	56,262	81,533	89,271	85,817	95,225	92,585	87,935	76,462	101,663	88,719	[illegible]
40	76,107	63,184	76,084	82,988	80,806	95,971	100,826	85,970	87,285	98,922	89,258	[illegible]
41	87,617	69,669	71,535	81,309	91,568	98,261	91,125	81,516	83,130	87,585	74,627	[illegible]
42	76,867	66,128	72,809	74,218	78,412	93,753	94,309	74,638	75,007	75,980	69,896	[illegible]
43	64,312	57,172	68,442	75,212	84,838	85,036	101,929	70,637	73,530	77,001	61,891	[illegible]
44	59,231	54,028	63,173	72,546	83,239	78,411	100,623	71,349	72,649	77,446	61,423	[illegible]
45	64,681	57,692	67,966	71,707	84,274	83,664	101,966	69,000	70,059	75,422	64,964	[illegible]
46	58,633	60,142	69,747	69,896	75,902	82,834	127,252	78,536	77,322	82,401	67,319	[illegible]
47	56,805	61,985	75,279	77,909	89,071	91,956	140,572	80,627	70,371	74,539	67,037	[illegible]
48	48,582	66,454	75,561	70,673	92,024	88,404	97,882	83,673	77,890	75,063	64,706	[illegible]
49	46,379	64,601	79,351	76,100	80,019	89,172	89,954	92,777	81,524	76,236	65,369	[illegible]
50	52,038	67,599	74,189	72,313	78,674	88,463	102,401	97,345	80,045	78,252	76,467	[illegible]
51	54,885	67,182	67,763	74,732	82,783	88,702	96,442	92,956	74,190	85,507	73,431	[illegible]
52	58,947	70,966	60,379	69,280	81,254	90,907	96,082	77,091	72,150	82,331	75,937	[illegible]
53	- -	61,829	- -	- -	- -	- -	91,845	- -	- -	- -	- -	[illegible]
Total	1545,004	3152,857	3296,381	3576,653	3768,602	3927,620	4393,025	3889,007	4064,305	3174,680	[illegible]	[illegible]

Statement of the Total Quantities of Wheat and Wheat Flour imported into and exported from Great Britain, in each Year from 1697 to 1841.

Years.	Imported.	Exported.	Years.	Imported.	Exported.	Years.	Imported.	Exported.
	Qrs.	Qrs.		Qrs.	Qrs.		Qrs.	Qrs.
1697	400	14,698	1746	- -	131,105	1795	313,793	18,839
1698	1,689	6,886	1747	- -	270,491	1796	879,200	24,679
1699	486	557	1748	6	545,240	1797	461,767	54,525
1700	5	49,057	1749	382	631,007	1798	396,721	59,782
1701	1	98,324	1750	280	950,483	1799	463,185	39,362
1702	- -	90,230	1751	3	662,957	1800	1,264,520	22,013
1703	50	106,615	1752	- -	430,117	1801	1,424,765	28,406
1704	2	90,314	1753	- -	300,754	1802	647,663	149,304
1705	- -	96,185	1754	201	356,781	1803	373,725	76,580
1706	77	188,332	1755	- -	237,466	1804	461,140	63,073
1707	- -	174,155	1756	5	102,752	1805	920,834	77,955
1708	86	83,969	1757	141,562	11,545	1806	310,342	29,566
1709	1,552	71,618	1758	20,353	9,234	1807	404,946	25,113
1710	400	16,607	1759	162	227,641	1808	84,889	98,005
1711	- -	80,941	1760	3	393,614	1809	455,987	31,278
1712	- -	148,539	1761	- -	441,956	1810	1,567,126	75,785
1713	- -	179,969	1762	56	295,385	1811	336,131	97,765
1714	16	180,665	1763	72	429,538	1812	290,710	46,325
1715	- -	173,237	1764	1	396,857	1813	559,000	{ Records destroyed.
1716	- -	75,876	1765	104,547	167,126	1814	852,567	111,477
1717	- -	25,637	1766	11,020	164,939	1815	384,475	227,947
1718	- -	74,381	1767	497,905	5,071	1816	332,491	121,611
1719	20	130,533	1768	349,268	7,433	1817	1,089,855	317,524
1720	- -	84,343	1769	4,378	49,892	1818	1,694,261	58,668
1721	- -	82,748	1770	34	75,449	1819	625,638	44,689
1722	- -	178,915	1771	2,510	10,089	1820	996,479	94,657
1723	- -	158,082	1772	25,474	6,959	1821	707,384	199,846
1724	148	247,162	1773	56,857	7,637	1822	510,602	160,499
1725	12	211,175	1774	289,149	15,928	1823	424,019	145,951
1726	- -	143,626	1775	560,988	91,037	1824	441,591	61,680
1727	- -	31,030	1776	20,578	210,664	1825	787,606	38,796
1728	74,574	3,935	1777	233,323	87,686	1826	897,127	20,054
1729	40,315	18,993	1778	106,394	141,070	1827	711,868	57,323
1730	76	94,530	1779	5,039	222,261	1828	1,410,300	76,489
1731	4	130,650	1780	3,915	224,059	1829	2,190,095	75,097
1732	- -	202,612	1781	159,866	103,021	1830	2,205,751	37,149
1733	7	427,425	1782	80,695	145,152	1831	2,867,860	65,875
1734	7	498,747	1783	584,183	51,943	1832	1,254,351	289,558
1735	9	155,280	1784	216,947	89,288	1833	1,166,457	96,212
1736	18	118,218	1785	110,863	132,685	1834	981,486	150,482
1737	32	466,071	1786	51,463	205,466	1835	750,808	134,076
1738	3	588,284	1787	59,339	120,536	1836	861,156	256,978
1739	23	285,492	1788	148,710	82,971	1837	1,109,492	308,420
1740	5,469	54,391	1789	112,656	140,014	1838	1,923,400	158,621
1741	7,540	45,417	1790	222,557	30,892	1839	3,110,729	42,512
1742	1	295,698	1791	469,056	70,626	1840	2,526,645	87,242
1743	3	375,979	1792	22,417	300,278	1841	2,923,189	30,390
1744	2	234,274	1793	490,398	76,869			
1745	8	325,340	1794	327,902	155,048			

Note. — This Account includes the Trade with Ireland.

Statement of the Quantities of the several kinds of Grain and Meal imported from each Country, and likewise of the Quantities re-exported from the Warehouse to each Country, in each Year from 1828 to 1840 (omitting 1829 and 1831.)

WHEAT.

Quantities imported into the United Kingdom.

Countries.	1828.	1830.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	18,096	235,302	91,290	18,656	- -	- -	1,026	11,244	41,339	371,693	[illegible]
Sweden - -	1,303	2,937	- -	357	1	- -	- -	251	- -	352	2
Norway - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	300	
Denmark - -	41,150	88,032	33,548	7,958	11,732	9,758	10,258	18,240	111,499	196,730	[illegible]
Prussia - -	251,206	517,844	119,320	87,903	29,826	3,236	100,199	315,121	550,826	740,[illegible]	[illegible]
Germany - -	142,396	364,961	43,046	49,421	42,770	11,577	51,562	87,665	312,442	408,729	[illegible]
Holland -	167,025	76,711	- -	276	- -	8	3,984	10,741	82,010	116,[illegible]	30,[illegible]
Belgium -				- -	- -	111	- -	420	17,396	22,141	7,[illegible]
France - -	29,452	15,219	475	692	- -	- -	- -	746	53,190	278,162	[illegible]
Portugal, Proper -	- -	- -	- -	- -	- -	2,158	1,593	- -	15	26,[illegible]	1,[illegible]
——— Azores -	- -	1,141	- -	- -	- -	- -	- -	- -	- -	1,561	
——— Madeira -	- -	- -	- -	- -	- -	- -	- -	- -	- -	616	
Spain - -	22,216	39,493	1,763	- -	1	6	- -	1	421	17,741	[illegible]
——— Canaries	- -	- -	- -	41							
Gibraltar - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	4,573	1
Italy - -	5,216	28,612	2,304	6	1	1	4	4,483	30,264	335,612	140,[illegible]
Malta - -	- -	7,268	- -	- -	- -	- -	- -	6,390	11,647	16,370	1,344
Ionian Islands -	- -	- -	1,062	- -	- -	- -	- -	- -	5,370	13,928	1,[illegible]
Turkey - -	- -	- -	10	- -	- -	- -	- -	257	3,150	43,740	[illegible]
Egypt - -	1	- -	- -	- -	- -	- -	- -	- -	600	1,729	2,574
Tripoli, Tunis, Algiers, and Morocco	- -	- -	- -	- -	- -	- -	- -	- -	- -	3,360	
Cape of Good Hope	- -	- -	1,642	- -	1,616	1,107	1	- -	- -	3	
E. India Company's Territories and Ceylon - -	- -	656	945	2,696	471	336	- -	310	- -	2	
British Settlements in Australia -	1	- -	25	752	1,766	1	1	- -	- -	- -	2
British North American Colonies -	14,415	58,963	89,516	79,410	44,907	14,326	- -	- -	- -	27	4,192
United States of America - -	- -	6,086	6,286	- -	- -	- -	- -	- -	555	3,766	73,734
Chili - -	- -	- -	180	- -	- -	1	8	- -	- -	- -	[illegible]
Peru - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	12,[illegible]
Channel Islands -	22,359	32,079	- -	- -	- -	- -	- -	- -	20,531	28,236	
Total -	715,242	1475,314	391,417	248,171	133,091	42,628	168,647	455,871	1241,460	2634,556	1993,[illegible]

Quantities re-exported from the United Kingdom.

Countries.	1828.	1830.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	- -	- -	- -	- -	3,772	713					
Norway - -	- -	- -	- -	- -	29	1,283					
Denmark - -	- -	- -	- -	- -	- -	- -	10				
Prussia - -	- -	- -	- -	- -	- -	281					
Germany - -	- -	- -	1,677	- -	- -	1,083	- -	- -	- -	9	
Holland -	1,849	2,900	75,017	5,187	6,296	1,818					
Belgium -				1,182	- -	111	- -	40	1	5	
France - -	23,904	20,660	147,443	50	961	874	3,360	800	539	5	11,[illegible]
Portugal, Proper -	- -	- -	883	1,351	68,891	580	2,398				
——— Azores -	- -	- -	450	150							
——— Madeira -	1,328	670	3,595	5,609	7,117	19,118	3,769	10,235	4,442	- -	[illegible]
Spain - -	- -	- -	- -	3,966	3,403	10,540	250				
——— Canaries	100	- -	- -	- -	1,035	423					
Gibraltar - -	- -	- -	- -	3,846	2,404	390	1,122				
Italy - -	4,099	- -	175	- -	2,030	6,222					
Malta - -	500	- -	- -	- -	5,748	923	- -	708			
Ionian Islands -	53										
Cape of Good Hope	- -	- -	- -	304	- -	- -	872	2,180	1,371	3,082	2,[illegible]
Mauritius - -	- -	- -	1,212	294	300	1,723	3,313	4,437	1,109	- -	1,[illegible]
E. India Company's Territories and Ceylon - -	13	- -	- -	- -	- -	- -	- -	- -	- -	- -	[illegible]
China - -	- -	- -	- -	- -	1						
British Settlements in Australia -	- -	- -	- -	- -	- -	966	10,393	1,718	896	2,100	[illegible]
British North American Colonies -	- -	- -	63	5,971	4,748	24,569	64,055	99,522	67,368	81[illegible]	[illegible]
British West Indies	- -	- -	1,927	1,027	308	1,200	6	121			
United States of America - -	- -	- -	- -	1,127	- -	7,486	80,972	87,418	14,530		
Brazil - -	2,996	- -	- -	- -	62	1,029	114	- -	- -	602	
States of the Rio de la Plata -	- -	- -	- -	3,339	3,420	200					
Channel Islands -	23,804	821	3,441	1,577	3,051	3,460	3,300	8,658	5,146	1,179	11,[illegible]
Total -	58,646	25,050	235,883	34,480	113,576	84,992	173,994	316,[illegible]	[illegible]	[illegible]	[illegible]

WHEAT.

Statement of Quantities of Grain and Meal imported, and Quantities re-exported, in each Year from 1828 to 1840—*continued*.

BARLEY.

COUNTRIES.	QUANTITIES IMPORTED INTO THE UNITED KINGDOM.												
	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia	1,824	7,989	4,062	42,568	8,820	1,579	1,270	- -	- -	24	338	18,338	4,657
Sweden	1,393	5,179	579	1,719	- -	27	- -	- -	- -	- -	- -	2,499	23,783
Norway	- -	143	- -	- -	- -	- -	- -	- -	- -	- -	- -	233	820
Denmark	96,044	144,262	75,537	115,658	54,859	70,651	82,781	65,693	21,779	23,536	11	210,134	252,037
Prussia	21,297	49,615	29,508	60,886	11,373	8,734	2,166	823	29,586	28,443	469	139,153	188,167
Germany	33,031	55,193	27,722	116,928	16,208	4,219	2,161	1,267	24,327	24,780	1,384	75,694	81,017
Holland }	9,137	4,182	1,184	12,284	- -	2	178	7	6,333	3,585	- -	13,057	5,584
Belgium }						-	- -	- -	735	404	- -	4,318	
France	3,227	9,845	- -	18,738	4,381	- -	1	2	459	3,706	- -	105,326	58,207
Portugal, Proper	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	555
Spain and the Balearic Islands	- -	139	- -	2,318	- -	- -	- -	- -	- -	- -	- -	600	677
——— Canaries	- -	- -	- -	419									
Italy and the Italian Islands	- -	- -	- -	3,003	- -	6	- -	- -	1	2,696			
Malta	- -	- -	1	- -	- -	- -	- -	- -	- -	- -	- -	1,660	594
Turkey	- -	- -	- -	624	96	- -	- -	- -	- -	- -	- -	1,772	
Egypt	- -	- -	- -	- -	- -	- -	- -	- -	- -	604	- -	- -	5,676
Cape of Good Hope	- -	- -	- -	1									
East India Company's Territories and Ceylon	- -	- -	- -	15	2	- -	- -	- -	- -	- -	1	- -	3
British North American Colonies	- -	- -	- -	223	96								
United States of America	- -	1											
Isles of Guernsey, Jersey, Alderney, and Man (Foreign Goods)	2,718	5,159	6,528	1,128	- -	- -	- -	4	262	8	- -	6,621	3,661
Total	168,672	281,713	145,119	376,513	95,839	85,221	88,561	67,796	83,483	87,790	2,203	579,405	625,438

COUNTRIES.	QUANTITIES RE-EXPORTED FROM THE UNITED KINGDOM.												
	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia	- -	- -	- -	- -	- -	- -	618	7,444					
Sweden	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	300		
Norway	- -	- -	- -	- -	- -	- -	- -	24,471	3,192	634	1,087		
Denmark	- -	- -	- -	- -	- -	- -	292	385					
Prussia	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1
Holland }	- -	10	568	495	6,995	-	200	100					
Belgium }						-	- -	- -	- -	118	86		
France	633	9,033	- -	- -	10	- -	- -	- -	- -	- -	194	- -	1,968
Portugal, Proper	- -	50	135	- -	- -	2,562	3,750	8,153	7,162				
Spain	202												
Italy	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	3	
Gibraltar	- -	- -	- -	- -	- -	271	1,177	- -	- -	- -	204		
Malta	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	201		
Western Coast of Africa	- -	- -	- -	- -	- -	- -	- -	- -	35				
Cape of Good Hope	- -	- -	- -	- -	- -	- -	- -	8	5	5	746	5	264
St. Helena	- -	- -	8	- -	- -	- -	8	- -	- -	3	240	41	20
Mauritius	- -	10	56	- -	10	10	162	12	4	5	6		
East India Company's Territories and Ceylon	652	383	465	123	322	315	436	495	458	403	524	180	239
Sumatra, Java, and other Islands in the Indian Seas	- -	- -	- -	- -	- -	- -	- -	10	- -	- -	4		
China	- -	- -	- -	- -	- -	- -	23	33	18	12	6	6	
British Settlements in Australia	12	15	9	6	18	35	26	52	278	690	1,431	188	220
New Zealand	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	5	5	4
British North American Colonies	- -	- -	- -	7	- -	6	2,333	1,935	3,234	6,443	13,398		
British West Indies	35	- -	- -	11	3	11	44	94	18	99	70	16	36
United States of America	- -	- -	- -	- -	290	- -	300	1,167	3,387	261	622	7	20
Brazil	- -	- -	44	- -	- -	- -	121	6					
States of the Rio de la Plata	- -	24	- -	- -	- -	- -	200						
Isles of Guernsey, Jersey, Alderney, and Man (Foreign Goods)	2,583	772	- -	- -	174	- -	175	- -	28	1,932	693	169	1,607
Total	4,117	10,297	1,285	642	7,822	3,210	9,865	44,365	18,219	10,605	19,817	620	4,379

Statement of Quantities of Grain and Meal imported, and Quantities re-exported, in each Year from 1828 to 1840 (omitting 1829) — *continued.*

OATS.

Quantities imported into the United Kingdom.

Countries.	1828.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	35,036	122,015	371,710	17,696	18,047	13,017	12,370	1,731	151,205	10,229	316,823	[illegible]
Sweden - -	13,601	8,732	20,663	- -	1,124	19,667	26,785	5,735	2,307	- -	[illegible]	[illegible]
Norway - -	- -	1	- -	- -	480	- -	3					
Denmark - -	65,403	118,203	96,996	7,992	2,888	79,128	52,591	23,321	26,109	3,085	46,255	[illegible]
Prussia - -	12,063	130,961	70,597	- -	83	11,189	4,051	18,749	99,251	198	99,521	[illegible]
Germany - -	25,354	68,324	31,434	2,273	530	26,717	12,210	36,086	91,897	15,879	75,010	[illegible]
Holland - -	10,523	39,891	15,641	221	174	22,835	5,035	45,413	40,082	23,681	101,236	[illegible]
Belgium - -					-	2,422	- -	- -	130	467	21,156	26
France - -	1,508	15,684	7,936	- -	- -	- -	- -	- -	80	- -	5,640	66
Portugal, Proper -	- -	- -	- -	- -	4	- -	- -	- -	- -	- -	300	
Spain - -	- -	- -	30	- -	- -	- -	20					
Italy and the Italian Islands - -	- -	- -	1	- -	- -	- -	- -	- -	5,361	- -	- -	[illegible]
Cape of Good Hope -	- -	- -	1									
East India Company's Territories and Ceylon - -	- -	- -	- -	2	- -	- -	- -	- -	- -	4	- -	[illegible]
British North American Colonies -	580	1,223	6,329	- -	- -	- -	- -	1				
British West Indies -	- -	- -	- -	672								
United States of America - -	- -	- -	599	- -	- -	- -	- -	- -	- -	- -	- -	[illegible]
Channel Islands -	2,351	1,600	- -	- -	- -	- -	- -	20	- -	- -	432	[illegible]
Total - -	166,423	506,637	621,940	28,858	23,334	174,975	113,067	131,056	416,424	53,544	670,117	[illegible]

Quantities re-exported from the United Kingdom.

Countries.	1828.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	- -	- -	- -	- -	- -	505	3	2	3	- -	12	
Sweden - -	- -	- -	- -	- -	- -	- -	- -	10	- -	524		
Norway - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	165		
Denmark - -	- -	450										
Prussia - -	- -	- -	- -	- -	4							
Germany - -	2	6,791	- -	2,450								
Holland - -	- -	2,427	- -	56,731	157							
Belgium - -					6967	- -	- -	- -	130	713		
France - -	- -	9,131	- -	16,495	200	- -	- -	- -	- -	2,043		
Portugal, Proper -	- -	- -	- -	50	- -	16						
——— Azores -	- -	- -	- -	- -	50							
——— Madeira -	17	- -	- -	- -	- -	26	4	- -	- -	- -	- -	[illegible]
Spain - -	- -	- -	- -	- -	- -	- -	797	229				
——— Canaries -	- -	- -	- -	- -	15							
Gibraltar - -	- -	- -	- -	- -	1,719	- -	457					
Malta - -	- -	- -	- -	- -	35							
Cape of Good Hope -	- -	- -	- -	- -	- -	- -	8	363	5	1,192	1,725	1,604
St. Helena - -	- -	5	- -	- -	- -	108	- -	- -	17	90	[illegible]	[illegible]
Mauritius - -	9	43	200	2,167	430	3,449	2,312	5,281	6,319	7,591	1,373	[illegible]
East India Company's Territories and Ceylon - -	563	79	369	783	372	606	719	854	622	1,613	478	[illegible]
Sumatra, Java, and other Indian Islands	- -	- -	- -	- -	- -	- -	16	- -	- -	35		
China - -	- -	- -	- -	- -	- -	22	60	23	16	14	10	[illegible]
British Settlements in Australia -	546	64	53	19	23	19	190	1,823	1,676	2,097	770	[illegible]
New Zealand -	- -	- -	- -	- -	- -	- -	- -	- -	- -	5	5	[illegible]
British North American Colonies -	27	137	39	1,257	5,777	1,447	3,328	16,951	9,067	8,789	2,436	[illegible]
British West Indies -	4,849	5,588	4,802	3,703	3,601	6,801	14,908	20,491	28,791	29,073	33,138	[illegible]
Hayti - - -	40	- -	- -	- -	- -	- -	- -	- -	- -	8	- -	[illegible]
Cuba and other Foreign West Indies	- -	15	- -	- -	- -	25	186	- -	- -	58		
United States of America - -	- -	- -	- -	- -	- -	- -	4,223	8,906	79	160	38	[illegible]
Columbia - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	[illegible]
Brazil - -	- -	- -	- -	- -	- -	- -	25	27	12			
States of the Rio de la Plata - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	254		
Chili - -	- -	- -	- -	- -	- -	- -	4					
Channel Islands -	641	300	108	138	141	422	3,552	1,224	180	- -	- -	[illegible]
Total - -	6,694	26,140	5,571	83,793	19,491	13,446	30,792	56,184	46,917	54,424	[illegible]	[illegible]

WHEAT.

Statement of Quantities of Grain and Meal imported, and Quantities re-exported, in each Year from 1828 to 1840 — *continued.*

RYE.

Countries.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
Quantities imported into the United Kingdom.													
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	12,469	29,478	15,625	53,911	4,627	3,363	- -	- -	998	2,105	- -	14,030	
Sweden - -	- -	1,432	333	60	- -	- -	- -	- -	- -	3	- -	273	
Norway - -	- -	- -	- -	- -	- -	- -	- -	- -	86	606			
Denmark - -	1,154	6,103	1,151	5,832	- -	- -	- -	- -	- -	1,100	- -	16,460	333
Prussia - -	13,909	19,693	21,460	18,447	- -	- -	- -	- -	5,542	24,057	1,290	97,834	2,932
Germany - -	2,025	8,662	5,785	7,103	- -	- -	- -	- -	- -	67	360	16,588	8
Holland - -	- -	4,531	153	4,205	-	- -	- -	- -	- -	2,401	131	6,170	
Belgium - -						- -	- -	- -	- -	370	- -	215	
France - -	- -	- -	- -	137	- -	- -	- -	- -	- -	-	- -	1,738	
Italy and the Italian Islands - -	- -	- -	- -	- -	- -	- -	10						
United States of America - -	- -	- -	- -	1,867	- -	6	- -	- -	- -	- -	- -	- -	59
Isles of Guernsey, Jersey, Alderney, and Man (Foreign Goods) - -	2	9	45	- -	- -	- -	- -	- -	- -	- -	- -	365	
Total -	29,562	65,910	45,155	91,565	4,627	3,369	10	- -	6,626	30,710	1,781	153,673	3,332

Countries.	1828.	1829.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
Quantities re-exported from the United Kingdom.													
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia - -	- -	- -	- -	- -	- -	- -	- -	468					
Sweden - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1,491		
Norway - -	- -	- -	250	- -	- -	- -	- -	39	- -	- -	- -	172	
Denmark - -	- -	620	220										
Germany - -	- -	- -	15,925	3,075	460								
Holland - -	720	4,299	19,813	33,660	11,110	856	600	419	- -	- -	504	3,161	
Belgium - -						-	- -	- -	- -	- -	- -	459	84
France - -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	1,121
Portugal, Proper -	150	2,942	- -	- -	6,646	665							
British North American Colonies -	- -	- -	- -	- -	- -	- -	- -	- -	1,290	888	1,550	300	
United States of America - -	- -	- -	- -	- -	- -	- -	- -	- -	2,010	5,044	2,535		
Isles of Guernsey, Jersey, Alderney, and Man (Foreign Goods) - -	16	- -	- -	- -	- -	- -	- -	- -	- -	- -	- -	100	10
Total -	886	7,861	35,408	36,735	18,216	1,521	600	926	3,300	5,932	6,080	4,192	1,215

WHEAT.

Statement of Quantities of Grain and Meal imported, and Quantities re-exported, in each Year from 1828 to 1840 (omitting 1829) — *continued*.

BEANS AND PEAS.

Quantities imported into the United Kingdom.

Countries.	1828.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Russia	1,642	788	6,418	1,364	146	197	87	1	3,121	1,126	3,104	[illegible]
Sweden	2,324	516	34	-	108	2,686	752	222	144	-	1,506	[illegible]
Norway	-	-	-	-	-	165	-	34	-	-	494	
Denmark	35,796	5,181	3,966	7,044	8,599	26,927	13,420	37,838	37,010	23,875	29,579	[illegible]
Prussia	13,624	23,931	37,318	14,869	4,734	12,131	7,778	44,556	64,873	8,656	113,610	[illegible]
Germany	43,506	19,063	21,627	15,550	15,282	64,455	34,881	79,448	71,041	53,951	50,521	[illegible]
Holland }	10,456	1,411	7,543	29	5,104	6,734	1,007	8,114	21,077	4,776	19,109	[illegible]
Belgium }					-	518	-	692	1,388	1,648	2,351	5
France	1,881	15	1,576	8	-	-	-	1	9,567	30	28,580	[illegible]
The Azores	-	-	-	649	-	-	-	-	1	-	-	[illegible]
Spain	-	2	5	3	1	1	2	2	6	7	1	1
Gibraltar	-	-	-	-	-	-	-	-	-	-	-	[illegible]
Italy	1,936	-	3,691	2,295	4,760	1,215	-	103	8,115	-	8	[illegible]
Malta	-	-	1,031	-	-	-	-	-	313	-	-	[illegible]
Tripoli, Tunis, Algiers, and Morocco	-	-	-	-	-	-	-	-	-	-	1	
Western Coast of Africa	-	-	-	-	-	-	-	-	-	-	-	37
Egypt	12,904											
Cape of Good Hope	-	8	-	-	-	-	-	-	-	1		
Mauritius	-	-	-	-	-	-	15					
East India Company's Territories and Ceylon	10	1	136	-	-	35	-	6	-	55	36	[illegible]
China	-	-	-	-	-	-	-	-	-	-	-	1
British North American Colonies	1,868	1,424	461	8	10	283	650	4	8	39	279	[illegible]
British West Indies	-	-	-	-	-	-	1	1	-	-	-	1
United States of America	100	-	-	2								
Channel Islands	246	185	92	-	-	280	-	329	203	39	654	[illegible]
Total	126,299	52,533	83,904	41,825	38,749	115,635	58,596	171,355	216,868	94,207	249,823	[illegible]

Quantities re-exported from the United Kingdom.

Countries.	1828.	1830.	1831.	1832.	1833.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.
Norway	-	-	-	-	-	-	-	-	1			
Denmark	-	-	-	-	-	-	22					
Germany	-	-	-	-	-	-	-	-	-	-	-	1
Holland }	-	50	-	1,689	470	-	1					
Belgium }												
France	-	-	-	215								
Portugal, Proper	676											
——— Azores	-	-	-	456								
——— Madeira	10											
Spain	-	-	-	-	-	6	-	1	-	-	-	[illegible]
Gibraltar	56	-	-	-	-	-	2,085	-	27	1		[illegible]
Italy	-	-	-	-	-	-	-	-	-	3	7	1
Egypt	-	-	-	-	11							
Western Coast of Africa	-	-	-	-	-	-	-	-	-	2	3	[illegible]
Cape of Good Hope	-	-	-	-	-	-	2	8	2	1	5	[illegible]
St. Helena	-	6	-	-	-	4	-	-	2	-	1	
Mauritius	-	3	-	6	10	-	10	72	143	2	2	2
Arabia	-	-	-	-	-	-	5	5	-	-	1	
E. I. Co.'s Territories and Ceylon	271	255	58	137	197	240	246	278	200	159	165	[illegible]
Sumatra, and other Indian Islands	-	-	-	-		-	1	-	-	5		
Phillippine Islands	-	-	-	-	-	-	-	-	1			
China	-	-	-	-	-	40	32	3	-	-	3	3
Australia	-	4	-	4	10	12	8	124	75	335	153	[illegible]
New Zealand	-	-	-	-	-	-	-	-	-	5	3	[illegible]
British North American Colonies	154	151	182	128	60	126	137	356	826	1,349	45	[illegible]
British West Indies	683	104	357	370	542	194	1,233	1,510	3,375	1,501	1,816	[illegible]
Hayti	-	-	-	-	-	-	-	-	-	1		
Cuba and other Foreign West Indies	-	104	-	-	-	-	-	-	-	-	-	1
United States	-	-	-	-	-	-	-	1	158	1,983	21	[illegible]
Brazil	6	-	-	-	-	-	3	15	-	2	1	
States of the Rio de la Plata	-	-	-	-	-	-	2	-	1	-	-	3
Chili	-	-	-	-	-	-	-	-	1	1	13	[illegible]
Peru	-	-	-	-	-	-	-	1	-	1	8	[illegible]
Channel Islands	1,121	-	-	6	80	50	5	5	1	38	199	[illegible]
Total	2,977	677	597	3,011	1,381	672	3,792	2,379	4,813	5,389	2,446	[illegible]

WHEAT-MEAL AND FLOUR.

Quantities imported into the United Kingdom.

Countries.	1828.	1830.	1832.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.	Cwts.
Russia	226	1,740	51	1	-	2	1	241	3,946	63
Sweden	2	79	-	-	-	-	-	-	-	23
Denmark	2,417	246	-	7,895	8,577	32,560	41,370	77,233	39,395	10,951
Prussia	6,426	7,936	10	41,749	37,292	79,790	122,959	123,119	96,360	23,433
Germany	6,846	3,570	534	3,541	5,196	97,649	120,133	131,936	66,528	21,795
Holland }	60	-	247	-	-	179	919	-	1,474	175
Belgium }				-	-	709	956	3,639	6,061	
France	1,534	8	-	-	32	14	883	26,740	115,502	1,070
Portugal, Proper	4,485	5,112	-	-	-	-	42			
Spain and the Balearic Islands	-	-	89	-	-	-	-	-	185	2
Gibraltar	-	-	-	-	-	-	-	199	422	
Italy and the Italian Islands	-	-	-	-	-	35	1,677	2,596	19,488	73
Malta	-	-	-	-	-	-	1	1		
Turkey	-	-	-	-	-	-	-	-	60	
Egypt	-	-	-	-	-	-	-	40		
Western coast of Africa	-	-	-	-	-	-	-	5		
Cape of Good Hope	-	9	-	-	36	12	-	-	88	
E. I. Co.'s Territories and Ceylon	-	53	30,219	21,898	15,897	7,172	44,667	18,911	17,532	13,026
China	-	-	-	137	-	-	-	-	-	10
British Settlements in Australia	-	-	-	-	-	2	1	14	-	24
——— North American Colonies	16,575	61,916	48,831	40,386	9,735	18,025	9,527	39,745	27,094	478,969
——— West Indies	1	3	3	8	6	125	-	5	1	
United States of America	47,470	623,745	114,909	34,974	6,809	1,183	130	19,550	432,742	984,467
Brazil	-	-	-	-	-	-	-	-	3,251	1
Channel Islands (Foreign Goods)	64,992	2,660	1	712	1,389	18,374	20,974	12,756	12,917	3,753
Total	151,038	707,082	194,896	151,306	84,969	255,831	364,248	456,739	843,046	7,838

Quantities re-exported from the United Kingdom.

Countries.	1828.	1830.	1832.	1834.	1835.	1836.	1837.	1838.	1839.	1840.
Russia	-	-	15	168	3	14	9	17	3	10
Sweden	15	-	2	-	-	-	-	2	-	9
Norway	-	17	42	3	31	-	94	-	52	200
Denmark	-	-	-	88	-	-	-	5		
Prussia	-	-	3	2	-	-	-	-	-	2
Germany	-	-	370	-	-	-	4	2	-	240
Holland }	-	349	20,255	130	-	90	-	-	7	5
Belgium }				10	-	-	2	-	-	16
France	93	24	27,469	-	-	8	12	9	21	68
Portugal, Proper	-	88	3,119	35	-	178	10	9	-	7
——— Azores	-	-	138	-	-	73	7	4	-	2
——— Madeira	-	-	4,591	1,293	2,054	1,739	1,547	15	35	1,462
Spain and the Balearic Islands	-	-	4,332	24	48	30	2,790	7	10	5
——— Canaries	22	-	87	-	-	-	883	-	-	5
Gibraltar	9	2	9,741	208	1,680	105	73	11	-	12
Italy and the Italian Islands	-	15	41	14	5	28	24	49	14	50
Malta	-	-	12	44	174	6	5	12	-	63
Ionian Islands	21	-	2	2	-	2	7	7	10	21
Morea and Greek Islands	-	-	-	-	-	-	3	-	3	2
Turkey	-	5	33	23	9	14	4	12	-	40
Syria and Palestine	-	-	-	-	-	4	-	3	-	5
Egypt	9	5	14	-	-	5	5	16		
Tripoli, Tunis, Algiers, and Morocco	-	-	-	2,258	-	9				
Western Coast of Africa	497	437	871	231	232	717	728	547	344	691
Cape of Good Hope	-	379	93	46	513	4,776	2,561	3,891	9,640	27,199
Cape Verd Islands	-	-	-	-	-	-	5	3		
St. Helena	700	313	984	943	1,152	2,039	3,492	557	1,357	1,368
Mauritius	2,563	2,514	11,676	4,901	9,217	8,557	9,379	3,332	3,861	15,343
Isle of Bourbon	61	-	-	21						
Arabia	-	-	-	-	35	39	27	3	5	16
E. I. Co.'s Territories and Ceylon	1,781	1,997	2,418	2,949	2,581	4,271	2,911	2,646	1,396	5,521
Sumatra, Java, &c.	5	23	37	379	525	1,533	31	1,081	2	234
Philippine Islands	408	61	3	21	9	-	11	-	-	19
China	-	-	-	241	340	277	145	210	56	153
British Settlements in Australia	-	914	1,465	1,963	9,365	16,422	5,331	7,776	10,525	65,151
New Zealand	-	52	-	-	-	-	-	30	2,626	3,535
British North American Colonies	14,925	11,776	19,719	9,785	5,269	49,091	65,700	58,202	6,006	4,609
——— West Indies	27,776	9,149	36,966	57,776	79,875	133,645	181,462	102,131	57,288	23,775
Hayti	119	5	16	12	424	1,375	2,364	1,344	-	194
Cuba and other Foreign West Indies	-	26	119	12	530	66	1,752	131	14	69
United States of America	7	86	207	86	6,921	15,780	1,233	600	113	378
Mexico	-	35	28	28	32	200	62	12	12	18
Guatemala	174	-	-	-	-	-	40	-	18	5
Columbia	288	19	38	40	9	14	900	16	28	16
Brazils	5,709	3,999	25,338	74,357	41,328	42,567	39,363	29,107	11,901	20,848
States of the Rio de la Plata	1,623	853	559	928	432	61	50	222	931	115
Chili	52	196	37	72	1,683	43	122	43	333	158
Peru	9	48	64	81	833	84	67	53	26	108
Channel Islands (Foreign Goods)	1,980	381	12,169	1,557	-	-	29	344	2,283	9,388
Total	58,846	33,768	83,073	160,731	165,309	283,862	323,344	212,461	108,920	181,[illegible]

WHEAT.

An Account of the Total Quantities of each kind of Grain, Foreign and Colonial, with the Total Amount of Duty paid upon each kind, and the average Rate thereof during the whole Period from July, 1828, to December, 1841.

	FOREIGN CORN, MEAL, AND FLOUR.			CORN, MEAL, AND FLOUR, the Produce of, and imported from, British Possessions out of Europe.		
	Quantities charged with Duty for Home Consumption, under Act 9 G. IV. c. 60., from the passing of the Act (15th July, 1828) to the 5th January, 1842.	Amount of Duty received thereon.	Rates of Duty, taken on the Average of the whole Period.	Quantities charged with Duty for Home Consumption, under Act 9 G. IV. c. 60., from the passing of the Act (15th July, 1828) to the 5th January, 1842.	Amount of Duty received thereon.	Rates of Duty, taken on the Average of the whole Period.
	Qrs.	£	Per Qr. s. d.	Qrs.	£	Per Qr. s. d.
Wheat - - -	13,555,471	3,779,417	5 7	589,012	104,629	3 7
Barley - - -	2,826,397	659,559	4 8	839	89	2 1
Oats - - -	3,534,627	1,137,940	6 5	9,060	303	0 8
Rye - - -	319,842	49,195	3 1			
Peas - - -	919,227	266,374	5 10	25,872	1,786	1 5
Beans - - -	1,071,369	371,698	6 11	57	1	0 6
Indian corn - -	140,164	26,940	3 10	8,365	456	1 1
Buck wheat - -	40,024	12,357	6 2			
	Cwts.		Per Cwt. s. d.	Cwts.		Per Cwt. s. d.
Wheat Meal and Flour	4,303,981	428,083	2 0	1,704,528	81,479	0 11
Oatmeal - -	1,422	253	3 7	18,877	932	1 0

Statement of the Quantities of each kind of Grain and of Malt imported into Great Britain from Ireland, in each Year from 1800 to 1841.

Years.	CORN OF IRISH GROWTH IMPORTED INTO GREAT BRITAIN FROM IRELAND.							
	Wheat and Wheat Flour.	Barley, including Bere or Bigg.	Oats and Oatmeal.	Rye.	Peas.	Beans.	Malt.	Total.
	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs.	Qrs	Qrs.
1800	749	78	2,411	-	-	-	-	3,238
1801	150	-	375	-	-	-	-	525
1802	108,751	7,116	341,151	282	113	1,655	2,303	461,371
1803	61,267	12,879	266,359	753	611	1,653	25	343,547
1804	70,071	2,521	240,022	206	1.078	3,060	-	316,958
1805	84,087	15,656	203,302	235	1,634	2,010	-	306,924
1806	102,276	3,237	357,077	330	1,389	2,361	-	466,670
1807	44,900	23,048	389,649	431	1,390	3,777	-	463,195
1808	43.497	30,586	579,974	573	75	2,065	-	656,770
1809	66,944	16,619	845,783	425	38	2,669	-	932,478
1810	126,388	8,321	492.741	20	216	3,541	-	631,227
1811	147,245	2,713	275,757	21	50	4,081	-	429,867
1812	158,352	43,138	390,629	178	51	5,008	-	597,356
1813	217,154	63,560	691,498	420	77	4,455	-	977,164
1814	225,478	16,779	564,010	4	460	5,731	-	812,462
1815	189,544	27,108	597,537	207	425	6,371	-	821,192
1816	121,631	62,254	683,714	43	239	5,984	-	873,865
1817	55,481	26,766	611,117	-	12	2,275	-	695,651
1818	105,179	25,387	1,069,385	4	10	4,768	-	1,204,733
1819	153,850	20.311	789,613	2	-	3,904	-	967,680
1820	403,407	87,095	916,251	134	439	8,396	-	1,415,722
1821	569,700	82,884	1,162,249	550	2,474	4,959	-	1,822,816
1822	463,004	22,532	569,237	353	728	7.235	-	1,063,089
1823	400,068	19,274	1,102,487	198	586	5,540	-	1,528,153
1824	356,384	44,699	1,225,085	112	756	5,791	1,173	1,634,000
1825	396.018	154.256	1,629,856	220	1,431	11,355	10,826	2,203,962
1826	314,851	64.885	1,303,734	77	1,452	7,190	1.293	1,693,482
1827	405,255	67,791	1,343,267	256	1,282	10,037	572	1,828,460
1828	652,584	84,204	2,075,631	1,424	4,826	7,068	853	2,826,590
1829	519,017	97,140	1,673,628	568	4,435	10,445	2.011	2,307,244
1830	529,717	189,745	1,471,252	414	2,520	19,053	2,820	2,215,521
1831	557,498	185,409	1,655,701	515	4,142	15,029	10,888	2,429,182
1832	790,293	123,639	2,051,867	294	1,915	14.530	8,229	2,990,767
1833	844,211	101,767	1,762,520	166	2,646	19,114	7,017	2,737,441
1834	779,505	217,855	1,769.503	983	2,176	18,771	3,865	2,792,658
1835	661,776	156,242	1,822,767	614	3,447	24,235	10,357	2,679,438
1836	598,757	184,156	2,132,138	483	2,920	17.604	22,214	2,958,272
1837	534,465	187,473	2,274,675	1,016	60	25,630	4.174	3,027,493
1838	542,583	156,467	2,742,807	628	5,232	21,584	5,001	3,474,302
1839	258,331	61,676	1,904,933	2.331	1,484	11,535	2.861	2,243,151
1840	174,439	95.954	2,037,835	122	1,403	14,573	3,456	2,327,782
1841	218,708	75,568	2,539,380	172	855	15,907	4,935	2,855,525

(Parliamentary Returns, 1842.)

WHEAT, COW-. (*Melampyrum*, from *melas*, black; and *pyros*, wheat.) A genus of branched, spreading, annual, nearly smooth herbs, growing to the height of twelve or eighteen inches. The seeds, which resemble grains of wheat in shape and colour, turn black in drying. There are four indigenous species of cow-wheat, namely: —

1. Crested cow-wheat (*M. cristatum*), which grows in woods and thickets, and sometimes in cornfields, flowering in July. The stem is leafy, with wide-spreading branches, roughish to the touch. Leaves long and narrow, almost linear, rough-edged, one inch and a half or two inches in length. Spikes solitary, terminal, with close pectinated purplish bracteas, each tipped with a green leafy point. Flower rather small, not quite closed, variegated with cream-colour and light purple; the palate yellow. The seed-vessel is a crescent-shaped capsule, containing two large seeds in each cell.

2. Purple cow-wheat (*M. arvense*). This species grows in cornfields on a light soil, and flowers in July. Stem one foot and a half high, purplish, acutely quadrangular; the branches more upright than in the foregoing. Leaves lanceolate, rough-edged. Spikes long, many-flowered. Bractes loosely spreading, deeply pectinated or pinnatifid, the upper ones entirely, and the lower ones partially, coloured of a delicate purplish rose-colour. The flowers are large and scentless. The seeds are two or three in each capsule, but one is often abortive. This is one of the most beautiful of our indigenous wild plants. It will grow from fresh seeds in a dry garden, and is well worthy of cultivation.

3. Common yellow cow-wheat (*M. pratense*). This is a very common species in woods and bushy places, especially on clay or loamy soil. It flowers in July and August. Stem smooth, with several wide-spreading branches. Leaves bright green, lanceolate. Flowers axillary, solitary, opposite, turned in pairs to one side. The capsules have a curved point. Cows are reported to be fond of this plant; and Linnæus says the best and yellowest butter is made where it abounds.

4. Wood cow-wheat (*M. sylvaticum*). This species grows in alpine woods, especially in forests of fir. It agrees with the last in general habit, but is rather smaller, especially the flowers, and the capsule is less pointed. (*Smith's Eng. Flor.* vol. iii. p. 123.)

WHEATEAR. (*Saxicola œnanthe*). The wheatear, or fallowchat, as it is sometimes called, is a summer visiter, which generally makes its appearance from the southward about the middle of March. These birds, arriving in numbers, probably along the whole line of our southern coast, soon disperse themselves over the downs, warrens, and fallow lands. The wheatear feeds principally on worms, and various insects, some of which are taken on the wing, the bird returning to its former elevated position on a lump of earth, or the top of a stone, from whence it keeps a sharp look-out, both as a measure of precaution as well as for food. The nest is formed of dried bents, feathers, and rubbish. The eggs are about six in number, of a uniform pale blue, measuring ten lines and a half in length, and seven lines and a half in breadth. The adult male in the breeding season has the beak, the space between the beak and the eye, a small line under the eye, and the ear-coverts, black. Head, back, and scapulars, of a fine light grey; chin and throat, buff colour; belly, flanks, &c., pale buffy white; legs, toes, and claws, black. The whole length of the adult bird is six inches and a half. The wheatear is highly esteemed for the table. (*Yarrell's Brit. Birds*, vol. i. p. 253.)

WHEAT-GRASS. (*Triticum*). Of this genus, to which belongs our cultivated wheat, there are five indigenous species: —

1. Sea rushy wheat-grass (*T. junceum*), which is frequent on the sandy sea-coast, is a perennial, and flowers in July. The root, with its widely creeping, numerous woolly fibres, is well calculated for binding the loose sand, which purpose it serves in common with *Elymus arenarius*, *Arundo arenaria*, &c. The whole plant is glaucous and rigid, like those grasses. Stem twelve or eighteen inches high, simple, inclining, smooth, even and polished, tinged with a bright violet hue below, striated above. Leaves involute, sharp-pointed.

2. Creeping wheat-grass, or couch-grass (*T. repens*). This is a common pest everywhere, in waste as well as cultivated land. The long-jointed creeping root-stock, or rhizome, strikes so deeply and widely, as to be very difficult of extirpation. It is, in fact, an underground stem, vivacious, and consequently shooting up stems and leaves at every joint. The stem above ground is slender, two feet high, and leafy. Leaves linear, flat, of a dull somewhat glaucous green, most numerous on the lower part of the stems. But the plant is so well known that it requires no description. Forking out the roots after the plough is doubtless the best mode of extirpating this noxious weed; but the process must not be discontinued while a particle of the root-stock is suspected to remain in the soil, as the

least portion will grow, and the land being so much broken and loosened by the operation, gives double encouragement for the rapid growth of the plant. It does not thrive well when combined with other grasses, but is naturally more common in hedges. The root-stock contains a large proportion of nutritive matter; it is esteemed abroad for feeding horses. At Naples the root-stocks are collected in large quantities for this purpose, and brought to market. The nutritive matter from the leaves contains an excess of bitter extractive and saline matters. Dogs eat the leaves, and also those of the *Holcus avenaceus*, to excite vomiting; hence it is sometimes called dog's grass, and in other places bears the name of quitch or quicks. See COUCH.

3. Fibrous-rooted, or bearded wheat-grass (*T. caninum*). This differs essentially from the common couch-grass last described in having the root fibrous, without a rhizome. It grows in woods and shady hedges, on a chalky or limestone soil. The stems are two feet high, very smooth. Leaves nearly upright, lanceolate, taper-pointed, thin, flat, bright green, rough on both sides. As this grass yields a large supply of early spring herbage, and produces a sufficiency of seeds, which vegetate quickly on all soils except such as are tenacious or retentive of moisture, it might be cultivated to advantage on soils of an inferior quality instead of rye grass. But for soils of the best quality, it does not, as yet, uphold a sufficient claim, the awns of the spike being objectionable, and the produce of the latter-math very inconsiderable.

4. Crested wheat-grass (*T. cristatum*), a native of Scotland. The roots of this species consist of several long, strong woolly fibres, suited to a sandy soil. The culms are ascending, twelve or eighteen inches high, simple, rigid, slender, leafy; hairy at the top. This grass seems well adapted, from its comparative merits, for culture on light heath soils; the produce of early herbage in the spring being superior to most of the alpine grasses, or those which affect sandy dry soils. The latter-math is productive, and very nutritious. It flowers about the second week of July, and the seed is ripe about the end of August.

5. Dwarf sea wheat-grass (*T. loliaceum*). This is an annual species, growing on the sandy sea-coast, flowering in June and July. The root is formed of many long downy fibres. Stem rigid and wiry, branched from the bottom, generally two or three inches high, but various in luxuriance, leafy, very smooth, and polished, erect or decumbent. Leaves linear, acute, nearly smooth, involute when dry. (*Smith's Eng. Flor.* vol. i. p. 181.; *Sinclair's Hort. Gram. Wob.*)

WHEEL. A circular piece of wood, metal, or other substance, that revolves on an axis. It consists of three principal parts, the nave, heel, or the centre; the spokes or radii, and the periphery or ring. The strength of the wheel depends much on the framing and the arrangement of the spokes, every one of which should stand perpendicularly to the nave. The best wood for making naves is elm, as it bears the cutting of the mortices truer than any other. In making wheels, after they are loosely put together, they are either left to season in a current of air for some weeks, or they are exposed to a heat of 140° Fah. in a kiln. After this they are examined, and if every thing is correct, the tire or iron hoop is put on, whether made of one hoop or separate pieces. Some years since a patent was taken out by Mr. Theodore Jones for making iron wheels, many of which are now in use. These wheels are not conical nor what is termed *dished*, but cylindrical, which enables them to run lighter and also prove less destructive to roads. They are not heavier than wooden wheels, they require less draught, and are more durable. Some improvements have been made on Mr. Jones's wheel by Mr. William Howard, but the merits of this has not yet been fully proved.

The utility of wheels to carriages may be said to be twofold; namely, by diminishing or more easily overcoming the resistance or friction from the carriage, and more easily overcoming obstacles in the road. In the first the friction on the ground is transferred in some degree from the outer surface of the wheel to its nave and axle, and in the latter they serve easily to raise the carriage over obstacles and asperities met with on the roads. In both these cases the height of the wheel is of material consideration; as the spokes act as levers, the top of an obstacle being the fulcrum, their length enables the carriage more easily to surmount them, and the greater proportion of the wheel to the axle serves more easily to diminish or to overcome the friction of an axle, as has been shown by Jacob in his work on *Wheel Carriages*.

Carriages with four wheels are much more advantageous than carriages with two wheels, as carts; for with two wheels, it is plain, the tiller horse carries part of the weight in one way or other; in going down hill the weight bears upon the horse, and in going up hill the weight falls the other way and lifts the horse, which is still worse. Besides, as the wheels sink into the holes

oads, sometimes on one side some-
ı the other, the shafts strike against
r's sides, which destroys many horses;
er, when one of the wheels sinks into
or rut, half the weight falls that
hich endangers the overturning of
iage.

respect to the utility of broad
in amending and preserving the
t has been so long and generally
ledged as to have occasioned the
ire to enforce their use. At the
me the proprietors and drivers of
s seem to be convinced, by ex-
, that a narrow-wheeled cart is
asily and speedily drawn by the
mber of horses than a broad-wheeled
the same burthen; probably be-
hey are much lighter, and have less
on the axle.

EELBARROW. A small well-
hand-cart used for the carriage of
ads by manual labour about the
or farm. See BARROWS.

EEL CARRIAGE. See CARTS and
NS.

EEL PLOUGH. See PLOUGH.

EY. A provincial term applied to
us part of the milk, from which the
s been separated. See DAIRY and

MBREL. (*Numerius phæopus.*) In
age, haunts, and habits, the whim-
y closely resembles the curlew, but
means so numerous as a species,
also very considerably smaller in
much so that it has in some counties
l the names of half-curlew and jack-
in reference to its diminished com-
proportions. Although to be seen
ally on many parts of our shores
r, it is generally most plentiful in
d again in autumn. The eggs are
number, of a dark olive brown,
l with darker brown; they are pear-
and very much like those of the
but smaller, measuring two inches
s in length, by one inch eight lines
lth. The birds feed on insects and
and their note is said to resemble
ls "tetty, tetty, tetty, tet," quickly
l. An adult male measures sixteen
the beak three inches; the female
ghteen inches, the beak three inches
alf. The flesh of the curlew and
nbrel are alike excellent. (*Yarrell's
rds*, vol. ii. p. 516.)

N, or GORSE. See FURZE.

NCHAT. (*Saxicola rubetra.*) The
t or furzechat is in its habits, and
the localities it frequents, very
to the stonechat, already described.
ious *partiality to furze,* which is
also in many parts of England called whin, has induced its most common names; and, like the stonechat, it darts along with an undulating flight from bush to bush, always perching upon one of the uppermost twigs. The whincat makes its appearance about the middle or end of April. Its song is agreeable, generally given from an elevated position on a furze-bush, or while hovering in the air over it. Like most song birds it is prone to imitate the notes of others. The food of the whinchat is worms, insects, small testaceous mollusca, slugs, and berries. In the month of August, when fat, though smaller in size than the wheatear, they are not otherwise inferior to it as an article of food for the table. The nest, generally placed on the ground, is similar to that of the stonechat, formed with a little moss and bents of grass, lined with finer bents; the eggs are five or six in number, of an uniform bluish green, with some minute specks of dull reddish brown; nine lines long by six lines and a half in breadth. The top of the head, neck, back, and smaller wing-coverts are a mixture of pale brown and very dark brown; over the eye and ear-coverts there is an elongated streak of white; the throat and breast are delicate fawn-colour, passing into pale buff on the belly. The whole length of the bird is rather short of five inches. (*Yarrell's Brit. Birds*, vol. i. p. 249.)

WHISKEY. A British spirit obtained by distillation from corn, sugar, or molasses, though generally from the former. Whiskey is the "national spirit," if we may so term it, of Scotland and Ireland; but that distilled in the former is generally reckoned superior to that of the latter.

WHITE-ROT. (*Hydrocotyle;* from *hydor*, water, and *cotyle*, a cavity; in reference to the plants growing in moist situations, and the leaves being hollowed like cups.) One species only is indigenous, the common white-rot or marsh penny-wort (*H. vulgaris*), which grows very frequent on moist heaths, boggy commons, and the margins of little clear rivulets. It is perennial in habit, flowering in May or June. The roots are fibrous; stems creeping to the extent of two or three feet, slender, smooth, often subdivided, quite prostrate. Leaves solitary or aggregate, on upright simple footstalks two or three inches high; orbicular, peltate, smooth, cloven at the base. Umbels very small, of diminutive white or reddish nearly sessile flowers. Fruit somewhat wrinkled, compressed. This herb is acrid, and, probably, like others of the umbelliferous tribe growing in wet places, poisonous. But whether it causes the rot in sheep, and indeed whether these animals ever touch it, is doubtful. Too moist a pasture is known to produce that disease, and there the *Hydrocotyle* is generally to be found. (*Smith's Eng. Flor.* vol. ii. p. 95.) See ROT.

WHITE-THORN. See HAWTHORN.

WHITE-THROAT. (*Curruca.*) Of this bird there are two British species.

1. The common white-throat (*C. cinerea*), which is probably more numerous as a species, and more generally diffused here, than any other of those summer warblers which annually visit this country. It makes its appearance about the third week in April, and frequents the sides of great woods, thickets, hedgerows with broad banks, and grassy lanes partially overgrown with low brambles, nettles, and other wild weeds or herbage: hence one of the most common provincial names by which this bird is known, that of "nettle creeper." The nest is sometimes placed in a low bush, or among a tangled mass of long grass, weeds, and brambles. It is formed of dried grass stems, lined with finer bents. The eggs are four or five in number, of a greenish white ground, spotted and sprinkled with ash-brown, and two shades of ash-green; the long diameter nine lines, transverse diameter six lines and a half. The food of this species consists of insects in their various states, particularly white caterpillars, and most of the smaller sized fruits and berries, to obtain some of which they visit the kitchen-garden, and bring their young with them, in July and August. The general colour of the plumage is brown of various shades; chin and throat white; the lower part of the neck, breast, belly, flanks, &c., pale brownish white, tinged with rose colour. The whole length of the bird is five inches and a half. The female is without the rosy tints on the breast.

2. The lesser white-throat (*C. garrula*) is readily distinguished from the more common white-throat by being rather shorter, as well as more slender in form. Its eggs are also rather smaller, measuring but eight lines in length by six lines in breadth. Its food and habits are much the same. The whole length of the bird is five inches and a quarter. The head, neck, and back are smoke-grey; the chin, throat, breast, and belly, nearly pure white, the latter tinged with red as far as the vent. (*Yarrell's Brit. Birds*, vol. i. p. 289—296.) See WARBLERS.

WHITLOW-GRASS. (*Draba*, from *drabe*, acrid, biting, alluding to the taste of the leaves.) Some of the species of this genus are very pretty, being well adapted for ornamenting rock-work or growing in pots among other alpine plants. A mixture of loam and peat suits them best; and they increase with facility, either by dividing at the root or by seeds. (*Paxton's Bot. Dict.*) There are five native species, the common whitlow-grass (*D. verna*); the yellow alpine whitlow-grass (*D. aizoides*); the simple-haired whitlow-grass (*D. hirta*); the twisted-podded whitlow-grass (*D. incana*); and the speedwell-leaved whitlow-grass (*D. muralis*). The leaves are undivided; the flowers either white or yellow. (*Smith's Eng. Flor.* vol. iii. p. 157.)

WHORTLE-BERRY. (*Vaccinium.*) A genus of shrubs mostly of very humble growth, with simple, alternate, evergreen or deciduous leaves. Flowers stalked, solitary or aggregate, reddish or white, very elegant. Berries blue, black, or red, and and eatable. The genus is chiefly American, and the foliage turns red in decay. All the species are well worth cultivating, some of them for the sake of their fruit, some for curiosity, and others for ornament. The different kinds of whortle-berry and bilberry succeed well in peat soil or very sandy loam. Some of them grow best in moist situations, and others in dry. They may be raised from root suckers, creeping roots, trailing rooting stems, or from seeds. There are four indigenous species, namely:—

1. The black whortle-berry, or bilberry (*V. myrtillus*), a shrub growing on stony heaths, and in woods where the soil is turfy, chiefly in mountainous countries, abundantly flowering in May. The stem is bushy, from one to two feet high, with irregular, smooth, green, leafy, angular branches. Leaves stalked, ovate, serrated, about an inch long, bright green, smooth, thin, delicate; and veiny; deciduous. Flowers on simple, axillary, solitary, drooping stalks. Corolla ovate, bright red, with a waxy transparency. Berries bluish-black, of five cells, acid, but not agreeable nor wholesome, except when dressed. They are, nevertheless, eaten raw in some countries with boiled cream and sugar. The leaves contain a good deal of tannic acid, and have been substituted for those of *Uva ursi*, as an astringent medicine, but are very inferior to them.

2. Bog whortle-berry, or great bilberry (*V. uliginosum*), grows on boggy mountainous heaths, and common in the Highlands of Scotland. It flowers in May. Taller than the preceding, with round branches. Leaves obovate, entire, smooth, deciduous. Flowers several together, flesh-coloured. Berries large, bluish-black, less acid, and less wholesome than the former.

3. Red whortle-berry, or cowberry (*V. Vitis Idæa*). This species grows on dry, stony, turfy heaths, or in mountainous woods, in many parts of Scotland, Wales, and the north of England. It is plentiful

rbyshire. It is an evergreen, flower-
n June. The roots are creeping;
erect, three or four inches high, with
irregular, wavy, leafy, downy branches
e summit. Leaves various in size,
reen, obovate, revolute, veiny, of a
shining green above, minutely toothed,
with glandular dots beneath. Clusters
nal, drooping, of several very pretty
coloured flowers, without scent, with
, concave bractes, longer than the
r-stalks. Berries globose, deep red,
gent, and acid, with much bitterness,
they lose by immersion for some
in water before they are made into
rob, or jelly. In the latter state this
is excellent for sore throats, as well as
ting with venison or other roast meat,
practised generally in Sweden. The
s of this species are often mistaken for
of *Uva ursi*. They contain much
gent matter, and are little inferior to
ursi as a medicine.

Marsh whortle-berry, or cranberry (*V.
ccus*). This species grows in clear
y turfy bogs, among mosses. The
are creeping, with many long fibres.
s slender, wiry, trailing, and creeping,
numerous leafy branches. Leaves
, entire, smooth, revolute, acute, peren-
Flowers very elegant, drooping, on
e red stalks, several together at the
f each branch. Berries spotted in an
state, finally deep red, very acid,
y grateful to most people in tarts or
preparations with sugar; though in
en they serve only for the acid liquor
il silver plate in, to eat away the
te external particles of the copper
(*Paxton's Bot. Dict.*; *Smith's Eng.*
vol. ii. p. 218.)

IKES. A provincial term signifying
rary boundaries or marks, set up to
swath, to be mown, such as boughs,
e common fields, or meadows. Also
s set upon haycocks for tithes, &c.

ILD OATS. A name given to the
at-like soft grass (*Holcus avenaceus*).
noxious weed in arable lands. See
us.

ILLOW. (*Salix*; from *sal*, near, and
ter (Celtic); in allusion to the place of
owth: or from *salire*, to leap, because
e rapidity of its growth.) An ex-
e genus of well-known useful and
ental trees and shrubs. They all
t to grow in swampy places, and are
sed by cuttings, though some of the
rare alpine kinds root with difficulty.
is no tribe of trees of such various
itude as the willows, from the large
willow to the minute *Salix herbacea*,
f which may be *placed* between two leaves of a duodecimo, roots, stems, leaves, and flowers. Many of the species of willow, under the names of osier and sallow, are extensively grown for the manufacture of basket-rods; the best sorts for which are the great round-leaved sallow (*S. caprea*) and the common osier (*S. viminalis*). The branches of some of the species are used as stakes, poles, handles to rakes, hoes, and a great variety of economical purposes. Loudon (*Arb. Brit.*) says, "In the north of Europe the bark of *S. alba* is used for tanning leather, and for dying yarn of a common cinnamon colour; and the leaves and young shoots are given to cattle in a green state, or dried like the twigs of the birch, and laid up for winter fodder." The bark, however, is less valuable than that of some of the other species. The leaves of the least willow (*S. herbacea*), soaked in water, are employed in Iceland for tanning leather. (*Paxton's Bot. Dict.*) The arrangement of the species of willows is a matter of considerable difficulty, as well as their technical discrimination. Among the numerous species of willows there are only a few which are cultivated for farm purposes, of these we shall enumerate and describe the following:—

1. The long-leaved triandrous willow (*S. triandra*). This tree is very common in wet woods, hedges, and osier grounds. It is of an upright form, rising naturally, when not injured, to the height of thirty feet; towards autumn casting the bark of its trunk and larger branches in broad solid portions, cracking angularly asunder, like the plane tree. The young branches are erect, long, tough, and pliant, smooth, leafy, brownish, somewhat brittle at their joint or insertion. Leaves linear-oblong, serrated, smooth, rather unequally sloping at the base. The narrower-leaved willows generally come under the denomination of osiers, of which this is one of the most valuable. It is cultivated for white basket-work, producing rods eight or nine feet long, tough and pliant, even when stripped of their bark, and very durable. They are cut down every year. There are several varieties of this species; one, called the French willow, is cultivated in Sussex and in the eastern parts of England; it is more slender in form, and only about twelve or fifteen feet high.

2. Bedford willow (*S. Russelliana*). When this tree was first recommended for cultivation, by the name of the Leicestershire, or Dishley willow, it was regarded with scorn as "only the crack willow" (*S. fragilis*), a sort notoriously useless. This ignorance and prejudice are now removed, and this willow is found the most profitab

for cultivation of any species of the genus, for the value of its timber as well as bark, the rapidity of its growth, and the handsome aspect of the tree. This species of willow was first brought into notice by the late Duke of Bedford, who engaged an able chemist, Mr. Biggin, to make experiments upon it. It was found to contain in its bark more of the tanning principle than any other tree of this country, except the oak. The bark also contains the largest quantity of *salicina*, a salt which has been found useful as a substitute for the quinia and cinchona in agues, and which is much less liable to excite irritation in the stomach than the salts of the cinchona. It is of great importance that the distinctions between this willow and the crack willow (*S. fragilis*, should be clearly pointed out, on account of the wide difference in their qualities and value. This tree is more handsome than the crack willow in its mode of growth, as well as altogether of a lighter or brighter hue. The branches are long, straight, and slender, not angular in their insertion like *S. fragilis;* and the trees, when stripped of their leaves, may always be distinguished by these marks. They are polished, very tough, flexible, round, and smooth. Leaves lanceolate, tapering at each end, serrated throughout, and very smooth. Those of *S. fragilis* are ovate-lanceolate; the foot-stalk, also, is longer than the scale, whilst in *S. fragilis* it is so short that the leaf is nearly sessile. In both it is glandular or leafy.

3. Bitter purple willow (*S. purpurea*). This is a shrub growing in low meadows, about the banks of rivers and ditches, but not common. The trunk is three or four feet high, with long, slender, very smooth branches, spreading widely, and, if not supported, trailing on the ground, of a rich and shining purple, with a somewhat glaucous hue. Leaves partly opposite, obovate-lanceolate, serrated, very smooth, narrow at the base. This is a very valuable osier for fine basket-work, but more especially for platting into low close fences to keep out hares and rabbits; the leaves and bark being intensely bitter, those animals will not touch either. The twigs, moreover, are so long, tough, and flexible, that they may be interwoven into any shape, and kept very close to the ground, as they always retain their horizontal mode of growth. Such a fence is scarcely inferior to one made of wire, and is, perhaps, more durable, as continually producing young shoots, to supply the place of those that decay. It is important to distinguish this useful and elegant willow from that to be next described. The bark contains much salicina.

4. The rose willow (*S. Helix*) grows in marshes, osier holts, and about the banks of rivulets. It is a tree of humble growth, erect, about ten feet high, smooth in every part, altogether of a lighter hue than the last. The branches not trailing, but upright, smooth, and polished, of a pale yellowish, or purplish ash-colour, tough, and pliable, less slender and elongated than the foregoing species, though useful for the coarser sorts of basket-work. Leaves partly opposite, oblong-lanceolate, pointed, slightly serrated, very smooth, linear towards the base. Their colour a light rather glaucous green, turning blackish in drying. The leaves and twigs are less bitter than the former, and the greater size of the trunk, as well as branches, renders this species fit for several purposes which that is not. It also makes a better figure in plantations, and the roots give more solidity to the banks of rivers or ditches.

5. Common white willow (*S. alba*). This is a tall tree, whose bark is thick, full of cracks, useful for tanning; and, as yielding much salicina, good, also, for the cure of agues, though inferior in quality to that of the true Bedford, or Huntingdon willow. The bark is called *cortex salignum*, and *anglicanum* by some writers. The branches are numerous, spreading widely, silky when young. Leaves all alternate, elliptic-lanceolate, pointed, serrated, silky on both sides; the lowest serratures glandular. There is a variety which is very superior in the value of the wood and bark, and the rapid growth as well as handsome aspect of the tree, to the original species. (*Smith's Eng. Flor.* vol. iv. p. 163—233.) See Osier and Sallow.

WILLOW-HERB. (*Epilobium*, from *epi*, upon, and *lobos*, a lobe; the flowers have the appearance of being seated on the top of the pod.) Many of the species of this genus are very ornamental, as *E. angustifolium;* while a few others, such as *E. montanum*, are mere weeds. They all grow well in any common soil,and are either increased by seeds or by dividing the roots. The indigenous species are nine, namely, the rose-bay willow-herb (*E. angustifolium*), the great hairy willow-herb (*E. hirsutum*), the small-flowered hoary willow-herb (*E. parviflorum*), the broad smooth-leaved willow-herb (*E. montanum*), pale smooth-leaved willow-herb (*E. roseum*), square-stalked willow-herb (*E. tetragonum*), round-stalked marsh willow-herb (*E. palustre*), chickweed-leaved willow-herb (*E. alsinifolium*), and the alpine willow-herb (*E. alpinum*).

These are all perennial herbs, with simple, generally toothed, leaves; flowers mostly purple, in terminal leafy clusters or spikes, without scent. The most common of these are—

1. The rose-bay willow-herb (*E. angustifolium*), which grows wild in meadows and moist shady places, chiefly in the north of England. The root is creeping, fleshy, with numerous buds, stems from three to six feet high, erect, roundish, leafy, smooth, reddish, seldom branched. Leaves scattered, numerous, nearly sessile, linear-lanceolate, acute, various in breadth, veiny, smooth. Flowers crimson, inodorous, very handsome, numerous, in long terminal upright clusters. This is a very ornamental flower, common in gardens, where it increases but too rapidly; thriving, like many mountain plants, even in the smoky air of London. There is a white variety. 2. The great hairy willow-herb (*E. hirsutum*). This species is very common in all watery places, ditches, and the margins of rivers; among reeds, coarse grasses, and willows. It has an extensively creeping root. The whole herbage is downy, soft, and clammy, exhaling a peculiar but transitory acidulous scent, justly compared to the flavour of boiled codlings and cream. Stems four feet or more in height, round, leafy, copiously branched, and bushy. Leaves half clasping the stem, ovate-lanceolate, hairy. Flowers in leafy corymbose clusters, large, of a delicate pink. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. ii. p. 212.)

WILLOW WARBLER. See WARBLER.

WILLOW-WEED. A name applied in the fens to the snake-weed, or pale-flowered persicaria (*Polygonum lapathifolium*), an annual plant, which grows very freely on all loose and deep soils, and on marshy lands, though it be scarcely known to any of the cultivators of clay, and it is as rarely to be seen on any sort of turnip land. This plant grows commonly from eighteen inches to two feet; its stalks are tender and succulent, pale, spotted, or reddish; the joints much swollen. The plant branches most when it has free growth, and produces a great number of crowded spikes of seeds. The leaves resemble those of the willow, but are charged with dark spots in the middle. The seeds are very bright and heavy, highly nutritious, and therefore very grateful to birds, especially partridges. Those who keep decoys for catching wild ducks will buy the seeds to feed and entice the fowl. Pigs will do well on them, if boiled. These seeds very much infest samples of fen corn, whether wheat, oats, or barley. As a weed in fen soils, this plant is the most ramping and cumbersome of any weed that grows. (*Holdich's Weeds*, p. 21.; *Smith's Eng. Flor.* vol. ii. p. 234.)

WIND. See WEATHER.

WIND-FLOWER. One of the names of the marsh gentian. See GENTIAN.

WINDHOVER. One of the common names of the kestrel. See FALCON.

WIND, in HORSES. See BROKEN WIND and ROARING.

WINDMILL. A well-known contrivance for grinding corn or raising water, which is put in motion by the action of the wind upon its sails or vanes. They are of two kinds, *vertical* and *horizontal*, but the former is generally preferred. Since the extensive introduction of improved horse power, hand, and steam machinery, windmills are becoming much less common throughout the country; and from depending entirely upon the caprice of the weather, they are only suited to elevated or exposed situations, where they will catch every passing breeze; and are much less useful than water-mills, which can generally be kept at work continuously, or for a much longer period. A set of arms and sails might be advantageously used in some situations for pumping up water from a well into a trough or cistern for cattle, or for the purposes of irrigation. In the West Indies, a simple apparatus of this kind is usually attached to the pump or well in the farm-yard. The velocity of the sails of a windmill, in a moderate wind, was calculated by Mr. Ferguson to be thirty miles an hour.

WIND-ROW. A term signifying the green parts, or borders of a field, dug up, in order to carry the earth on other land to mend it; so called because it is laid in rows, and exposed to the wind. It is also applied to a row of peats or a line of hay exposed to dry, and also to turfs cut up in paring and burning.

WINE. (*Vinum*, Lat.; *vin*, Fr.; *vino*, Ital. and Span.; *vinho*, Portu.; *wein*, Germ.; *wijn*, Dutch; *win*, Swed.; *viin*, Dan.; *vino*, Russ.) A well-known agreeable, and, when moderately used, wholesome liquor, prepared from the juice of the grape, and that of some other fruits. The invention of wine is involved in the obscurity of the earliest ages. The sacred writings, however, lead us to believe that it must have been known before the deluge; for we are informed that the patriarch Noah, immediately after that overwhelming event, "began to be a husbandman; and he planted a vineyard; and he drank of the wine, and was drunken" (*Genesis*, ch. ix. v. 20, 21.), a sufficient reason for supposing that it was a fermented liquor, and not merely the simple juice of the grape. It is, indeed, natural to imagine, that in those countries where the vine is a native, the spontaneous fermentation of the juice of the fruit, when it was expressed, either purposely or accidentally, and not immediately used as a beverage, would have naturally led to the invention of making wine at a very early period. It is, nevertheless, certain, that until modern times the preparation of wine was purely empirical.

The history of wine is of great interest, but it would be impossible to attempt even a very brief sketch of it in an article of this description, and therefore we shall confine our remarks upon that part of the subject to some account of the wines used in England, our object being rather to treat of the general rules to be followed in making and preserving wine, and to explain its dietetic qualities, than to trace its history.

Wine, at a former period, was made in England for sale, and most of the large Abbeys were supplied with it from grapes raised in their own vineyards; but at no time was it considered equal in quality to foreign wine; and certainly no stronger reason for the neglect into which wine-making in England fell need be stated. Soon after the Norman conquest, much encouragement was given to the importation of the wines of Anjou and of Poitou; and in the time of Henry III. we find those of the Moselle and St. John, probably an Italian sweet wine, were added to the imports. But for a considerable period the foreign wines were not drank in their genuine form, but were mixed with honey, sugar, orange juice, and even opium. Chaucer, in the *Knight's Tale*, speaks of

> " A clarrie (claret) made of certain wine,
> With narcotise and opie of Thebes fine."

These mixed wines received different names, according to the nature of the wine employed. When made with Burgundy or Bordeaux, the mixture was called *Bishop;* when with old Rhenish, its name was *Cardinal;* and when with Tokay, it was dignified with the title of *Pope*. In the reign of Edward II. the taste for sweet wines prevailed; and consequently we find the wines which Alsace then furnished, which were chiefly sweet, were much used. In the time of Elizabeth, the profusion and diversity of wines displayed on the tables even of the citizens of the metropolis, and the inhabitants of the southern provinces, almost exceed belief. Harrison, in his account of the mode of living in England in that reign, states, that there were upwards of eighty-six different wines in use; "whereof," he adds, "Vernage, Cate-piment, Raspis, Muscadell, Romnie, Bastard, Tire, Oseie, Caprike, Clareie, and Malmeseie are not least of all accompted of, because of their strength and valure." (*Holinshed's Chron.* p. 167.) Sack, with which all are familiar who have read the works of our immortal dramatist, was a dry Spanish wine; but sugar was often added to it, with the view, as Venner informs us, to lessen the hot and penetrative quality of the wine. In truth, the best sack, for there were several kinds in use, was of the growth of Xerez, or in other words sherry. In *Pasquil's Palinodia*, published in 1619, this is stated in the following lines:—

> " ——— give me sacke, old sacke, boys,
> To make the Muses merry;
> The life of mirth, and the joy of earth,
> Is a cup of good old sherry."

The Spanish wines still retained the first place on the tables of our countrymen, at the commencement of the seventeenth century. After this time, the preference was given to the Canary wines, more of which Howell (*Familiar Letters*, part ii. 60.) informs us, "was brought into England than to all the world besides." Champagne appears to have been unknown in this island until a present from Louis XIV. of two hundred hogsheads of wine, consisting of Champagne, Burgundy, and Hermitage, was sent to the king of England; but it was long after this time unknown to those not connected with the court, and, therefore, it was regarded, as Venner terms it, "a regal wine." Even at this period, however, although much wine was drunk, yet few persons kept a stock of it in private cellars; the chief consumption was in taverns.

The war with France in 1689 introduced the use of the wines of Portugal, particularly the red wine, or port, as a substitute for the growths of Bordeaux; and the celebrated Methuen treaty, which obliged us to receive the wines of Portugal in exchange for our woollen manufactures, and at one third less rate of the duty levied on French wines, confirmed the taste of Englishmen for this strong and intoxicating beverage, a taste which is again happily, as respects health and longevity, on the decline.

From the foregoing sketch it is evident that the taste of our countrymen in wine has varied considerably at different periods. For five or six centuries, the light wines of France and the banks of the Rhine, and the rich sweet wines of the Mediterranean and the Archipelago, were in high estimation. Then came the dry Spanish wines; and at the close of the seventeenth century the red growths of the Bordelais were in most frequent demand; which however, owing to the wars with France, were given up, and the rough wines of Portugal substituted for them. But, as we have already said, the use of these is now on the decline, and our growing intercourse with the continent has revived the taste for light wines. (*Henderson's History of Wine.*)

As far as concerns what is denominated home-made wines, there is scarcely any, if we except the Gooseberry (intended to imitate Champagne) and Raisin-wine, that merit any notice. Indeed, it is an incontrovertible fact, that grapes ripened on walls and trellises are in general unfit for the manufacture of wine; and, in this country, those cultivated under glass are too valuable for the desert and other purposes, in their recent state, to be employed for making wine. Still, however, to make home-made wine forms one of the occupations of the wife of a farmer, and tolerable wine may be made with a mixture of raisins and grapes cultivated in the open air, in favourable seasons. The principles of wine-making are the same, whatever kind of fruit is employed: in knowing, therefore, the manufacture of Grape-wine, it is easy to modify the process, so as to render it applicable to every other description of wine.

The juice of the grape, when chemically analysed, is found to consist of a considerable portion of sugar and water, mucilage, tannic acid, bitartrate of potassa, tartrate of lime, phosphate of magnesia, chloride of sodium, sulphate of potassa, and a *mucoso-saccharine* principle, on which the fermentative process productive of the wine depends. Thénard, a distinguished French chemist, assures us that this substance excites the vinous fermentation by abstracting a portion of oxygen from the sugar, by means of its carbon, forming carbonic acid gas, whilst its hydrogen and the remaining oxygen and carbon of the sugar are converted into alcohol, the basis and exciting principle of all wines. When the *must*, or expressed juice of the grape, is exposed to a temperature of 65° Fahr., this chemical change or fermentation commences; an intestine motion takes place in the liquor; bubbles are evolved, which buoy up the grosser matter, increasing the bulk of the mass, and forming a scum upon the surface. An augmentation of temperature now takes place; the *must* loses its saccharine taste; it acquires a deeper colour than before, and a vinous flavour, which increases with the advancement of the process. After a few days, the fermentation gradually subsides, the mass returns to its original bulk, the scum sinks to the bottom of the vessel, the liquor becomes transparent, and it is now *wine*. The constitution of the must is liable to be greatly influenced by the quality, the variety, the climate, and the culture of the grapes, as well as the nature of the seasons. In a cold year, owing to the deficiency of the saccharine matter, the wine is weak, harsh, and acescent; in wet seasons it is devoid of a competent quantity of spirit: high winds and fogs are also injurious. In this country, the mode of training the vine high upon walls is a disadvantage for making the fruit into wine. In the best wine countries, it is never allowed to grow more than three or four feet high; and it is found that the bunches nearest to the soil, if they do not touch it, are always the richest. It is a mistake to suppose that sweet wines are the most susceptible of decomposition; on the contrary, they can be kept for almost an indefinite length of time without undergoing any deleterious change. All wines continue to suffer a certain degree of fermentation after they are racked off and put into casks; and as long as the saccharine matter is supplied to maintain this slow fermentation, the wine remains good; but, when that is exhausted, the acetous fermentation begins, and the wine is converted into vinegar.

Admitting, however, the goodness of the fruit, and the wine to be made consequently expected to be excellent, many circumstances may destroy that hope, for the process does not proceed in the regular manner above described, unless certain rules be strictly observed: these are the following: — 1. The grapes should be well and equally bruised or trodden; for the juice that first flows contains little *mucoso-saccharine* matter, and consequently does not ferment freely. That substance is contained chiefly in the insoluble organised parts and the skin, which also contains the greatest part of the acid, the resinous extractive, and the colouring principle. 2. The fermentation should be conducted at a temperature of 60° to 65° Fahr., below which it languishes, and above which it proceeds too violently. When it progresses too slowly, that evil may be remedied by the addition of a little boiling *must*. 3. The contact of air is essential in the commencement; and this affords another reason for the good bruising of the fruit, as much air is absorbed in that stage of the process. But after the fermentation is established, the air should be excluded, for the sake of preserving the aroma; and to secure this, the French chemist, Chaptal, who paid much attention to the manufacture of wines, recommends the vats to be covered with boards and linen cloths. 4. The greater the bulk of material, the more perfect the wine. 5. When the wine is perfected and racked off, it should be sulphured by burning sulphur matches within the casks intended to contain it, in order to restrain, within a certain degree, the further fermentation.

When good wine is actually produced, much of the advantage expected from the possession of it depends on the future management and preservation of it; for every wine contains within itself the sources of both improvement and decline. The chief points to be attended to are guarding against vicissitudes of temperature and the contact of air. Wines in the cask or wood, as the term is, are liable to become sour, either by a sudden transition from cold to heat, or the reverse; and the same susceptibility to ascescency is favoured by defect of proper fining; but this process should not be frequently repeated, as it impairs the flavour and the body of the liquor. Wines are mellowed by the slow precipitation of the tartar, which carries down with it the colouring matter and the salts of lime; and this occurs in the ratio of the evolution of the alcohol, during the continued gradual fermentation which goes on even after the wine is bottled. This would strengthen wine in the cask, were it not balanced by the evaporation of the alcohol through the sides of the cask. Old Rhenish wines kept in the barrel lose nearly one half of their original alcohol; yet it is an undoubted fact, that wine in bottles, not corked, but tied over with a bladder, becomes stronger: — that membrane permitting water to pass through it, but not spirit. Another curious fact, however, must not be forgotten, namely, that whilst the wine becomes weaker when kept in cask, it becomes much improved in its other qualities; a fact which is illustrated by the transportation of Madeira to India, or keeping it in a warm place.

The adulteration of wine is too comprehensive a subject to be here fully treated of; but, independent of this evil, every foreign wine sent to this country, except the best of the Rhenish wines, contains much uncombined brandy, which tends not only to render them unwholesome, but impairs their original flavour, and risks their partial decomposition. Were our home-made wines free from this evil, it would tend greatly to encourage a new branch of trade which hat lately sprung up in Scotland, chiefly as Edinburgh, Leith, and Glasgow. From a parliamentary return, we find that 24,848 gallons, equal to nearly 150,000 bottles, were sent to England in 1839, and 23,089 gallons in 1840. Of the 24,848 in 1839, about 13,000 gallons were shipped from Leith, and 11,000 from Glasgow; and of the quantity in 1840, about 14,700 gallons went from Leith, and 7,000 from Glasgow.

In the present day, when temperance has made so favourable an impression on the habits of all classes of society, some remarks on the dietetic properties of wine become essential in an article devoted to its other qualities. Were technical phraseology allowable, we should say that wine is stimulant and salutary in small, narcotic and poisonous in large quantities. This opinion, however, neither implies that it is necessary as an ordinary article of diet, nor that it is deleterious even in the largest doses, as a medicinal agent. Wine, moderately used, in the artificial state of modern civilised society, is not at all essential for the healthy, however occupied, except under exposure to unusual fatigue. But were this principle of necessity to guide the regulation of diet and beverage, the art of cookery would be annihilated; and the growth of wine, as well as the manufacture of every spirituous liquor, under whatever name it is known, ardent spirits, cyder, or malt liquor, would cease to exist. In noticing, therefore, the dietetic properties of wine, we must take society as we find it, not as it ought to be constituted. The stimulant operation of wine is exerted on the nerves of the stomach, and the secreting powers of that organ are influenced by these; and thus a beneficial effect results when the digestive powers are depressed. This, in a great degree, depends on the alcohol contained in the wine; yet it is a fact, that the same quantity of brandy diluted with water, to the strength of wine, will cause intoxication more speedily than when it is taken in the form of wine, especially if the wine contains no uncombined alcohol. The stimulant power of wine, however, depends on the quantity of alcohol in its composition; but this power is much greater in those wines that contain adventitious and imperfectly combined spirit. On this account, Port-wine is more apt to derange the stomach, and to cause intoxication, than Sherry of the same strength; and Claret or Rhenish less than either. But besides the evils arising from wines containing uncombined brandy, those wines that contain much acid are usually deleterious to persons of sedentary habits, or who have weak stomachs. Indeed, the daily use of the best wine can only be supported with impunity by those who take much exercise in the open air. But, if we admit that wine is a necessary article of life for the healthy, there can be only one opinion respecting the superiority of the better kinds of Bordeaux. Whatever wine is taken, it should not be conjoined with other sorts, as nothing impairs digestion more than mingling several sorts of wine at one meal.

Such are the general effects of the moderate use of wine; its abuse is so well known, both in reference to mind and body, that it is unnecessary to make a single remark, in this place, upon the subject, except to caution those who feel no immediate injurious effects from a pint of Port, or indeed of any wine, daily, not to rely too confidently upon their apparent powers of resisting its evil influence; for a foundation may be slowly formed for maladies, that, when they appear, are always difficult of cure, and often altogether irremediable.

With respect to the comparative value in reference to the wholesomeness of different wines, a few remarks may be necessary, before concluding this article. Among the brisk wines, Champagne is the least noxious, even when it is drank to excess, the excitement is of shorter duration, and the subsequent exhaustion is less. It is said to be hurtful to the gouty; but gout is almost unknown in the province where it is made; and more of the evil said to be caused by Champagne is due to the variety and the nature of the dishes, and the period of the day at which they are eaten, than to the wine itself. The red wines of Burgundy are strong, heating, and consequently intoxicating, and they should only be taken in very small quantity. The Bordeaux wines, as we have already stated, are the safest for daily use. They certainly do not excite inebriety so rapidly as most other wines. The wines of Oporto abound in astringent matter, and in uncombined brandy. They are unfit for weak stomachs; they tend to cause sleep rather than to elevate the spirits, and they are the most pernicious as daily beverage. The Spanish wines, especially Sherries, are less objectionable, but they should never be drunk without dilution with water, unless for medicinal purposes. The same opinion may be hazarded with respect to Madeira; and perhaps no wine is more suited for the dyspeptic, if hypochondriasis be absent. The best light wines of the Rhine and the Moselle are, of all others, the most wholesome. They contain little alcohol, and that little is wholly combined. They prove, in many instances, refrigerant, and have a tendency, from the nature of the acid which they contain, the tartaric, to diminish obesity. Lastly, all sweet wines are apt to disorder the stomach; and when used freely they intoxicate as readily, and cause as deleterious subsequent effects as the stronger wines. But after all, we must revert to the opinion, that wine is an unnecessary article of diet for all who are healthy and robust; and must truly be regarded, beyond certain limits, either as a medicine or a poison. (*Henderson's History of Ancient and Modern Wines; Macculloch on Wine Making.*) *Dr. A. T. Thomson.*

See Alcohol and Wine.

Account of the Quantity of Foreign Wine retained for Home Consumption, in Wine Gallons, from 1789 *to* 1836.

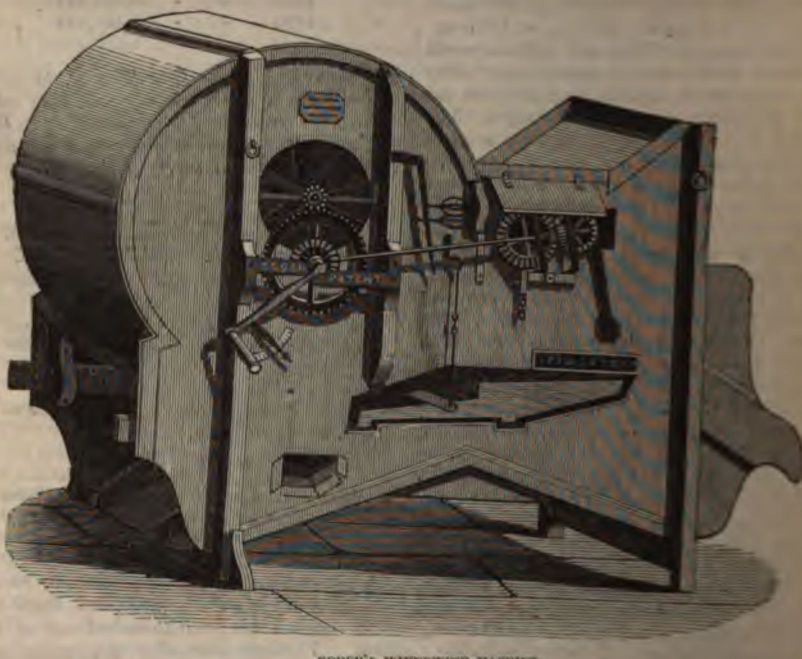
Years.	Gallons.
1789	5,814,665
1790	6,492,313
1792	8,082,249
1794	6,799,220
1796	5,732,385
1798	4,760,657
1800	7,728,871
1802	6,355,749
1804	4,840,719
1805	5,936,235
1810	6,805,276
1815	5,968,435
1820	5,019,960
1822	4,975,159
1823	4,845,060
1824	5,030,091
1825	8,009,542
1826	6,058,443
1827	6,826,361
1828	7,162,376
1829	6,217,652
1830	6,434,445
1831	6,212,264
1832	5,965,542
1833	6,207,770
1834	6,480,544
1835	6,420,342

Account exhibiting the Quantities of the different Sorts of Wine imported into and exported from the United Kingdom in the Year ending the 5th of January, 1840, *and the gross Revenue accruing thereon.*

Species of Wine.	Quantities imported into the United Kingdom.	Quantities exported from the United Kingdom.	Gross Amount of Revenue received thereon.
	Gallons.	Gallons.	£
Cape	723,740	3,520	73,596
French	508,329	121,525	109,820
Madeira	267,047	162,527	1,732,232
Portuguese	3,272,206	299,355	
Spanish	4,130,753	989,776	
Rhenish	82,910	13,350	
Canary	341,225	292,779	
Fayal	202	90	
Sicilian and other Wines	582,310	170,163	
Total	9,908,722	2,053,085	1,915,648

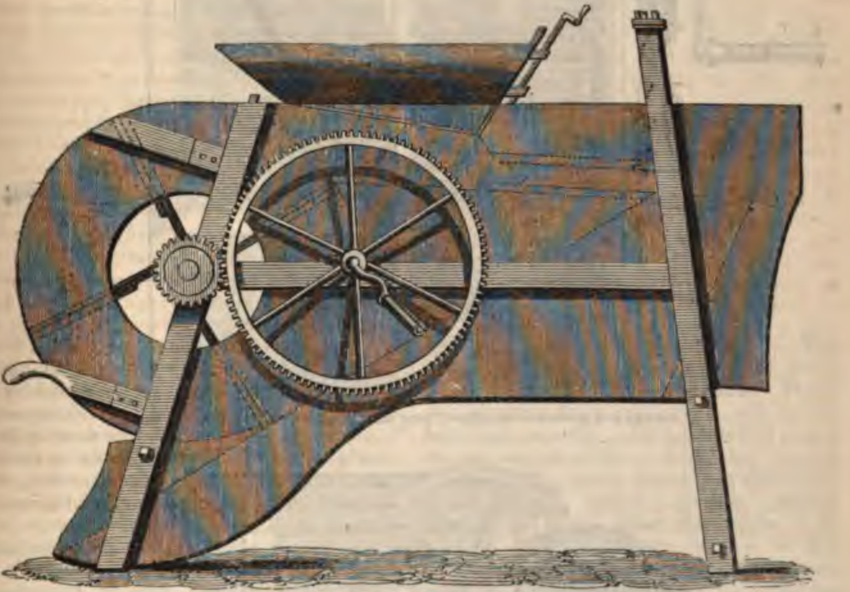
WINNOWING-MACHINE. A contrivance employed for separating, by an artificial current of air, the chaff from the grain, after it has been thrashed out of the straw. Various are the accounts, remarks Mr. J. A. Ransome in his *Treatise on the Implements of Agriculture*, given of the introduction of this machine, and many the claimants for the credit of having been the first maker of this piece of mechanism in England or Scotland. All, however, agree that the idea, design, or model was originally furnished from Holland, earlier, however, than the date of any of these by at least a period of twenty years. We learn from the papers of Robert Somerville of Haddington, that in 1710, pursuant to articles of agreement between himself and Fletcher Laird of Saltoun, James Meikle (father to Meikle of thrashing-machine memory) visited Holland for the purpose of learning " the perfect art of sheeling barley," in order to the introduction of the barley mill. The same authority, 1805, states, " that on Meikle's return he made the first fanners which were seen in Britain;" and that these were in use only a few years before that date at the Saltoun barley mills. That the machine was not made public till many years afterwards may be attributed to a clause in the above-mentioned agreement, by which Meikle was bound, on leaving Saltoun's service, " not to profit any more by this mill, nor communicate the arts he had learned to any other." In 1737, through the medium of Rogers of Cavers and others, it was brought into more general use; and in 1768, A. and R. Meikle obtained a patent for a machine of this kind. Although a very considerable advantage over the plan of dressing by hand, these still appear to have been but very imperfect, the corn having to be passed through them twice or thrice in order to be perfectly separated. And in 1798, R. Douglas, in his *Agricultural Survey of Roxburghshire*, remarking upon these defects, mentions an improvement invented by one Moodie of Lilliesheaf, " in which he had happily combined some properties of other fans, so that the grain at one operation could be both separated from the chaff and lighter seeds, and completely riddled of all sorts of refuse."

Other patents had been taken out which do not appear to have involved much real improvement, till, in 1800, I. Cooch of Northampton patented the machine which has since been known by his name, and has obtained deserved commendation, being in use and approved beyond most at the present day. This machine dresses all kinds of seeds, and its work is performed in a perfect manner: its principle involved more mechanical combinations than were at that time generally understood by the class for whose use it was intended; and this, together with its then cost, retarded its more general adoption.



COOCH'S WINNOWING-MACHINE.

In 1812, John Elmy obtained a patent for improvements in winnowing-machines, and produced a very efficient implement; the arrangement of its various parts were simple, and greater effect was obtained from the blast. Comparing this with the drawings and description of one we find in the *Edinburgh Journal of Agriculture*, and with that described by Professor Low, we have little doubt of their general identity with this, and as it is the model upon which the machines in general use are now made, we subjoin a sketch of it.



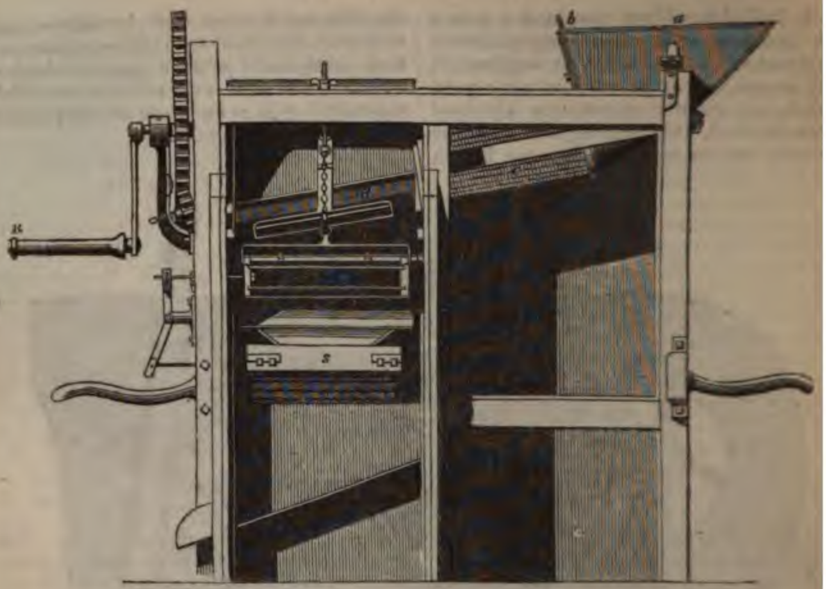
ELMY'S WINNOWING-MACHINE.

In 1839, T. F. Salter obtained a patent for a machine for winnowing and dressing corn and seeds, which at the R. A. S. E. meeting at Cambridge was exhibited, and obtained the silver medal.

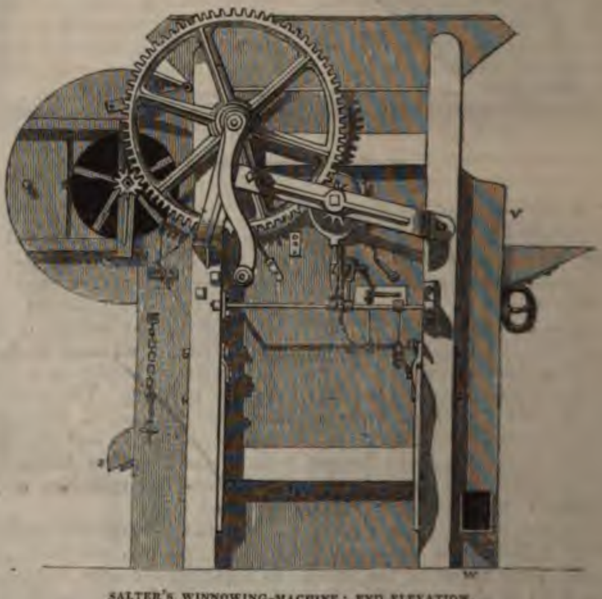
In this invention are combined the principles of Grant's hummelling machine, described in *British Husbandry*, vol. xi. p. 204., and of Hall's smut machine (*Loudon's Ency. of Agr.* p. 439. fig. 403.), with the operations of the common winnower.

The undressed grain from the hopper passes through a cylindrical sieve, having within it a rotatory spindle, upon which short blunt arms are arranged in a spiral direction; these agitate the grain as it passes along, and thus separate the small dirt and dust as well as the awns of barley, which fall through in a closed box or cupboard. The cylinder is placed in a slanting direction, and is provided at each end with slides, which regulate the quantity and speed with which the grain shall pass. Through the slide aperture at the lower end the grain is introduced upon other sieves, which, having a backward and forward motion, distribute it equally over their surface when it is subjected to the blast of the fan, driving obliquely through the sieves; this carries the chaff out of the machine; the grain falls on a screen, which, having a similar motion to the sieves, separates from it all small seeds, and the dross corn is carried away in a division formed for the purpose. The grain, dross, corn, and chaff are thus all thoroughly separated from each other, and the dust, dirt, and small seeds, having fallen in an enclosed box from the cylinder, may be entirely removed.

We have heard this machine highly approved by many, and when pains are taken to separate the corn from the short straw, &c., previously to submitting it to the machine, we believe it to be very effective; but as there is some degree of complication in its details, it is chiefly suited to those to whom a high degree of excellence in the manner of "making up their corn" is a matter of more importance than the time or labour it may require.



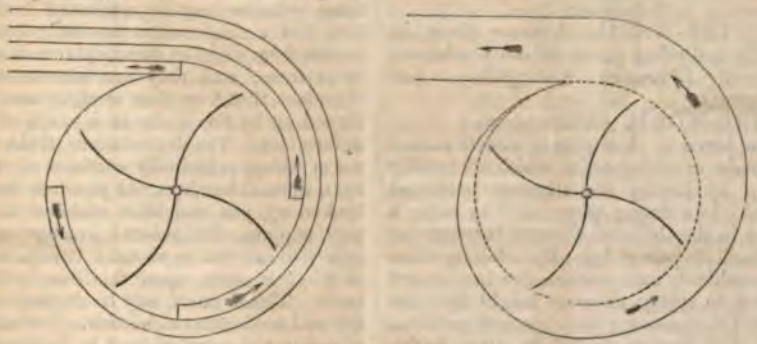
SALTER'S WINNOWING-MACHINE; SIDE ELEVATION WITH FRONT REMOVED.



SALTER'S WINNOWING-MACHINE; END ELEVATION.

We now come to the description of the winnower used in combination with the thrashing apparatus at Whitfield, in which the principal feature is the improvement of the fan or blower. Having noticed that the ordinary form and position of the fans, which are flat boards, radiating from the centre as seen in the drawing, tended to ke air constantly whirling within the c rather than to force it forwards; and if, instead of being flat, they were c forward in the direction of their m they would draw the air in from the and force it out at the sides, J. Clyb

Uley, the engineer by whom the machinery at Whitfield was executed, constructed a blower, in which, by a certain curvature of the fans, and a different arrangement of the chamber in which they revolve, the tendency to form a vacuum is considerably increased, and greater force is consequently obtained from the blast. The arrangement of the chamber in which the fans are made rapidly to revolve will perhaps be better understood by the following sketches, &c.



CLYBURN'S IMPROVED BLOWERS.

We are not disposed to leave this part of our subject without some allusion to an invention for still further carrying out the process of cleaning corn, known as Tuxford's reeing-machine. This consists of a series of sieves, to which a rotatory motion is given: the grain is by this means separated from any small dust and dirt, which passes through the wires of the sieve, while all the lighter rubbish is by the motion brought to the top, whence it is removed by hand. This implement is more, perhaps, adapted for millers; and its cost presents, in its present form, a bar to its general introduction. If it could be reduced to the power of being worked by hand, it would be a very valuable assistant to the proper preparation of the grain for market.

WINTER CHICKWEED. See CHICKWEED, EUROPEAN.

WINTER-CRESS. (*Barbarea*, on account of its being formerly called the herb of St. Barbara.) There are two indigenous species; 1. The bitter winter-cress, or yellow rocket (*B. vulgaris*), a perennial, which is common in rather moist waste ground, about hedges, or in marshy meadows. The root is tapering, somewhat woody; stem about two feet high, simple or branched, leafy, stout, angular, and furrowed. Lower leaves lyrate, the terminal lobe roundish; upper obovate, toothed, strongly ribbed, of a fine texture, quite smooth. Flowers bright yellow, in round-headed corymbose clusters. Pod quadrangular, about an inch long. The whole herb is nauseously bitter, and in some degree mucilaginous. A double-flowered variety, with innumerable petals produced in long succession, and turning white as they fade, is frequent in gardens. 2. Early winter-cress (*B. præcox*). This biennial species is found in watery grassy places, or on the banks of ditches. Stems, one or more, erect, one and a half or two feet high, smooth, a little branched, tinged at the bottom with a violet hue. Lower leaves lyrate; upper deeply pinnatifid, with linear, oblong, entire segments; flowers fewer, smaller, and paler than those of *B. vulgaris*. Pods thrice as long as in that species, exactly square, smooth. This species propagates itself abundantly by seed, but the root is not perennial. It may be eaten like water-cresses, with which it agrees in flavour, except being rather more pungent. (*Smith's Eng. Flor.* vol. iii. p. 198.)

WINTER-GREEN. (*Pyrola*, from the leaves being similar to those of the pear tree.) A genus of very pretty plants, rather difficult to cultivate. A shaded peat border appears to suit them best, and they are readily increased by divisions or seeds. The whole genus is astringent and tonic. There are five native species, all perennials, as follows:—1. Round-leaved winter-green (*P. rotundifolia*). 2. Intermediate winter-green (*P. media*). 3. Lesser winter-green (*P. minor*). 4. Serrated winter-green (*P. secunda*); and 5. Single-flowered winter-green (*P. uniflora*). They all inhabit alpine wooded localities; the flowers are white or reddish, often highly fragrant. *P. uniflora* is one of the most curious and elegant of British flowers. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. ii. p. 254.)

WINTER PROUD. A term provincially applied to wheat which in winter puts on a more green and luxuriant appearance than it is able to support in the following summer; or in which the ramifications b too numerous to be kept up, or brought to maturity, from the previous over-exertion of the soil. In these cases the crops decline during the spring and summer, and at harvest yield imperfectly, falling much below other crops which had a more backward appearance in the winter.

WINTER-WEED. A name given, in Norfolk and other parts, to the ivy-leaved speedwell (*Veronica hederifolia*). See SPEEDWELL.

WIRE-WORM. (*Elater segetis.*) These are the larvæ of that tribe of insects named *Elateridæ*, or click-beetles, which are readily known by having the sternum produced behind into a strong spine fitted to enter a groove in the abdomen situated between the intermediate pair of legs. By bringing these parts suddenly into contact, the insects are enabled to spring to some height into the air, and thus recover their natural position, when they happen to fall on their backs, which they frequently do, when dropping from plants to the ground. A special provision of this kind is rendered necessary, in consequence of the shortness and weakness of their legs. The wire-worms have a long, slender, and cylindrical body, covered by a hard crust, which has obtained for them the above name. They are composed of twelve segments fitting closely to each other, and are provided with six conical scaly feet, placed in pairs on the three segments next the head. The latter is furnished with short antennæ, palpi, and two strong mandibles or jaws.

Upwards of sixty different species of these insects occur in Britain, and it is probable that a considerable proportion of them feed upon our most valuable cultivated plants. The same species of larva does not appear to confine itself to one kind of food, but attacks indiscriminately the roots of corn and other grasses, as well as esculent roots, such as turnips, carrots, radishes, &c. But it is at the same time deserving of notice, that as a strong similarity prevails among larvæ specifically distinct, it is probable that different kinds may often have been confounded, and a more correct knowledge may prove them to be more restricted in their choice of food than is at present supposed: this, at least, is rendered not unlikely by what is observed in analogous cases. We are as yet acquainted with the metamorphoses and habits of a very small number of these insects; and it is, therefore, highly desirable that whenever a destructive species of wire-worm prevails, it should be traced to the perfect condition. This, however, is attended with considerable difficulty, owing to the length of time they continue in the larva state, extending, in many instances, to several years.

This insect occurs in considerable plenty throughout the country in grass fields and pasture lands, and is usually found creeping among the herbage, or lying at the sides of stones; it is scarcely ever observed on the wing. The extent of the injury they sometimes occasion may be estimated from the fact, that a single worm has been observed to bite from eight to twenty plants in a very short time; and they are occasionally so abundant, that from four to eight have been turned up by the spade in a space of four square feet. The depredations of the wire-worm being principally confined to wheat sown upon clover leys, old pastures recently broken up, pea and bean stubbles, &c., we may suppose the general average of the injury to amount to about a twentieth part of what is sown upon this description of lands. This, I think, may be deemed a very fair and moderate calculation. The number of cultivated acres of land in England was computed at 7,000,000, of which 2,400,000 were calculated to be sown with wheat; and as only one half of the wheat sown is supposed to be on clover leys, old pastures, &c. our calculations must be confined to 1,200,000 acres instead of 2,400,000. This will give 60,000 acres as annually destroyed by the insect in question, which, re-planted at one bushel per acre, will require 60,000 bushels of seed, which, at 8*s.* per bushel, are worth 24,000*l.* Besides this, although no extra expense is incurred by the farmer in preparing the land, yet he has to pay for dibbling in the seed, which, at 5*s.* 3*d.* per acre, will cost 15,750*l.*, or at the full price, 6*s.* per acre, 18,000*l.* If the land require harrowing, there will be a further charge of 9*d.* per acre, or 2,250*l.*, not to name other items, which render it difficult precisely to ascertain the loss of the farmer.

If the above calculation be thought a fair one, and I see no reason why it should not, we find the quantity of wheat lessened to the market by the depredations of these insects is very frequently, if not annually, 60,000 bushels, which occasions to the farmers an additional expense of at least 15,750*l.* (*Linn. Trans.* vol. ix. p. 158.)

When the fields lie fallow, these insects continue to feed on the grass and other weeds, which are frequently allowed to overrun the surface; whereas, if the soil were kept clean, they would either die for want of food, or be compelled to remove to some other place. As these larvæ invariably live beneath the surface of the soil, every plan suggested for their destruction must be founded on this consideration.

Without adverting to this fact, many superficial applications, such as strewing the surface with quicklime, soot, &c., have been tried without effect. The most obvious remedy is to saturate the soil with some fluid which has been previously ascertained to destroy the insects without injuring the plants; that is, if the latter be of a kind which it is necessary to preserve, as will usually be the case. In a fallow field, this precaution need not be observed, as a double benefit would ensue from the destruction of both insects and weeds. More carefully conducted experiments, and on a more extensive scale than any that have yet been undertaken, will be necessary to show what kind of liquid is best adapted for this purpose. Probably, different substances will be found most useful in different situations, according to the nature of the soil and the chemical ingredients which enter into its composition. The latter consideration should be particularly attended to in all experiments on the subject, as most likely to suggest the most appropriate remedy; and it might even happen that the fluid employed to destroy the insects might be so managed as to produce a most beneficial change in the chemical qualities of the soil. If a strong saline solution, for example, should be found to kill the insects, as it is very likely to do, there are few soils which would not derive benefit from such an application. Of course, many substances prove speedily fatal to these insects, and among these the choice would have to be determined by cheapness and ease of application. Beirkander, a Swedish observer, who has investigated their habits, found that they lived among —

	Days.	Hours.
Garlic - - - -	9	0
Spruce leaves - -	0	14
Fir leaves - - -	0	12
Ledum palustre - -	0	9
Myrica gale - - -	0	2
In water - - - -	4	0

He suggests that such of these plants as proved most speedily fatal should be mixed with the manure. He also considers it of great advantage to cause children to follow the plough, and pick up all that happen to be turned up. He states that, in this way, he has seen 351 wire-worms collected in a field not exceeding 600 feet by 56.

Sir Joseph Banks suggested a very simple plan for alluring the wire-worms from the plants, and collecting them that they might be destroyed. This consisted merely in burying slices of potato, stuck upon skewers, near the seeds sown. As the larvæ are very fond of this root, they leave the young plants, and fix upon it. These slices require to be examined every day, and the wire-worms collected upon them destroyed. Mr. Tallant affirms, that he has frequently freed fields entirely from wire-worms by sowing a crop of white mustard-seed. The experiment he has tried so frequently, and in circumstances so well calculated to demonstrate its effects, that he is perfectly satisfied that the remedy is efficient. "Encouraged," he observes, "by the results of my former trials, I sowed a whole field of forty-two acres, which had never repaid me for nineteen years, in consequence of nearly every crop being destroyed by the wire-worm; and I am warranted in stating, that not a single wire-worm could be found the following year; and the crop of wheat throughout, which was reaped last harvest, was superior to any I had grown for twenty-one years. I am, therefore, under a strong persuasion that the wire-worm may be successfully repelled and eradicated by carefully destroying all weeds and roots, drilling white mustard seed, and keeping the ground clear by hoeing." (*Brit. Farm. Mag.* 1831.)

Nature herself has taken means to check their superabundant increase by making them the prey of a small ichneumon, which searches out their retreats, and deposits its eggs in their bodies, which are consumed by the parasitical larvæ as soon as hatched. (Mr. Duncan, *Quart. Journ. of Ag.* vol. viii. pp. 96. 348.) See INSECTS.

WISE, HENRY, was, like London, a pupil of Mr. Rose. He survived Mr. London. Wise was the designer of the grounds at Blenheim. They published, in conjunction, the two following translations: —

1. The complete Gardener; or, Directions for cultivating and right ordering of Fruit Gardens and Kitchen Gardens. With the Gardener's Kalender, directing what is to be done every month in the year. By Monsieur de la Quintiney. Now compendiously abridged and made of more use, with very considerable improvements. By George London and Henry Wise. London, 8vo. 1st edit. 1699, 1706, 1710; 1717, 6th edition; 7th edition, 1719, plates. 2. The Retired Gardener. Being a translation from the Sieur Louis Liger. The whole revised, with several alterations and additions which render it proper for our English culture. By George London and Henry Wise. 2 vols. 1706, 8vo. (*G. W. Johnson's Hist. Eng. Gard.*)

WISP. A term applied to a small bunch of hay or straw, when used in rubbing down horses or cattle.

WITHY. A name sometimes given to the flexible boughs of willows and osiers.

WOAD, DYER'S (*Isatis tinctoria*). This is a biennial plant, growing wild in cultivated fields and about borders, but rare. As the ancient Britons are reported to have painted their bodies with the blue colour obtained from this plant, which is still used in dyeing, the woad is most probably an original production of our island; though what occurs now and then about cultivated fields is supposed to have escaped from the crops occasionally raised chiefly in the middle part of England. The naturalized plants are less perfectly smooth, and far less luxuriant than the cultivated ones. This plant has a tapering root. The stem is about two feet high, wand-like, slightly glaucous, leafy, panicled at the top. Radical leaves copiously crenate; those of the stem sessile, arrow-shaped, entire. Panicle of many compound racemose branches, beset with diminished lanceolate leaves, all of a yellow hue as well as the stalks. Flowers numerous, small, bright yellow. Pouches on capillary stalks, pendulous, wedge-shaped, obtuse, quite smooth, blackish, a little shining, finally bursting in the middle, where the seed is lodged. (*Smith's Eng. Flor.* vol. iii. p. 182.)

WOLF'SBANE. (*Aconitum.*) A genus of ornamental, tall, free-flowering, very hardy plants, succeeding well under the shade of trees; increased by division or by seeds. All the species are to be dreaded, being of a poisonous quality, highly narcotic, and acid. The aconite has, however, become of great service as a narcotic, in many very troublesome disorders. One species, the common wolf'sbane, or monk's-hood (*A. Napellus*), is a native of Greece, but now grows wild in this country in watery places. It is perennial in habit. Root fleshy, tapering; stem erect, simple, leafy, clothed with minute close hairs, and terminating in a solitary, simple, upright, spikelike panicle of large, dark-blue, helmeted flowers, without scent. The nectaries are full of honey, and form the spur of the flower. Leaves deeply five-cleft, cut, with linear segments, furrowed above, and of a deep green, but pale beneath. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iii. p. 31.) See Aconite.

WOOD. The fibrous or ligneous substance of which the branches, trunks, and roots of trees are principally composed. In vascular trunks, the hardest wood is always in the centre. See Lignin, Liber, Timber, Trees, Bark, &c.

WOODBINE. See Honeysuckle.

WOODCHAT SHRIKE. See Shrike.

WOODCOCK. (*Scolopax rusticola*). A well-known bird of passage, which arrives in England early in October, and departs again northwards in March. The woodcock is a nocturnal bird, seeking its repose by day, remaining quietly hid in the dry grassy bottoms of brakes and woods, seldom or ever moving unless disturbed. These birds feed principally upon earthworms and insects, which their long bills enable them to extract from soft grounds and moist woods. The colour of the plumage is a mixture principally of three shades of brown; namely, pale wood-brown, chesnut-brown, and dark umber brown. The whole length of the bird is about fourteen inches and a half, of which the beak is three. Woodcocks have occasionally been shot as heavy as twenty ounces, but twelve ounces is about the average weight. As an article of food, the woodcock affords to the epicure one of the most delicious dishes; its flavour is considered superior to that of the partridge. (*Yarrell's Brit. Birds*, vol. ii. p. 583.)

WOOD LARK. See Lark.

WOODPECKER. (*Picus.*) The general habits of the woodpeckers are well known. Of this genus of birds, there are four, which are occasionally met with in Great Britain.

1. The great black woodpecker (*P. martius*). Of this species several specimens have been killed in some of the counties of England. The plumage of the whole body of the bird is uniform black. The feathers on the head are tipped with rich blood-red. It is the largest of the British species, measuring sixteen inches in length.

2. The green woodpecker (*P. viridis*) is the most common, and accordingly the best known, among British woodpeckers, and is found over a great portion of, if not all, the wooded districts of England and Scotland. It is generally seen either climbing the bark of trees in search of its insect food, or passing by a short, somewhat laboured and undulating flight, from one tree to another. Insects of various sorts, ants, and their eggs, form the principal food of this woodpecker; it is said also to be a great enemy to bees. The green woodpecker is known under various names in different localities. It is termed in many places the rain-bird. (See Weather.) It also bears the names of hew-hole, yaffil, whittle, woodwale, witmale, &c., in other localities. The plumage of the back, wings, &c. is dark green, tinged with yellow; rump and upper tail-coverts, sulphur yellow. The crown of the head is bright scarlet. The whole length of the bird is about thirteen inches.

3. The great spotted woodpecker (*P. major*) is, next to the green woodpecker, the best known in this country, and is by no means uncommon, particularly in the wooded districts of our midland counties, where it inhabits forests, woods, parks, and gardens. Like its generic companion, the woodpecker, this species has several names. In some counties it is called the whitwall, in others the French-pie or wood-pie. Their food is insects of all sorts, and probably in all their various stages; and M. Temminck says they will also eat seeds and nuts. The forehead, ear-coverts, and a circle round the eye, are

dull dirty white; irides red; top of the head dark bluish black; occiput bright scarlet; nape of the neck, back, rump, and tail-coverts, black. The throat, neck, breast, and belly, dirty white; vent and under tail-coverts, red. The whole length of an adult bird is nine inches and a half.

4. The lesser spotted or barred woodpecker (*P. minor*), has the character and actions, as well as the colours, of the black and white woodpecker last described; while its small size and retiring habits enable it to escape observation, so that it is generally considered to be much more rare. This species is not uncommon around London and many of the midland counties. The middle of the back is white, barred transversely with black; the wing-coverts and tail are black; chin, throat, and all the under surface of the body, dull white; crown of the head bright scarlet. The whole length of the bird is five inches and three quarters. (*Yarrell's Brit. Birds*, vol. ii. pp. 127—150.)

WOODRUFF. (*Asperula*, a diminutive of *asper*, rough; alluding to the leaves.) Most of the species of this genus are pretty, and remarkable for thriving under the shade of trees in moist soil.

There are two indigenous species.

1. Sweet woodruff (*A. odorata*), which grows in dry mountainous woods. The root is creeping; stems simple, annual, a span high. Leaves, eight, in a whorl, lanceolate, bright green, spreading, about an inch long; panicles generally three together, on longish stalks, forked, of pure white flowers with a short tube. These blow in May, and are fragrant chiefly at night. Fruit rough, with ascending bristles. The herb, while drying, has the scent of new hay, approaching to bitter almonds, or heliotrope, of which it retains a portion some time. This pleasant scent has been used for flavouring wine, perfuming clothes, &c. The edges of the leaves stick to the hands and garments, in a manner almost peculiar to the rough plants of this natural order, caused by the minute hooked bristles to which that roughness is owing. This plant is eaten by cattle, sheep, and goats, and has the property of increasing the milk of animals.

2. Small woodruff, or squinancy-wort (*A. cynanchica*). In this perennial species, the stems are numerous, ascending, from four to six inches high, copiously clothed with linear smooth leaves, four in a whorl; the upper ones very unequal. Flowers white or blush-coloured, in terminal panicled tufts, sometimes very fragrant. Physicians do not, in our days, rely on the practice of old Dalechamp, who recommends this plant, outwardly as well as inwardly, to cure the squinancy, or quinsey. Hence, however, we have retained an obsolete and unmeaning name, for a plant which might easily have had one more expressive. An infusion of this species is astringent, and might be used as a gargle. (*Smith's Eng. Flor*. vol. i. p. 197.)

WOOD-RUSH. (*Luciola*, from the *Gramen Luzulæ*, or glow-worm grass of Bauhin.) These plants are nearly related to *Juncus*, from which they are at once distinguished by their flat leaves. They possess little beauty, and are of the easiest culture. There are seven indigenous species, all of which are described in *Smith's Eng. Flor*. vol. ii. p. 177.

WOODSIA. (Named in honour of Joseph Woods, F.L.S., an excellent practical British botanist, who first illustrated our native species of *Rosa*.) A genus of small ferns, of which two species only have hitherto been discovered:—the oblong Woodsia (*W. ilvensis*), and the rounded-leaved Woodsia (*W. hyperborea*). These ferns grow best in peat and loam mixed, and are increased by division, or by seed. Their roots are fibrous; fronds tufted, erect, stalked, pinnate, pinnatifid, clothed with simple hairs, or narrow pointed scales. (*Smith's Eng. Flor*. vol. iv. p. 322.)

WOOD-SORREL. (*Oxalis*, from *oxys*, acid; the leaves have an acid taste.) Most of the plants of this genus deserve cultivating on account of their very pretty blossoms, which are produced in great abundance. The hardy species should be planted in a shady border, where they will grow and flower very freely. The seeds of the hardy annual species may be sown in the open border in spring. There are two wild native species,—1. The common wood-sorrel (*O. acetosella*), which grows abundantly in groves and shady places. Stalks radical, single-flowered. Leaves ternate, inversely heart-shaped, hairy; root of many scaly joints. Leaflets of a delicate bright green, often purplish at the back, drooping at night, on long, hairy, radical, purplish footstalks. Flowers solitary, drooping, bell-shaped, either white or purplish, always streaked with fine branching purple veins. When ripe, the blackish shining seeds are projected to a distance on the slightest touch or motion, by their elastic tunics, which remain contracted and wrinkled in the capsule. This herb is powerfully and most agreeably acid, making a refreshing and wholesome conserve with fine sugar; its flavour resembling green tea. Few of our wild flowers are more elegant.

2. Yellow procumbent wood-sorrel (*O. corniculata*). This species is annual, growing in shady, rather moist waste ground. The

root is fibrous, and it has become almost a weed in gardens. Stems branched, procumbent. Flower stalks in small umbels of yellow flowers. (*Paxton's Bot. Dict.; Smith's Eng. Flor.* vol. ii. p. 323.) See SORREL.

WOOD-WAXEN. See GREENWEED.

WOOL. (Germ. *wolle;* Dutch, *wol;* Rus. *wolna.*) The soft, hairy, or downy substance which forms the covering of sheep, and is found in smaller proportion on many other animals. It is an article which has continued from the earliest period down to the present day to be of primary importance, having always formed the principal part of the clothing of mankind in most temperate regions. Authors have seemed to imagine that the production of wool was confined to the sheep; practical men, however, know that there is a numerous list of animals, on whom, at some season of the year at least, wool is found.

M. Chevreul, who has long devoted himself to the examination of wool, has proved that wool contains three or four different substances. The following is the results of an examination of 100 parts of a Merino fleece:—

	Parts.
Earthy substances - - -	- 26·06
Fat matters dissolved by washing	- 32·74
Fat matters - - - -	- 9·97
Clean wool - - - -	- 31·23
	100·00

A consideration of the most important properties of wool cannot be better introduced than in the words of one to whom the agriculturist, whatever department of husbandry may chiefly occupy his attention, is much indebted. — "Fine and coarse," says Arthur Young, "are but vague and general descriptions of wool; all fine fleeces have some coarse wool, and all coarse fleeces some fine. I shall endeavour, for the information of my readers, to distinguish the various qualities of wool in the order in which they are esteemed and preferred by the manufacturer. First, fineness with close ground, that is, thick-matted ground. Second, fineness. Third, straight-haired, when broken by drawing. Fourth, elasticity, rising after compression in the hand. Fifth, staple not too long. Sixth, colour. Seventh, what coarse is in it to be very coarse. Eighth, tenacity. Ninth, not much pitch-mark; but this is no other disadvantage than the loss of weight in scouring. The bad or disagreeable properties are, — thin, grounded, toppy, curly-haired, and, if in a sorted state, little that is very fine, a tender staple, no elasticity, many dead white hairs, very yolky. Those who buy wool for combing and other light goods that do not want milling, wish to find length of staple, fineness of hair, whiteness, tenacity, firmness, elasticity, and not too many pitch-marks." (*Annals of Agriculture,* vol. xviii. p. 329.) The fineness of the wool differs greatly on the different parts of the sheep. That running down the side of the neck, and covering the shoulders, the ribs, and the back is the finest; the next covers the superior parts of the legs and the thighs, and extends up to nearly the haunch and the tail, and a still inferior portion runs along the upper part of the neck, the throat, the breast, the belly, and the lower part of the legs. There is considerable variation in this respect in different breeds, and in individuals of the same breed; and although a fleece, taken generally, may be said to be adapted to a particular use, yet a portion of it may be employed in the manufacture of a much more valuable article; and at the same time, a greater quantity will be thrown aside as not sufficiently fine for the originally intended purpose. The influence of temperature on the growth of wool is very considerable. Sheep in a hot climate will yield a comparatively coarse wool, and those in a cold climate will carry a finer, but, at the same time, a closer and a warmer fleece. The natural instinct of the sheep would seem to teach the wool-grower the advantage of attending to the influence of temperature on him. He is evidently impatient of heat. In the open district, and where no shelter is near, he climbs to the highest parts of his walk, that if the rays of the sun must still fall on him, he may nevertheless be cooled by the breeze; but if shelter is near, of whatever kind, every shaded spot is crowded with sheep. Pasture has a very great influence on the fineness of the fleece. The staple of the wool, like every other part of the sheep, must increase in length or in bulk, when the animal has a superabundance of nutriment; and, on the other hand, the secretion which forms the wool must decrease, like every other, when sufficient nourishment is not afforded. Connected with fineness is trueness of staple — as equal a growth as possible over the animal — a freedom from the shaggy portions, here and there, which are occasionally observed in poor and neglected sheep. These portions are always coarse and comparatively worthless, and they indicate an irregular and unhealthy action of the secretion of wool which will probably weaken or render the fibre diseased in other parts. Soundness and elasticity are also very important properties in wool.

If the pile is sound, there are few qualities in wool of so much consequence as softness. Fashion has done much in effecting this. Softness of the pile is evidently connected with the presence and quantity of yolk. There is no doubt that this substance is designed, not only to nourish the hair, but to give it richness and pliability. Bad management, neglect, exposure, starvation, impair the pliability of the woolly fibre, but chiefly so because they arrest the secretion of the yolk, or change its properties. The colour of the fleece is of minor, and yet of no trifling importance. The alteration of the colour was the first recorded improvement of the sheep; and its purity, its perfect whiteness, should never be lost sight of by the sheepmaster of the present day. To a certain extent, the fleece is frequently stained with the colour of the soil on which the animal grows. In some parts of Gloucestershire the wool acquires an orange colour; in Hertfordshire and Warwickshire it is of a brownish red; and in the fens of Lincoln and Cambridge it has a dark blue tint.

In some districts, and particularly in the west of England, the farmer needlessly uses a considerable quantity of ochre or ruddle, either in the composition of his salving mixture, or to gratify a foolish fancy. The tar gives consistence to the oil or butter, and although it is often with considerable difficulty washed away, yet while it remains on the fleece, it gives a permanency to the smearing process; not one plea, however, can be offered in favour of the ruddle. See Salving.

It is not necessary (nor, indeed, would our space permit it) to go into the construction of wool, as seen through the microscope. We shall pass on, therefore, to point out the difference between hair and wool. The fibre of wool is crisped or curled, the curls increasing according to the fineness and felting property of the wool: hair is often disposed to curl, but in an inferior degree. The distinction, therefore, between these substances is more in degree than intent. Wool is decidedly crisped and serrated; hair is sometimes curled, but to an inferior degree, and the irregularities of its edge, in some few cases, assume the form of slight serrations. Wool will felt; hair will only entangle and harle to a limited extent. See Felt and Hair.

The old and apparently simple division of wool was into *long* and *short*, or, according to the purposes to which it was devoted, "combing" and "clothing wool;" but there was considerable difficulty in arranging some fleeces which were of intermediate lengths, and convertible to either purpose. A third subdivision, that of "middle wool," has recently been added. These are again divided into subordinate classes according to the fineness of the fibre. "In sorting wools," says Mr. M'Culloch, "there are frequently eight or ten different species in a single fleece; and if the best wool of one fleece be not equal to the finest sort, it is thrown to a 2d, 3d, or 4th, or to a still lower sort, of an equal degree of fineness with it. The best English short native fleeces, such as the fine Norfolk and Southdown, are generally divided by the woolsorter into the following sorts, all varying in fineness from each other: — viz. 1. Prime; 2. Choice; 3. Super; 4. Head; 5. Downrights; 6. Seconds; 7. Fine Abb; 8. Coarse Abb; 9. Livery; 10. Short coarse, or breech wool. The relative value of each varies, according to the greater demand for coarse, fine, or middle cloths." (*Youatt on Sheep; Bakewell's Observations on Wool; Luccock on Wool; Anderson on Wool.*) See Fleece, Lamb-skins, and Sheep.

Price of Southdown Wool in different Years.

	s.	d.		s.	d.
1784 - -		8½	1810 - -	2	4
1785 - -		9	1815 - -	1	11
1790 - -	1	0½	1820 - -	1	5
1795 - -	1	3	1825 - -	1	4
1800 - -	1	5	1830 - -	0	10
1805 - -	2	3	1833 - -	1	5

An account of Sheep and Lambs' Wool imported into Great Britain in the undermentioned Years. (M'Culloch's Com. Dict)

In 1810 - -	10,914,137 lbs.
1820 - -	9,789,020
1825 - -	43,795,281
1830 - -	32,313,059
1833 - -	38,076,413
1839 - -	57,379,923
1841 - -	56,170,974

An Account of the Quantity of Sheep and Lambs' Wool imported into the United Kingdom in the Year 1841; *specifying the Countries from which it came, the Quantity that paid a Duty of One Penny per Pound, and the Quantity that paid a Duty of One Halfpenny per Pound; of the Quantity of Foreign Wool re-exported during the same Period, and the Countries to which it was sent; and the Quantity remaining warehoused under Bond on the 5th Day of January*, 1842. (Parl. Paper, No. 237. Sess. 1842.)

Quantity of sheep and lambs' wool imported into the United Kingdom: —

	Lbs.
From Russia - - - -	4,131,652
Sweden and Norway -	15,424
Denmark - - -	778,256
Prussia - - - -	165,125
Germany - - -	20,958,775
Carried forward - -	26,049,232

	Lbs.
Brought forward	26,049,232
Holland	121,061
Belgium	300,862
France	14,659
Portugal	679,071
Spain	1,088,200
Gibraltar	25,678
Italy	1,502,254
Malta	124,989
Turkey	447,563
Egypt	70
Morocco	85,250
Cape of Good Hope	1,079,910
St. Helena	990
East India Company's Territories	3,008,664
New South Wales	7,993,060
Van Diemen's Land	3,597,531
Swan River Settlement	48,590
South Australia	759,909
New Zealand	272
British North American Colonies	4,881
British West Indies	5,014
Curaçoa	224
United States of America	58,791
Brazil	318
States of the Rio de la Plata	5,105,637
Chili	923,832
Peru	3,144,462
Foreign Wool	56,170,974
Produce of the Isle of Man	8,667
Total quantity imported	56,179,641

Quantity of foreign sheep and lambs' wool retained for home consumption:—

	Lbs.
Charged with a duty, at 1*d*. per lb.	22,051,796
Ditto - - at ½*d*. per lb.	14,495,002
Ditto - - at 6*d*. per lb., being red wool	4,306
Duty-free, being the produce of British possessions	16,310,916
Total quantity retained for home consumption	52,862,020

Quantity of foreign sheep and lambs' wool re-exported:—

	Lbs.
To Germany	19,484
Holland	67,517
Belgium	1,094,636
France	846,460
Portugal	3,927
United States of America	520,460
Islands of Guernsey, Jersey, and Man	1,971
Total quantity re-exported	2,554,455

	Lbs.
Quantity of foreign sheep and lambs' wool remaining warehoused under bond on 5th January, 1842	6,912,060

An Account of the Quantity of British Sheep and Lambs' Wool, and Woollen Yarn, exported from the United Kingdom in the Year 1841; specifying the Countries to which they were sent. (Parl. Paper.)

Countries to which exported.	Year 1841.	
	Sheep and Lambs' Wool.	Woollen and Worsted Yarn (including Yarn of Wool or Worsted mixed with other Materials).
	Lbs.	Lbs.
Russia	- -	[illegible]
Sweden	- -	[illegible]
Norway	- -	[illegible]
Denmark	- -	[illegible]
Prussia	- -	[illegible]
Germany	2,314	[illegible]
Holland	10,525	[illegible]
Belgium	7,544,196	[illegible]
France	894,704	[illegible]
Portugal, Azores, and Madeira	- -	[illegible]
Spain and the Canaries	- -	[illegible]
Gibraltar	- -	[illegible]
Italy	- -	[illegible]
East Indies and China	- -	[illegible]
Western Coast of Africa	- -	[illegible]
British Colonies in North America	70	[illegible]
British West Indies	- -	[illegible]
Foreign West Indies	[illegible]	[illegible]
United States of America	[illegible]	[illegible]
Chili	- -	[illegible]
Isles of Guernsey, Jersey, Alderney, and Man	[illegible]	[illegible]
Total	[illegible]	[illegible]

Account of the Pieces of Woollen Cloths, Coatings, and Kerseymeres, exported in the Years 1820, 1830, *and* 1840.

Countries to which exported.	1820.	1830.	1840
	Pieces.	Pieces.	Pieces.
Russia	31,824	7,415	[illegible]
Sweden	- -	33	[illegible]
Norway	799	1,376	[illegible]
Denmark	220	248	[illegible]
Prussia	54	14	- -
Germany	91,802	54,502	[illegible]
Netherlands	24,564	21,313	[illegible]
France	15	169	[illegible]
Portugal, Azores, &c.	51,979	[illegible]	[illegible]
Spain, &c.	4,791	3,085	[illegible]
Gibraltar	7,248	[illegible]	[illegible]
Italy	28,967	15,304	[illegible]
Malta	725	736	[illegible]
Ionian Isles	12	134	[illegible]
Turkey and Levant	313	1,782	[illegible]
Guernsey, Jersey, &c.	3,192	3,415	[illegible]
East Indies and China	43,133	[illegible]	[illegible]
Australia	564	1,363	[illegible]
Cape of Good Hope	2,256	[illegible]	[illegible]
Other parts of Africa	133	370	[illegible]
British America	20,513	[illegible]	[illegible]
British West Indies	14,559	[illegible]	[illegible]
Foreign West Indies	5,633	[illegible]	[illegible]
United States of America	76,114	101,294	[illegible]
Brazils	33,913	[illegible]	[illegible]
Mexico	12,063	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]

[illegible]

An Account of the Quantity and declared Value of British Woollen Manufactures exported from the United Kingdom in the Year 1841. (Parl. Paper, No. 23. Sess. 1842.)

Countries to which exported.	Cloths of all Sorts.	Napped Coatings, Duffels, &c.	Kerseymeres.	Baizes of all Sorts.	Stuffs, Woollen or Worsted.	Flannel.	Blankets and Blanketing.	Carpets and Carpeting.	Woollens mixed with Cotton.	Hosiery; viz., Stockings, Woollen or Worsted.	Sundries; consisting of Hosiery, not otherwise described, Rugs, Coverlids, Tapes, and Small Wares.	Declared Value of British Woollen Manufactures exported from the United Kingdom.
	Pieces.	Pieces.	Pieces.	Pieces.	Pieces.	Yards.	Yards.	Yards.	Yards.	Dozen Pairs.	—	£
Russia - -	839	1	367	- -	52,212	2,798	1,451	5,360	90,430	253	332	102,733
Sweden - -	264	- -	50	- -	14,905	594	250	1,736	9,450	14	302	26,620
Norway - -	671	136	157	117	2,650	3,608	416	410	3,383	363	1,055	11,930
Denmark - -	64	101	39	- -	318	565	60	222	1,196	7	105	1,774
Prussia - -	5	- -	9	- -	164	- -	198	366	2,000	- -	- -	663
Germany - -	15,800	5,124	2,663	824	512,493	385,083	86,800	93,776	519,623	1,053	19,733	883,878
Holland - -	1,624	1,585	269	15,662	156,747	127,500	572	62,771	246,049	4,138	8,025	316,769
Belgium - -	562	2,325	421	112	56,272	114,973	3,441	19,167	198,570	3,968	900	110,792
France - -	274	135	50	15	18,299	10,424	1,000	26,259	129,853	22	863	38,043
Portugal, Azores, and Madeira -	10,031	41	349	3,474	44,623	8,943	3,771	3,952	31,955	2,125	1,242	164,251
Spain and the Canaries - -	969	101	214	3,207	25,309	4,313	8,000	16,718	7,727	600	649	60,342
Gibraltar - -	5,758	26	727	58	38,942	28,031	700	8,837	67,082	207	2,557	92,261
Italy - -	2,127	- -	1,429	3	112,739	3,194	7,118	22,997	224,031	2,270	3,917	203,797
Malta - -	1,436	30	25	6	3,173	4,625	5,738	2,487	200	94	274	15,010
Ionian Islands -	98	- -	3	3	522	3,458	200	485	470	24	327	2,234
Kingdom of Greece	- -	- -	24	- -	286	390	- -	35	360	- -	193	752
Turkey - -	238	40	78	- -	10,242	3,034	448	14,620	17,290	125	691	20,913
Syria and Palestine	- -	- -	- -	- -	408	- -	- -	- -	2,000	- -	- -	571
East Indies and China - -	45,068	94	265	122	126,016	164,170	33,130	9,947	62,159	2,090	6,699	532,710
Settlements in Australia - -	4,282	27	892	151	10,521	88,976	227,881	25,672	52,709	4,876	6,028	91,851
New Zealand -	27	- -	22	8	419	3,922	26,834	3,198	1,20[illegible]	196	277	4,767
Cape of Good Hope	2,416	798	856	680	12,400	56,475	27,390	3,370	57,100	1,113	3,214	55,185
Other parts of Africa - -	879	- -	43	221	6,198	10,316	6,452	465	10,796	2,111	3,798	24,447
British Colonies in North America -	22,374	766	2,981	575	106,510	509,864	466,358	186,567	373,200	29,900	28,471	515,344
British West Indies	2,708	13	184	258	14,381	59,527	56,868	2,031	57,969	2,376	8,907	62,919
Foreign West Indies - -	1,823	- -	25	154	12,184	1,667	90,830	6,145	26,457	895	3,201	56,962
United States of America - -	39,670	42	5,866	370	498,246	29,115	925,038	166,820	2325,488	68,554	46,263	1521,980
Brazil - -	17,325	100	2,374	7,326	79,789	17,360	150,382	10,125	142,885	2,342	7,098	329,984
Mexico and the States of South America - -	33,274	- -	1,749	3,750	86,142	98,089	36,365	85,661	353,455	6,193	7,396	468,070
Isles of Guernsey, Jersey, Alderney, and Man - -	2,579	6	- -	64	4,256	79,230	19,638	29,116	- -	- -	1,383	31,121
Total -	213,125	11,491	22,131	37,160	2007,366	1820,244	2187,329	809,315	5015,087	135,909	163,900	5748,673

WOOLLEN RAGS. See RAG.

WORK. See LABOUR.

WORLIDGE, or WOOLRIDGE, JOHN. An early English agricultural writer. But little is known of his history. I find, however, that he was a gentleman and a great lover of rural affairs and gardening. Of his works I am only acquainted with the following:— 1. Systema Agriculturæ; the Mystery of Husbandry discovered and laid open, 1669-77-81, 1687, folio, 1716, 8vo. 2. Treatise on Husbandry, 1675, fol. 3. Systema Horticulturæ; or, the Art of Gardening, 1677. 4. Vinetum Britannicum, 1678-91, 8vo. 5. The most easy Way of making Cyder, 1678. 6. Apiarium, 1691, 12mo.

The *Systema Agriculturæ* was the most bulky folio volume on agriculture that had yet appeared, and its comprehensive themes are all set forth in its first page. The authors of those days seemed to consider it essential that their readers should have, in the title-page of a book, a complete summary of its inviting contents. Woolridge was evidently of this opinion, for his title-page announces that this was the "Systema Agriculturæ, or the Mystery of Husbandry discovered; treating of the several new and most advantageous ways of tilling, planting, sowing, manureing, ordering, improveing, of all sorts of gardens, orchards, meadows, pastures, corn-lands, woods, and coppices; as also of fruits, corn grain, pulse, new hays, cattle, fowl, beasts, bees, silk-worms, and fish, with an account of the several instruments and engines used in the profession; to which is added, Kalendarium Rusticum, or the husbandman's monthly directions; also the prognosticks of dearth, scarcity, plenty, sickness, heat, cold, frost, snow, winds, rain, hail, thunder, &c.; and Dictionarium Rusticum, or the interpretation of rustick terms; the whole work being of great use and advantage to all that delight in that most noble practise." It is dedicated to the gentry and yeomanry of England, and opens with a preface laudatory of agriculture.

Notwithstanding, however, the ill aspect of this heavy title-page, the book contains more useful and more enlightened observations on many points of husbandry, than any which had preceded it. He was a warm friend to the enclosure of commons and other waste land, and he suggested, what in fact he appears (p. 21.) to have carried into effect in 1665, at Wilton, the erection of water-works for the purpose of *flooding* meadows, an improvement of which I think not nearly so much has been made as is possible in this land of steam and steam-engines. He was evidently well acquainted with the management of water-meads, and his directions with relation to them are practical and sensible. He advises that sandy meadows should be chalked, and ashes applied to sour rushy grasses. When speaking "of several new species of hay or grass," he enumerates clover-grass, trefoyle, St. Foyn, La Lucern, Ray-grass, &c. He also recommends the deep ploughing or digging of land, and on all occasions seemed alive to any improvement in the implements of agriculture. After giving an account, at some length, of the rude and clumsy contrivance of Gabriel Platte, for a dibbling-machine, he elaborately and earnestly advocates the use of a drill, an engraving of one of which, primitive enough it is true in his appearance, he gives in his work. "To remove," he says, "all manner of errors or inconveniences that can be found in setting or howing of corn, I shall here give you a plain and perfect description of an easy and feasible instrument that shall disperse your corn, grain, or pulse, of what kind soever, at what distance, and in what proportion you please." The farmer may be curious to know the construction of this drill of a century and a half since. It had a coulter, a pipe, a hopper, wheels, and axletrees. He was the first English author, I believe, who suggested the use of the manure-drill, for, when speaking of the drill, he says (p. 52.), "By the use of this instrument also, you may cover your grain or pulse with any rich compost you shall prepare for that purpose, either with pigeon's dung, dry or granulated, or any other saline or lixivial substance made disperseable, which may drop after the corn, and prove an excellent improvement; for we find experimentally, that pigeon's dung, sown by the hand on wheat or barley, mightily advantageth it by the common way of husbandry; much more might we, therefore, expect this way, where the dung, or such like substance, is all in the same furrow with the corn, where, in the other vulgar way, a great part thereof comes not near it. It may either be done by having another hopper, on the same *frame*, behind that for the corn, wherein the compost may be put, and made to drop successively after the corn, or it may be sown with another instrument to follow the former, which is the better way, and may both disperse the soil, and cover both soil and seed."

Woolridge was evidently an observer who was able and willing to think for himself. He advocated change of seed "from dry, hungry, barren land, to rich and fat land; also from land inclineing to the south, to land inclineing towards the north, and the contrary;" all of which, he well adds (and the reader must remember that Woolridge was writing when chemistry existed only in name), "are manifest signs that there is some particular thing wherein each seed delights, which if we did but understand we might properly apply it, and gain riches and honour to ourselves; but because we are ignorant thereof, and are content so to remain, we must make use of such soils, dungs, composts, and other preparations and ways of advancement of the growth of vegetables as are already discovered and made use of." (p. 57.)

He extols the use of steeps for seed-corn, mentions with approbation for this purpose, nitre, common salt, as well as urine, and gives a recipe for making a kind of liquid manure with sheep-dung (½ bushel), saltpetre (½ pound), and common salt (1 pound), boiled together for ten minutes in water (20 quarts), and this he commends very highly as a steep; and I am inclined to believe that something of this kind of rich liquor, more especially if the seed was afterwards dried by being sprinkled with some of the very fine manure-powders at present proposed, such as the urate of the London Manure Company, the composition of M. Poittevin, the guano, gypsum powder, &c., might be used more profitably by the cultivator than at first sight he may be inclined to believe. He was in favour of paring and burning on some soils, and had the good sense to discern the advantage capable of being derived from the permanent improvement of the soil by the use of earthy manures. He devotes, therefore, a chapter to the soils and manures taken from the earth (p. 65); notices the uses, for this purpose, of chalk, lime, marl, clay, Fuller's earth.

The value of sand as a fertiliser did not escape our author's attention. He notices the value to some soils of that of the calcareous shores of Cornwall, and of the Suffolk craig formation, and of that which he advises the farmer to lay under his farm-yards and sheep-pens.

The excrements of fowls were strongly recommended by Woolridge as a fertilizer. He describes those of pigeons and hens as "incomparable, — one load is worth ten loads of other dung;" commends the use of "all marrow-bones, fish-bones, horn, or horn-shavings;" but he fell into the error with regard to those which it required a century and a quarter to remove, viz. he fancied that all the enriching qualities of the bones were to be attributed to the grease they contained, instead of to their phosphate of lime. He advocated the mixture of peat, saw-dust, and tanners' refuse bark with dung-heaps, — a plan which is even now not nearly so extensively adopted as its merits deserve. Indeed, as honest John Woolridge concludes his section (p. 85), "The well-preparing of *dung-mixt* is a piece of husbandry not to be slighted, on which point of good or ill husbandry depends the rise and fall of the rents or values of many farms in this kingdom."

Every account of live-stock given by the earlier agricultural writers betrays the total want of attention then paid by the farmers to the breeding of stock, or if they do mention the points to be commended in an ox or a sheep, they are precisely those which a modern breeder endeavours to avoid. For instance, the chronicler Hollingshed commends the English cows for their largeness of bone, and even Woolridge, writing centuries after him, although very elaborate on most points of husbandry, treats of the farmer's live-stock in a manner that clearly indicates that in those days, to use a Norfolk phrase, "a cow was a cow, and a sheep a sheep." Thus *all* the instruction he gives the breeder with regard to the selection of a cow is, that "the best sort is the large Dutch cow that brings two calves at one birth, and gives ordinarily two gallons of milk at one meal." His account of sheep I will also give, without abridgment, for its facts will sound still more novel to a modern farmer: — "There are divers sorts, some bearing much finer wool than others: as the *Herefordshire* sheep about Lemster bear the fairest fleeces of any in England. Also they are of several kinds as to their proportion: some are very small, others larger. But the Dutch sheep are the largest of all, being much bigger than any I have seen in England, and yearly bear two or three lambs at a time. It is also reported that they sometimes bear lambs twice in the year." This seemed to convince Woolridge, and very naturally too, of their value, for he adds, "It may doubtless be of very good advantage to obtain of those kinds and also of Spanish sheep that bear such fine fleeces."

The scientific modern breeder, when he smiles at this negligence and folly of a bygone race of farmers, must remember, however, the difficulties under which they laboured, not only from lack of knowledge, but also of the means to improve at a reasonable rate their ill-shaped, large-boned, and slow-feeding race of oxen. He should recollect that they had not had the advantage of a Bakewell, a Culley, or a Collings, to labour during a lengthened period for their improvement,—the days of the Smithfield Club, and of the Highland Society, were yet far distant. They had not even a suspicion of what improved breeding would effect; and if they were ignorant, as they evidently were, that their breeds were inferior, we can hardly wonder that they were content to labour on, since the very first step to improvement, a belief in greater excellence being possible, was wanting.

The opinions, however, of Woolridge with regard to plantations of timber-trees were evidently more enlightened; for although he lived a century before the days of our modern extensive planters — of such men as the Lords Athol, Devonshire, and Fife, and of Sir Henry Steuart—yet he earnestly advised the planting of the poorer soils of our island; he asked the landowners of his time, after describing to them the profit they might derive from such foresighted enterprise, "What can be more pleasant than to have the bounds and limits of your own property preserved, and continued from age to age by the testimony of such growing and living witnesses, in the spring yielding a reviving cordial to your winter-chilled spirit, giving you an assurance of the approaching summer by their pregnant buds and musical inhabitants? In the summer, what more delectable than the curious prospect of the variety of greenness, dark shades, and retirement from the scorching sunbeams?" He well knew, too, what some of my northern friends are only now proving to be practically the case, that "woods also finely refrigerate the air in the summer's parching heats, and qualify the dry and injurious winds, both in winter, spring, and autumn." He devotes a long chapter to the profits and pleasures of fruit-trees, and ridicules very quaintly the objection too commonly made to such plantations, viz. "that their fruit would be stolen." "When," he says, "they become more common, they will be little regarded by these filchers, or if they do borrow a few sometimes in their pockets, or to make a few apple-pies withal, yet that is a poor discouragement to an ingenious spirit, and much like that rustick humour of one that would not improve a very good piece of ground for that purpose with fruit-trees, because the parson would have the decimation of it, and so denied himself the nine parts, because the parson should not have the remainder."

Of the ploughs employed 150 years since, he mentions the double-wheeled or Hertfordshire plough, the turnwrest or Kentish plough, "which surpasseth for weight and clumsiness" the one-wheeled plough, the plain plough, and the trenching plough.

Woolridge gives also sundry directions for angling, fowling, bird-catching, horse-breeding, and sundry other rural affairs, and finally he winds up with a Kalendarium Rusticum. In these he gives various monthly directions, of which one specimen will suffice, of the mode of farming then commonly adopted. In May he directs the farmer "to kill ivy, to feed down or mow rank corn; to sow barley, buckwheat, pease, hemp, and flax, clover grass, St. Foyn, and other French grasses; to pare and burn land, and wean lambs." He every month, as if in rivalry of the almanack-makers of former generations, treated the farmer to some poetry, often of a most absurd description; thus in the month of March, after having told them that "this month ushers in the most welcome season of the year," and that "now gentle Zephyrus fans the sweet buds, and the cœlestial drops water fair Flora's garden," he could not help adding same of his own poetry, telling them what must have been indeed novel information, that now

"The lofty mountains standing on a row,
Which but of late were perriwigg'd with snow,
Doff their old coats, and now are daily seen
To stand on tiptoes all in swaggering green;
Meadows and gardens are pranckt up with buds,
And chirping birds now chant it in the woods."

Woolridge laboured hard, however, in spite of occasional absurdities of expression, to elevate the science of agriculture; and that it was deemed a science in the seventeenth century, is evident in this opening address to the farmer, when he says, "Agriculture hath been (not undeservedly) esteemed a science that principally teaches us the nature and divers properties and qualities, as well of the several soils, earths, and places, as of the several productions or creatures, whether vegetable, animal, or mineral, that naturally proceed or are artificially produced from, or maintained by, the earth." This he promises the husbandman he will do "after a plain and familiar method." He soon, however, begins to illustrate his "plain and familiar method," by talking of the "secret, mystical, and mechanick indagations of nature, the universal spirit, or spirit of mercury and of salt;" and gives us but a mean opinion of his natural philosophy, by gravely telling us that "soon will horse hairs receive life lying in rain-water but a few days in the heat of the sun in spring time."

But in spite of these occasional mistakes, the book of Woolridge was perhaps the most practical, and therefore the most useful, book which had yet appeared treating of agriculture and rural affairs. The very publication of such an expensive folio, of 326 pages, betrays the increasing thirst for knowledge of the cultivators of those days, and the same remarks apply generally to those of Platte and of Hartlib; in truth, both agriculture and agricultural writers could hardly fail to keep pace with the rapid increase to the general stock of knowledge which the age in which they flourished received to so remarkable an extent; and this improvement was not, as my brother Mr. George Johnson remarks (*Hist. of Gard.*), in only one branch of knowledge, but in the whole circle of the arts and sciences. The reformation was not confined to religion. By delivering the human mind from servile thraldom, and teaching man, instead of bowing blindly to custom, merely on account of its antiquity, to have a self-dependence, it gave an impulse to improvement which no tyrant opposition of either bigotry, indolence, or self-sufficiency could check. Such men as Bacon, Peiresc, and Evelyn arose, and whilst the first traced the path which men of science should tread, the two latter lent their talents and their wealth to sustain them in the pursuit. Bacon, it has been truly observed, was the first who taught men that they were but the servants and interpreters of nature, capable of discovering truth in no other way than by observing and imitating her operations; that facts must be collected instead of speculations formed, and that the materials for the foundations of true systems of knowledge were to be discovered, not in the books of the ancients, not in metaphysical theories, not in the fancies of men, but by careful, and laborious and patient experiments and observations in the external world. Peiresc was a munificent man of letters; his advice, his purse were open to the votaries of every art and every science; his library was stored with the literature of every age and nation, his garden with the rarest and most useful exotics, and these last he delighted to spread over the country. When, indeed, we cast our eyes over a list of the men of science and literature of all kinds that adorned this age, especially in chemistry and in botany, the two sciences perhaps of all others the most important to agriculture, we need not be surprised to find how rapidly it was rising from being a mere art of empiricism; and when we note how rapidly the thirst for foreign research was prevalent, we can easily perceive how improved modes of culture and new plants were acquired to agriculture. Cavendish, but especially Raleigh, by their visits for lucre as well as fame to the Spanish settlements of America in 1580–8, led the way in a path which Lancaster and Raymond followed in 1791, and laid the foundation of that anomalous copartnership of commercial monarchs, the East India Company. Annual fleets now returned from the east and west laden with the curiosities of both the animal and vegetable kingdoms; of these the potato, tobacco, and tea need alone be instanced; and although the views of men were not yet liberal enough to prompt them to voyages of discovery, with an unmixed desire of extending the field of science, or an enlarged wish to benefit mankind, yet new plants, in common with other hitherto strange natural products, attracted their attention, and, though at first imported as novelties, soon became by degrees to be desired and sought for as the luxuries and necessaries of life. (*Quart. Jour. Agr.* vol. xii. p. 460.)

WORM. See Earth-worm, Wire-worm, &c.

WORMS, INTESTINAL. A troublesome sort of vermin found in the intestines of horses and other animals. There is, perhaps, nothing so destructive to the health and appearance of the horse as worms. When they have obtained a settlement in the intestines, neither the labour of the groom nor the liberality of the master will prove of any avail towards improving the animal's condition: for as fast as the chyle is formed from the aliment, which ought to be converted into blood, these numerous guests first satiate their craving appetites, and leave but a scanty supply for the exhausted system of the horse, so that a double allowance of corn would not preserve a healthy state; because the digestive organs cannot exert an extraordinary power for any length of time, without producing such a state of debility as to render them incapable of performing afterwards their proper office.

In these animals, the most common kinds are the following: — 1. bots, which many young horses are subject to in the spring; 2. those that resemble earth worms, and which, by physicians, are called *lumbrici*; 3. those that are about the size of the largest sewing needles, with flat heads called ascarides; 4. that species of worm called *tænia*, or tapeworm. See Bots, Fluke-worm, &c.

WORMWOOD. (*Artemisia*, so named in honour of Artemisia, wife of King Mausolus, or of Diana Αρτεμις.) There are four perennial rooted bitter aromatic herbs included under this name, and cultivated solely for medicinal purposes: — Common wormwood (*Artemisia Absinthium*) is a native of almost every part of Europe, and in this country is found by road-sides on heaps of rubbish, &c. It is an erect under shrub, with hoary tri-pinnatisert leaves. The flowers in small, globose, nodding, racemose panicles. The same remarks apply to the drooping sea-wormwood (*A. maritima*), which is found on salt marshes and the sea coast. Roman wormwood (*A. pontica*) is a native of Italy; and Santonicum or Tartarian wormwood (*A. Santonica*), which is a mere variety of *A. maritima* of Persia and Siberia. The soil best suited to the growth of these plants is one that is dry, light, and poor, otherwise they become luxuriant, and are defective in their medicinal qualities, as well as in their power to withstand the rigour of the winter. Any situation will suit the common and the sea-wormwoods that is open and unconfined; but the exotic species require to be sheltered from the severe aspects. In a severe winter, the Tartarian can only be preserved under a frame. The sea-wormwood seldom flourishes from the want of a genial soil; the application of salt would undoubtedly be beneficial.

They are all propagated by seed, as well as slips and cuttings, the first of which may be sown in March or April, and the latter planted during June, July, and beginning of August. The seed is sown thinly broadcast, and when the plants arrive at a height of two or three inches, are weeded and thinned to six inches asunder; and those taken away pricked out at a similar distance, water being given if the weather is at all dry. The slips and cuttings are planted in a shady border, about eight inches apart, and water given regularly every evening until they have taken root. They are all to be transplanted finally early in the following spring, by whichever mode they are raised, setting the plants at last 18 inches apart. (*G. W. Johnson's Kitchen Garden.*) See Mugwort and Southernwood.

WOUND. A recent and violent separation of continuity in a soft external part of the body, being attended with an effusion of blood. See Cut, Poultice, Fomentation, &c.

WOUNDWORT. (*Stachys*, from *stachys*, a spike, alluding to the mode of flowering.) A genus of rather weedy-looking plants, hardly worth cultivating for ornament. They all succeed in common garden soil. The perennial kinds are easily increased by dividing the roots in spring or autumn. The seeds of the annual kinds should be sown in spring, in the open border. As a vulnerary these plants have no power. There are five indigenous species; the hedge woundwort (*S. sylvatica*); the ambiguous woundwort (*S. ambigua*); the marsh woundwort (*S. palustris;* see All-heal); the downy woundwort (*S. germanica*); and the corn woundwort (*S. arvensis*). The marsh woundwort has a fleshy root, creeping extensively; throwing out in autumn a number of tuberous shoots, which render it, in low wet ground, very difficult of extirpation. This, therefore, should be attempted in summer before these knobs are produced, when the flowers are appearing. (*Smith's Eng. Flor.* vol. iii. p. 98.)

WREN. (*Troglodytes vulgaris.*) A very diminutive well-known bird, inhabiting all parts of Europe, where it maintains itself during the severest winters. The whole length of the bird is rather less than four inches. The plumage is of a deep brown colour. Wrens construct their nests in the corners of out-houses, stacks of wood, or holes in the wall, being nearly of an oval shape, and composed chiefly of moss, lined with feathers. The female usually lays from seven to ten minute white eggs, marked with a few red spots; the eggs measure seven lines and a half in length, by six lines in breadth. The wren produces two broods in the season. These little birds feed on small worms and insects. (*Yarrell's Brit. Birds*, vol. ii. p. 162.)

WRYNECK. (*Yunx torquilla.*) This common bird is a well-known visiter to this country, arriving in the first or second week of April, and departing by the end of August, or early in September. It frequents small copses, plantations, orchards, and fields enclosed with tall hedges. This bird is called a wryneck from the habit it exhibits of moving its head and neck in various directions, sometimes describing parts of circles, at others from side to side with an undulating motion, not unlike the actions of a snake; and in some of the counties of England this bird is called the snake-bird, from this circumstance. These birds feed on caterpillars and various other insects, and are often seen on the ground near ant-hills, consuming, as food, large quantities of the ants and their eggs. The wryneck makes little or no nest, but deposits its eggs on the fragments of decayed wood within the hole of a tree. The eggs are from six to ten in number, white, smooth, and shining, nine lines and a half long, by seven lines in breadth. The whole length of the bird is seven inches. The plumage is beautifully marked and shaded with brown and grey. (*Yarrell's Brit. Birds*, vol. ii. p. 152.)

Y.

YARD DUNG. See Farm-Yard Manure.

YARD OF LAND. A quantity of land which in some counties signifies fifteen acres, in some twenty, and in others twenty-four, thirty, and thirty-four acres.

YARROW. (*Achillea.*) A genus of showy, free-flowering plants, succeeding well in any common soil, and readily increased by dividing the roots. The species are possessed of aromatic, bitter, tonic, and stimulating qualities. The following are indigenous perennials: —

1. Sneezewort yarrow, or goose-tongue (*A. ptarmica*), which grows in wet hedges, or about the banks of rivers, flowering in July and August. The root creeps widely, and is difficult of extirpation where the soil is moist. Stems upright, about two feet high; corymbose at the top. Leaves sessile, linear, pointed, equally and sharply serrated, and of a glaucous green. Flowers numerous, small, milk-white in the disk as well as in the radius, with an irregular number of ligulate florets. The whole plant has a pungent flavour, provoking a flow of saliva, and this flavour renders it acceptable, as Schreber asserts, to sheep, who delight especially in saltish food. The sneezing caused by the dried and powdered leaves is rather owing to their little sharp marginal prickles. Its name is derived from this property of causing sneezing.

2. Serrated yarrow (*A. serrata*). This is a much less common species, in which the root is fibrous, leaves linear, lanceolate, downy, deeply serrated. Flowers of a yellowish white or buff colour, not half the size of the foregoing. The whole herb has a powerful aromatic scent and bitter flavour, somewhat like tansy.

3. Common yarrow or milfoil (*A. millefolium*). This species grows abundantly in our meadows and pastures. The root is

creeping, with smooth, reddish, subterraneous shoots, which are warm and agreeably pungent, partaking of the flavour and salivating quality of the pellitory of Spain (*Anthemis pyrethum*). Stems furrowed, erect, about a foot high. Leaves doubly pinnatifid, hairy; segments linear, toothed, pointed. Flowers numerous, white, occasionally reddish or purple. The whole herb is astringent, and weakly aromatic. Although considered a bad weed in pasture and arable lands, in consequence of its creeping root, Dr. Anderson and others have recommended it for cultivation; but its productive and nutrient properties are very inferior to many other plants equally adapted to light soils; 64 drachms of the leaves and stems, cut when in flower, afforded 98 grains of nutritive matter. Linnæus says that its properties are vulnerary and styptic. An essential oil is extracted from the flowers; and an ointment made of the leaves is reckoned good against the scab in sheep. *A. moschata*, an exotic species, a native of Italy, is sudorific and acrid, and makes a wholesome food for cattle.

4. Woolly yellow milfoil, or yarrow (*A. tomentosa*). This species grows about dry hilly pastures in Scotland and Ireland. The root is woody, slightly creeping, with many long fibres. Stems scarcely a foot high, curved at the base, then erect. Leaves doubly pinnatifid, woolly, segments linear, crowded, acute. Flowers densely corymbose, on woolly stalks, of a bright golden yellow. The whole herb, as well as the flowers, has an aromatic scent when rubbed. It serves to decorate rock-work in gardens, but will not bear wet or shade. (*Smith's Eng. Flor.* vol. iii. p. 460.; *Sinclair's Hort. Gram.* p. 412.)

YEARLINGS. A term applied to calves, colts, and other young stock, when they have completed their first year.

YEAST. The froth or scum which rises on beer during the act of fermentation. (See Brewing and Fermentation.) It contains a variety of components; among others, carbon, acetic and malic acids, alcohol, potassa, lime, a saccharine mucilaginous extract, gluten, and water.

Yeast is an article of the greatest importance in domestic economy, forming a necessary ingredient in the manufacture of bread, which would otherwise become heavy and unwholesome. When put in contact with saccharine matters, at a temperature between 50° and 60°, it causes fermentation, and changes the sugar into alcohol and carbonic acid. Yeast may be dried and yet retain its properties, but a temperature of 212° destroys it.

The yeast prepared by the Hungarians will keep for a whole twelvemonth. During the summer season they boil a quantity of wheaten bran and hops in water; the decoction is not long in fermenting, and when this has taken place they throw in a sufficient portion of bran to form the whole into a thick paste, which they work into balls, that are afterwards dried by a slow heat. When wanted for use they are broken, and boiling water is poured upon them; having stood a proper time, the fluid is decanted, and in a fit state for leavening bread. See Bread.

YELLOW-HAMMER. (*Emberiza citrinella.*) A well known diminutive bird, which inhabits Britain and other parts of Europe. The crown of the head and belly are of a pale yellow or straw-colour; the hinder part of the neck is tinged with green, and the breast is of an orange red. These birds frequent meadows, where they construct their large flat nests of dried moss, roots, and horse-hair. The female lays six white eggs, streaked with purple veins. The yellow-hammer is of considerable service to the husbandman, by devouring innumerable insects during the summer.

YELLOW-WEED. See Weld.

YELLOW-WORT. (*Chlora*, from *chloros*, green. The flowers of *C. perfoliata* are a perfect green when dried, but yellow when fresh; hence the common and generic names.) This is a pretty genus, and the species well worth cultivating as hardy annuals; they only require to be sown in the open borders as soon as the seeds are ripe.

The perfoliate yellow-wort is indigenous, growing on chalky hills or clay soils. The stems are a foot and a half high, terminating in an upright, leafy, repeatedly forked panicle of many elegant bright yellow flowers, open in sunshine only: they are without scent. Leaves ovate, acute, combined and perfoliate. The whole herb is very glaucous, subject to mildew. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. ii. p. 218.)

YEOMAN. A term applied to the first or highest degree of cultivators in this country. The yeomen are properly freeholders, and such as cultivate their own lands. This term has been derived from various words by different authors. Dr. Johnson seems to incline to the word *geman*, Frisick, a villager; Fortescue derives it from *gemen*, or *yemen*, Saxon for a commoner. Sir Thomas Smith's definition of a yeoman is, "a free-born Englishman who may lay out of his own free lands in yearly revenue to the sum of 40*s*.

YEW TREE. (*Taxus.*) A genus of ornamental evergreen trees, well adapted for underwood, as they thrive under the shade and drip of other trees; they are also very ornamental when planted to form hedges. They will grow in any moist soil, but succeed best in loams and clays. They are chiefly propagated from seeds, which should be sown as soon as ripe; but can also be increased by cuttings formed of either one or two years' wood, and planted in a shady border in the beginning of April or end of August. The common yew tree (*T. baccata*) is the only indigenous species. The trunk is straight, with a smooth deciduous bark. Leaves two-ranked, crowded, linear, flat, about an inch long, dark green. Fruit drooping, consisting of a sweet, internally glutinous, scarlet berry. The leaves are fetid and very poisonous, and prove speedily fatal to cattle accidentally tasting them when young and tender. The berries have a sweet mawkish taste, and may be eaten without danger. The wood of the yew tree, being of extremely slow growth, is hard and tough, formerly highly valuable for making bows, but now chiefly used for fine cabinet-work or inlaying. It makes handsomer chairs than many exotic woods. (*Paxton's Bot. Dict.*; *Smith's Eng. Flor.* vol. iv. p. 253.)

YOKE. A frame of wood fixed with bows over the necks of oxen, whereby they are coupled together, and harnessed to the plough. It is sometimes written "yoak," and is composed — 1. of a thick piece of wood that passes over the neck, and is strictly called the "yoke;" 2. of a bow, which encompasses the neck; and 3. of the "wreathings," or "stitchings," that serve to connect the whole. Besides these parts, there are employed a ring, denominated the "yoke-ring," and a chain for securing the traces.

YOKE *of land*. The quantity of land which a yoke of oxen can plough in a day. Hence, in some parts of Kent, a little farm, from its only requiring a yoke of oxen to till it, is called a "yokelet."

YOLK. See EGG, and WOOL.

YOUNG, ARTHUR. A celebrated agricultural writer and farmer; perhaps the most popular author on rural affairs that this or any other country has produced. His characteristics were great zeal, enterprise, and energy, with a copious flow of plain and intelligible language, which the meanest capacity could readily comprehend; and although he possessed few claims to be ranked as a scientific farmer, yet he succeeded by his labours in exciting a general love of agriculture in the upper classes of his countrymen, which has, since his day, never materially subsided. And this feeling, although attended, through a want of practical information, with considerable individual loss, has yet produced great public advantages. It has been remarked, indeed, of the writings of Arthur Young, that they produced more private losses and more public benefit than those of any other author. A memoir of this extraordinary man was published soon after his death by Dr. Paris, his friend and medical attendant, from which most of the facts of this article are, in the words of their author, taken. (*Brande's Journ. of Science*, vol. ix. p. 273.)

His services to agriculture were important, and they would have been still more valuable if he had confined himself to the improvement of the science of agriculture, and avoided all those many political and party themes of which he was ever too ready to be the champion. This morbid feeling he carried with him to the Board of Agriculture; and, in consequence, both Arthur Young and the board of which he was long the chief spirit, experienced the same fate, — they obtained the support of only a section of the farmers of England, and they much too often laid themselves open to the charge of being more intent upon the advancement of the interests of their party than of those of practical agriculture. Thus the very first sentence of the first volume of the *Annals of Agriculture*, published in 1790, is as follows:— "The parties of one country and the debility of another having at last extinguished the torch of discord;" and the entire essay comprehends hardly anything else than a political survey of the state of the kingdom, and its possessions, fisheries, &c. It speaks with much zeal of the French Revolution, union with Ireland, customs, exports, tonnage, produce of the taxes, population, national debt, West Indian plantations of Great Britain; indulges in all kinds of visions; gives a statement of what the editor would do if he were made a king, &c., &c.; and hardly a page is reserved for practical agriculture, of which his work was to be "the annals."

Arthur Young was the descendant of a respectable family, who had resided on their estate at Bradfield Combust, near Bury St. Edmund's, in the county of Suffolk, for more than two centuries; he was born in London, on the 7th of September, 1741. His father, the Reverend Arthur Young, rector of Bradfield, had three children; John, a daughter Elizabeth; the third was Arthur, subject of the present memoir, who was educated at Lavenham, a school about six miles from Bradfield Hall.

Arthur Young was brought up for mercantile pursuits, in a merchant's counting-house at Lynn, where, at the age of seventeen, he commenced his literary career by writing a political pamphlet, entitled *The Theatre of the present War in North America;* and then four novels—*The Fair American, Sir Charles Beaufort, Lucy Watson,* and *Julia Benson, or the Innocent Sufferer.* In 1763 he returned from the residence of his uncle in London to his mother at Bradfield Hall, without any prospect of a pursuit, profession, or employment. His whole income, during the life of his mother, arising from a copyhold farm of twenty acres, and producing only as many pounds, she was anxious that he should reside with her; and, as the lease of her farm of eighty acres would shortly expire, she urged him to undertake its cultivation, a scheme so much in unison with his taste and wishes, that he did not long hesitate in accepting her proposal, and he embarked as a farmer. Young, eager, and totally ignorant, as he then was, of every necessary detail, it is not surprising, as he used to say, that he should have squandered large sums, under golden dreams of improvements, especially as he had a thirst for experiment, without a knowledge of what is demanded for its success. In this year (1765), he married Miss Martha Allen of Lynn, and in the year 1767 undertook the management of the farm of Samford Hall, in Essex, which consisted of about 300 acres of land. Various unforeseen circumstances, and embarrassments from the want of capital, soon induced him to give a hundred pounds to a farmer for taking the estate off his hands; and this farmer, by the advantages of capital, realised a fortune upon it. It was here, uniting the plough and the pen, that he wrote his work entitled, *Political Essays on the Present State of the British Empire*, but which was not published until 1772, in one volume, quarto. He now advertised for another farm, and the knowledge which resulted from viewing the different estates that were on this occasion presented to his notice, furnished him with the materials for his tour, which he called *The Six Weeks' Tour through the Southern Counties.* By the advice of his Suffolk bailiff, he hired a farm of 100 acres in Hertfordshire; and, from viewing it in an uncommonly favourable season, they were both deceived in the nature of the soil. "I know not," said Young, "what epithet to give this soil, sterility falls short of the idea; a hungry vitriolic gravel—I occupied, for nine years, the jaws of a wolf. A nabob's fortune would sink in the attempt to raise good arable crops, upon any extent, in such a country: my experience and knowledge had increased from travelling and from practice; but all was lost when exerted upon such a spot. I hardly wonder at a losing account, after fate had fixed me upon land calculated to swallow, without return, all that folly or imprudence could bestow upon it." It will be here naturally asked, why he did not go to land decisively good? He answers the question very satisfactorily. "It was on account of the houses; for although I saw numerous farms that would have suited well, they had wretched hovels on them."

Finding, about the year 1783, that his income was barely sufficient to meet his expenditure, he engaged to report the parliamentary debates for the *Morning Post:* this he continued to perform for several years; and after the labours of the week, he walked every Saturday evening to his farm, a distance of seventeen miles from London, from which he as regularly returned every Monday morning. This was the most anxious and laborious part of his life: "I worked," says he, "more like a coalheaver, though without his reward, than a man acting only from a predominant impulse." In 1774, he published *Political Arithmetic*, a work which met with high consideration abroad, and was immediately translated into several languages. Mr. Young has left a memorandum, which states, that he received for his different writings, in the interval between the years 1766 and 1775, the sum of three thousand pounds.

In 1784, he commenced the publication of his *Annals of Agriculture*, in which he appeared in the double capacity of editor and author, a work which he continued to the period of his blindness: it extends to forty-five volumes, octavo, and presents a vast store of information upon subjects of agriculture and political economy. The plan upon which it was conducted was one which ought to have ensured for it more extensive and profitable pratronage, for, instead of recording anonymous correspondence, it refused admittance to any paper that had not the name and address of its author; it can accordingly boast of communications from the most exalted and enlightened characters in Europe, at the head of whom stands our late most gracious sovereign, who transmitted to Mr. Young for publication an account of the farm of Mr. Ducket, the able cultivator of Petersham, which is recorded in the seventh volume of the annals, under the signature of "Ralph Robinson." During the progress of this work he travelled (and he published a popular description of his travels) over most parts of England, into Ireland, and in France.

In 1793, animated as he always was by the spirit of adventure, he could not resist an opportunity that occurred for realising the favourite speculation he had so long entertained — that of cultivating a large tract of waste land. He accordingly completed the purchase of 4,400 acres of waste in Yorkshire. But his fates had decreed other things for him. The Board of Agriculture was established in the August of 1793, and he was immediately appointed its secretary. An individual is rarely appointed to an official situation on account of his possessing in an eminent degree those qualifications which its duties require; but in the instance of Mr. Young this was undoubtedly the fact; his general and profound knowledge in agriculture was the only circumstance that marked him as the most proper person to fill a situation in every respect so important and honourable. "The gratification," says he, "of being elected into so respectable a situation, in which opportunities of still giving an humble aid to the good cause of the plough could scarcely fail of offering, would not permit me to decline the appointment; although, to a person established in the country, the salary, with the residence annexed, was not that pecuniary object which has been represented; and I must have improved on bad principles indeed, if it would not, in a few years, have turned out a more profitable speculation. (The salary was 400*l.* per annum, with a house free from all charge.) What a change in the destination of a man's life! Instead of entering, as I proposed, the solitary lord of 4,000 acres, in the keen atmosphere of lofty rocks and mountain torrents, with a little creation rising gradually around me, making the desert smile with cultivation, and grouse give way to industrious population, active and energetic, though remote and tranquil; and every instant of my existence *making two blades of grass to grow where not one was found before* — behold me at a desk, in the smoke, the fog, the din of Whitehall. 'Society has charms;' true, and so has solitude to a mind employed. The die, however, is cast, and my steps may still be, metaphorically, said to be in the furrow."

At the Board, Arthur Young continued, to his death, zealously employed on all occasions as its secretary, in the service of Agriculture; — old age at last crept on; he became blind, and afflicted with the complaint which caused his death. He was attended (concludes Dr. Paris) by Mr. Wilson, Mr. Chilver, and myself; and although the incurable nature of his disease defied every hope of permanent relief, yet his sufferings were greatly palliated by the resources of art, and he died without entertaining the least suspicion of the malady under which he suffered. Pious resignation cheered him in his illness, and not a murmur of complaint was heard to escape his lips. On the 12th of April, in the year 1820, at his house in Sackville-Street, after taking a glass of lemonade, and expressing himself calm and easy, he expired. His remains were conveyed to Bradfield, and deposited in a vault in the church-yard.

I have thus offered a brief sketch of the principal labours of Arthur Young, a man who filled a large space in the public eye, for a long series of years, but whose name and talents appear to have commanded still greater notice and respect in foreign countries than in his own. That he reflected lustre on the age and the country in which he lived can be hardly denied. Of what other philosopher can it be said, that at one time he entertained, under his humble roof, pupils of seven different nations, each of whom had been sent to him for instructions in agriculture, by his respective government? I was lately informed by his daughter that the late Duke of Bedford breakfasted at Bradfield on one of the mornings of a Newmarket race-meeting, and was met by pupils from Russia, France, America, Naples, Poland, Sicily, and Portugal. His numerous works are distinguished by vivacity of thought, quickness of imagination, bias to calculation, and fondness for political speculation; and had they been less successful, posterity might perhaps have regarded these traits of genius as fatal defects, and as pregnant sources of fallacy and disappointment.

Arthur Young's published works are —

1. The Farmer's Letters. 1767. 8vo. 1 vol. A second vol. 1771. 8vo. 2. A Six Weeks' Tour through the Southern Counties of England and Wales. 1768-9. 8vo. 3. A Treatise on Hogs. 1769. 8vo. 4. A Six Months' Tour through the North of England. 1770. 4 vols. 8vo. 5. The Farmer's Guide. 1770. 2 vols. 8vo. 6. Rural Economy. 1770. 8vo. 7. A Course of Experimental Agriculture. 1770. 2 vols. 4to. 8. The Farmer's Tour. 1770. 4 vols. 8vo. 9. Proposals for numbering the People. 1771. 8vo. 10. Observations on Waste Lands. 1772. 8vo. 11. Political Arithmetic. 1774. 8vo. 12. Tour in Ireland. 1780. 2 vols. 8vo. 13. An Essay on Coleseed. 8vo. 14. Annals of Agriculture. 8vo. 1784 to 1804. 44 vols. 15. On the Wool Question. 1787. 8vo. 16. The Example of a Farmer. 1793. 8vo. 17. Travels in France. 1792, 1794. 4to. 18. The Agriculture of Suffolk. 1797. 8vo. 19. The Agriculture of Lincolnshire. 1799. 8vo. 20. On the Application of Waste Land. [illegible] 8vo. 21. The Farmer's Kalendar. 1803-4. 8vo. 4 vols. 22. Essay on Manners. 1804. 8vo. 23. View of the Agriculture of Essex. 1806-7. 2 vols. 8vo. 24. Report on Inclosures. 1807-9. 8vo. 25. View of Agriculture of Oxfordshire. 1808. 8vo. 26. View of the Agriculture of Sussex. 1808. 8vo. 27. On the Board of Agriculture. 1809. 8vo. 28. On the Husbandry of Bakewell, Arbuthnot, and Duckett. 1811. 8vo. 29. On Money. 1812. 8vo. 30. Essay on Manures. *Nicholson's Journal*, vol. xxiii. p. 120. (*Watt's Bibliotheca.*)

THE END.

London: Printed by A. Spottiswoode, New-Street-Square.